



## SURVEILLANCE REPORT

Annual Epidemiological Report for 2016

# Surgical site infections

### 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 2016, 14 EU Member States and Norway reported SSIs for seven types of surgical procedures to ECDC.
- During this period, 10 304 SSIs were reported from a total of 630 551 surgical procedures.
- The percentage of SSIs varied from 0.5% to 9.0%, 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 5.5, depending on the type of surgical procedure.
- From 2013 to 2016, a significantly increasing trend was only observed for the yearly percentage of SSIs in laminectomy (LAM) operations. However, there was no significant trend in the incidence density of in-hospital SSIs.
- For caesarean sections (CSEC) and knee prosthesis (KPRO) operations, a significantly decreasing trend for both the yearly percentage of SSIs and the incidence density of in-hospital SSIs was observed during 2013–2016.

### Methods

This report is based on data for 2016 retrieved from The European Surveillance System (TESSy) on 20 March 2018. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases. EU Member States and EEA countries contribute to the system by uploading their infectious disease surveillance data at regular intervals.

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

An overview of the national surveillance systems is available online [2].

Additional data on this topic are accessible from ECDC's online *Surveillance atlas of infectious diseases* [3].

SSI surveillance data for 2016 were reported to ECDC by 15 countries (14 EU Member States and Norway).

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Data on SSIs following surgical procedures that took place in 2016 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 [4,5]. SSI cases were classified according to the modified 2012 EU case definitions [6,7].

The SSI surveillance protocol includes seven types of surgical procedures: coronary artery bypass graft (CABG), cholecystectomy (CHOL), colon surgery (COLO), caesarean section (CSEC), hip prosthesis (HPRO), knee prosthesis (KPRO) and laminectomy (LAM). SSIs detected within a defined follow-up period, or where the date of onset was reported to precede the date of operation, 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), the follow-up period was extended to 90 days [5].

For all patients with an SSI, basic demographics, infection characteristics and outcome at hospital discharge were collected. Under 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 US 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 preoperative physical status as outlined by the American Society of Anesthesiologists' physical status classification system), was used to assign all surgical patients to one of four categories from low to high risk (0, 1, 2 and 3) [8,9]. In this analysis, categories 2 and 3 were combined because of the low number of operations in these categories.

ECDC checked the reported SSI surveillance data for missing, unknown or discordant values and reported the results back to each country, which then had the option to correct the data.

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

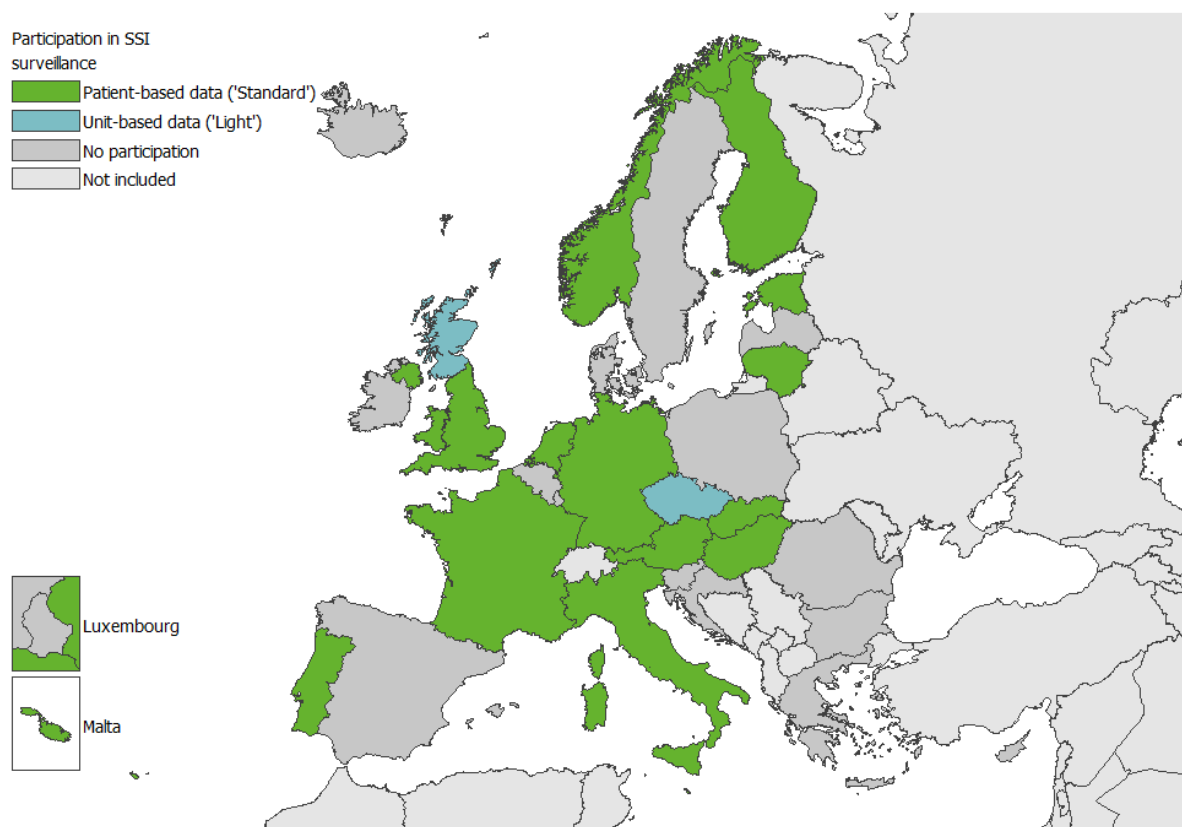
- The percentage of SSIs per 100 operations: an indicator that includes SSIs diagnosed during hospital stay and after discharge from the hospital (detected at hospital readmission or by post-discharge surveillance).
- The incidence density of in-hospital SSIs per 1 000 post-operative patient-days: an indicator that only includes SSIs diagnosed during hospital stay in patients with a known hospital discharge date.

For the patient-based data, both indicators were also stratified by NHSN risk index categories.

For each type of surgical procedure, trends in both the percentage and incidence density of SSIs between 2013 and 2016 were analysed by Poisson regression; a sandwich variance estimator was used to acquire robust standard errors of the regression coefficients. Only countries that provided data using the same surveillance option (patient-based or unit-based) for at least three years were included in the trend analysis.

## Epidemiology

Of the 15 EU/EEA countries that participated in surveillance of SSIs in 2016, 14 countries reported patient-based data (for the UK, UK–England, UK–Northern Ireland and UK–Wales) whereas Czech Republic (and UK–Scotland) reported 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). Nine of the 15 EU/EEA countries reported performing post-discharge surveillance, using different methods varying from SSIs reported by the patients to SSI reported by the surgeon or general practitioner [2].

**Figure 1. Participation in the surveillance of surgical site infections (SSIs), EU/EEA, 2016**

Source: ECDC, HAI-Net, 2016

Overall, 630 551 surgical procedures from 1 574 hospitals were reported in 2016. Of these procedures, 598 066 were reported using patient-based surveillance, and 32 485 used the unit-based surveillance (Table 1). The most common surgical procedure types under surveillance were HPRO operations, followed by KPRO operations and CSEC operations.

**Table 1. Number of reporting hospitals and reported surgical procedures by country/network and type of surgical procedure, EU/EEA, 2016**

Country/network	Number of reporting hospitals	Number of procedures							Total
		CABG	CHOL	COLO	CSEC	HPRO	KPRO	LAM	
<b>Patient-based data</b>									
Austria	34	429	889	336	3 165	4 874	3 663		13 356
Estonia	2	132			436				568
Finland	12					7 825	6 782		14 607
France	327	1 182	8 554	3 821	12 926	17 344	12 164	1 269	57 260
Germany	510	13 445	18 643	11 231	21 944	70 941	40 984	6 918	184 106
Hungary	39	146	2 655	1 048	3 289	951	541	464	9 094
Italy	69	1 110	6 137	4 369	7 317	7 513	2 496	2 048	30 990
Lithuania	21	350	1 080	311	1 340	1 544	699		5 324
Malta	1	64		61		174	347		646
Netherlands	80	2 726	6 185	4 439	6 745	25 295	20 044	1 082	66 516
Norway	60	1 341	5 720	3 230	9 102	12 253			31 646
Portugal	48	37	4 349	3 635	3 173	2 863	2 693	854	17 604
Slovakia	5		515						515
UK–England	314	6 635	463	4 355		63 070	65 039	8 885	148 447
UK–Northern Ireland	10				6 175	2 229	1 461	423	10 288
UK–Wales	12				7 099				7 099
<b>Subtotal</b>	<b>1 544</b>	<b>27 597</b>	<b>55 190</b>	<b>36 836</b>	<b>82 711</b>	<b>216 876</b>	<b>156 913</b>	<b>21 943</b>	<b>598 066</b>
<b>Unit-based data</b>									
Czech Republic	1			181					181
UK–Scotland	29				17 175	8 870	6 259		32 304

Country/network	Number of reporting hospitals	Number of procedures						Total	
		CABG	CHOL	COLO	CSEC	HPRO	KPRO		LAM
Subtotal	30			181	17 175	8 870	6 259		32 485
EU/EEA	1 574	27 597	55 190	37 017	99 886	225 746	163 172	21 943	630 551

Source: Country reports from Austria, the Czech Republic, Estonia, Finland, France, Germany, Hungary, Italy, Lithuania, Malta, the Netherlands, Norway, Portugal, Slovakia and the United Kingdom (England, Northern Ireland, Scotland and Wales).

CABG: coronary artery bypass graft, CHOL: cholecystectomy, COLO: colon surgery, CSEC: caesarean section, HPRO: hip prosthesis surgery, KPRO: knee prosthesis surgery, LAM: laminectomy

Patient characteristics per surgical procedure type were only available for the patient-based data. The ratio of male-to-female patients was the highest in CABG operations (4.2:1) and the lowest in CHOL and HPRO operations (0.6:1), not calculated for CSEC operations (Table 2). The median age of patients varied from 32 years in CSEC operations to 72 years in HPRO operations. The post-operative in-hospital case fatality (4.1%) and the proportion of contaminated or dirty operations (30.8%) were the highest among COLO operations. The median duration of operation was the longest in CABG operations (206 minutes), and the median length of post-operative stay was the longest in CABG and COLO operations (nine days). The proportion of urgent operations varied from 0.5% in KPRO operations to 50.1% in CSEC operations. In all types of surgical procedures, and with the exception of CHOL operations, over 80% of the patients received antibiotic prophylaxis. Among all CHOL operations, 89% were reported as endoscopic operations, compared with 33% of COLO operations.

**Table 2. Characteristics of patients by type of surgical procedure, patient-based data, EU/EEA, 2016**

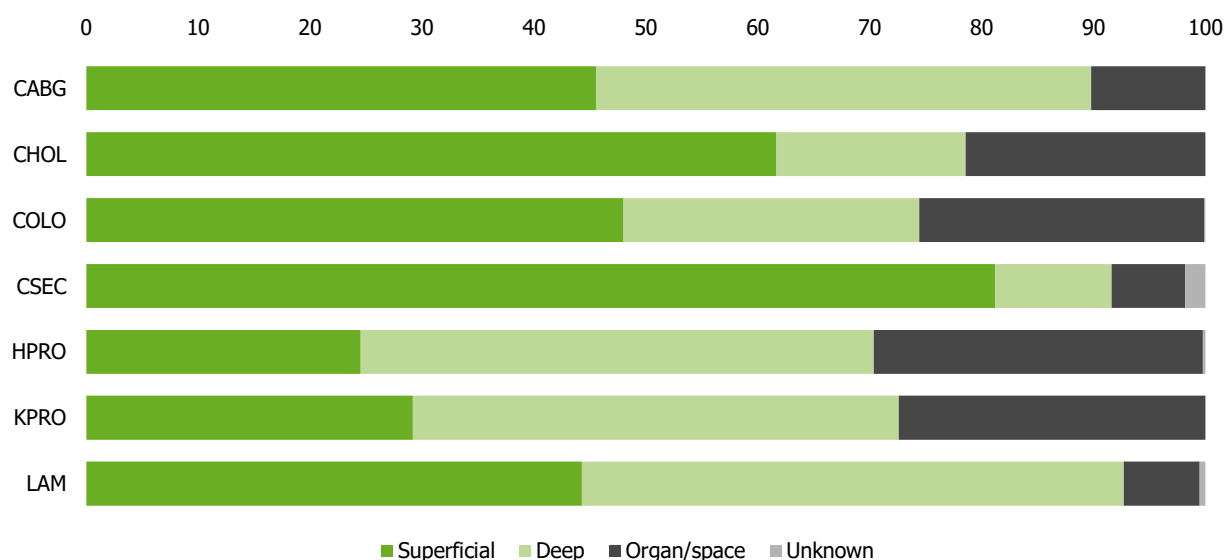
Characteristics	CABG (n=27 597)	CHOL (n=55 190)	COLO (n=36 836)	CSEC (n=82 711)	HPRO (n=216 876)	KPRO (n=156 913)	LAM (n=21 943)
Sex ratio (male:female)	4.2	0.6	1.1	0	0.6	0.7	0.7
Median age (years)	69	56	69	32	72	70	70
Post-operative in-hospital case fatality (%)	1.9	0.4	4.1	0	1.4	0.1	0.1
Contaminated or dirty operations (%)	11	16.3	30.4	5.8	1.6	0.9	0.9
Median duration of operation (minutes)	206	60	140	38	70	75	75
Median length of post-operative stay (days)	9	3	9	5	6	5	5
Urgent operations (%)	6.6	18	19.2	50.1	9.1	0.5	0.5
Antibiotic prophylaxis (%)	99.1	44.1	89.2	86.6	98.5	98.8	98.8

Source: Country reports from Austria, Estonia, Finland, France, Germany, Hungary, Italy, Lithuania, Malta, the Netherlands, Norway, Portugal, Slovakia and the United Kingdom (England, Northern Ireland and Wales).

See Table 1 for reporting hospitals and reported surgical procedures in EU/EEA countries.

CABG: coronary artery bypass graft, CHOL: cholecystectomy, COLO: colon surgery, CSEC: caesarean section, HPRO: hip prosthesis surgery, KPRO: knee prosthesis surgery, LAM: laminectomy

In 2016, 10 304 SSIs were reported using patient- and unit-based surveillance. Of these, 4 972 (48%) were superficial, 3 107 (30%) deep and 2 182 (21%) organ/space SSIs. In 43 (0.4%) SSIs, the type of SSI was unknown. The proportion of deep or organ/space SSIs was 17% in CSEC operations, 38% in CHOL operations, 52% in COLO operations, 54% in CABG operations, 55% in LAM operations, 71% in KPRO operations and 75% in HPRO operations (Figure 2). Thirty-four per cent of the SSIs were diagnosed in hospitals, whereas 51% were detected after discharge; for 14% the discharge date was unknown. The proportion of SSIs diagnosed in-hospital varied from 15% in CSEC operations to 63% in COLO operations.

**Figure 2. Types of SSI by type of surgical procedure, EU/EEA, 2016**

*CABG: coronary artery bypass graft, CHOL: cholecystectomy, COLO: colon surgery, CSEC: caesarean section, HPRO: hip prosthesis surgery, KPRO: knee prosthesis surgery, LAM: laminectomy*

*Source: Country reports from Austria, the Czech Republic, Estonia, Finland, France, Germany, Hungary, Italy, Lithuania, Malta, the Netherlands, Norway, Portugal, Slovakia and the United Kingdom (England, Northern Ireland, Scotland and Wales). 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 0.5% in KPRO operations to 9.0% in COLO operations. Similar variations between types of surgical procedure were observed for the incidence density of in-hospital SSIs (Table 3). In CHOL and COLO operations, the percentage of SSIs and the incidence density was lower in endoscopic procedures than in open procedures.

**Table 3. Percentage of SSIs and incidence density of in-hospital SSIs by year and type of surgical procedure, EU/EEA, 2016**

Surgical procedure type	Percentage of SSIs per 100 operations [inter-country range]	Incidence density of in-hospital SSIs per 1 000 post-operative patient-days [inter-country range]
CABG	2.8 [1.6–7.4]	1.0 [0.8–4.0]
CHOL	1.7 [0.8–3.4]	1.3 [0.6–2.5]
Endoscopic CHOL*	1.5 [0.6–3.2]	1.0 [0.2–1.9]
Open CHOL*	3.4 [0.0–10.1]	3.0 [0.0–8.0]
COLO	9.0 [5.3–18.0]	5.5 [1.9–11.0]
Endoscopic COLO*	6.3 [3.8–15.2]	4.3 [2.2–14.7]
Open COLO*	10.4 [5.8–18.4]	6.0 [1.9–11.3]
CSEC	1.9 [0.5–5.2]	0.6 [0.1–3.0]
HPRO	1.0 [0.1–4.0]	0.3 [0.1–2.0]
KPRO	0.5 [0.1–1.4]	0.1 [0.0–0.7]
LAM	0.9 [0.2–2.4]	0.4 [0.0–2.0]

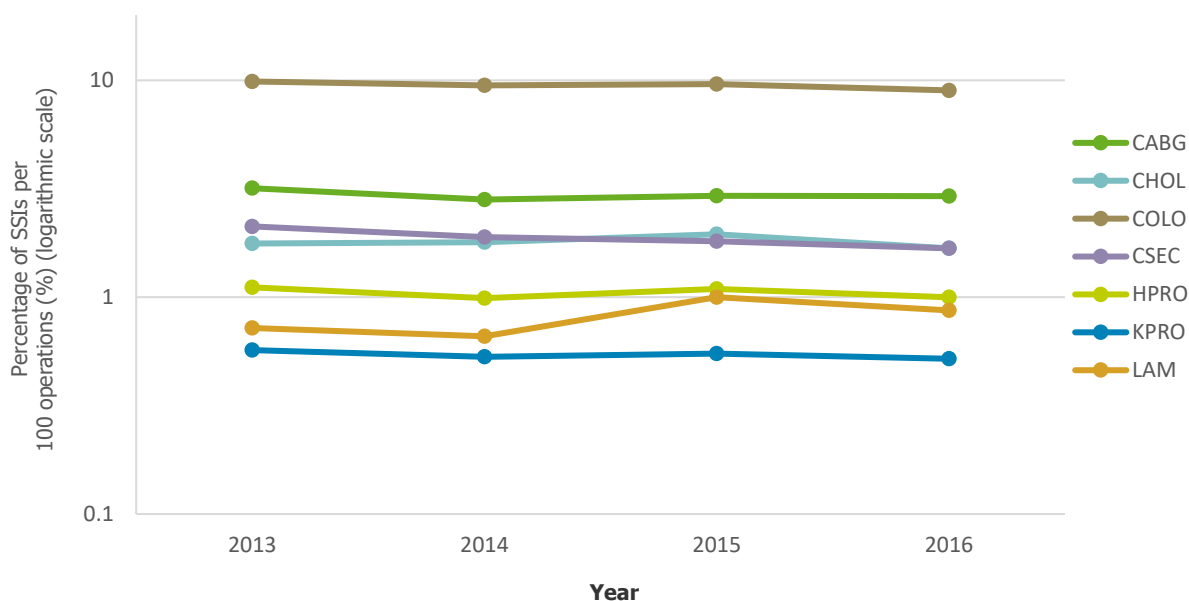
*\* Endoscopic/open procedures only include patient-based data for which the variable 'endoscopic procedure (yes/no)' was documented (CHOL: N=55 012; COLO: N=36 736).*

*Source: Country reports from Austria, the Czech Republic, Estonia, Finland, France, Germany, Hungary, Italy, Lithuania, Malta, the Netherlands, Norway, Portugal, Slovakia and the United Kingdom (England, Northern Ireland, Scotland and Wales). See Table 1 for reporting hospitals and reported surgical procedures in EU/EEA countries.*

*CABG: coronary artery bypass graft, CHOL: cholecystectomy, COLO: colon surgery, CSEC: caesarean section, HPRO: hip prosthesis surgery, KPRO: knee prosthesis surgery, LAM: laminectomy*

Trend analyses of the yearly percentage of SSIs in 2013–2016 showed an increasing trend for LAM operations ( $p=0.010$ ), and a decreasing trend for COLO ( $p<0.001$ ), CSEC ( $p<0.001$ ) and KPRO operations ( $p<0.001$ ) (Figure 3). For CABG, CHOL and HPRO operations, no significant trends were observed in 2013–2016.

**Figure 3. Trends of percentage of SSIs by year and type of surgical procedure, EU/EEA, 2013–2016**

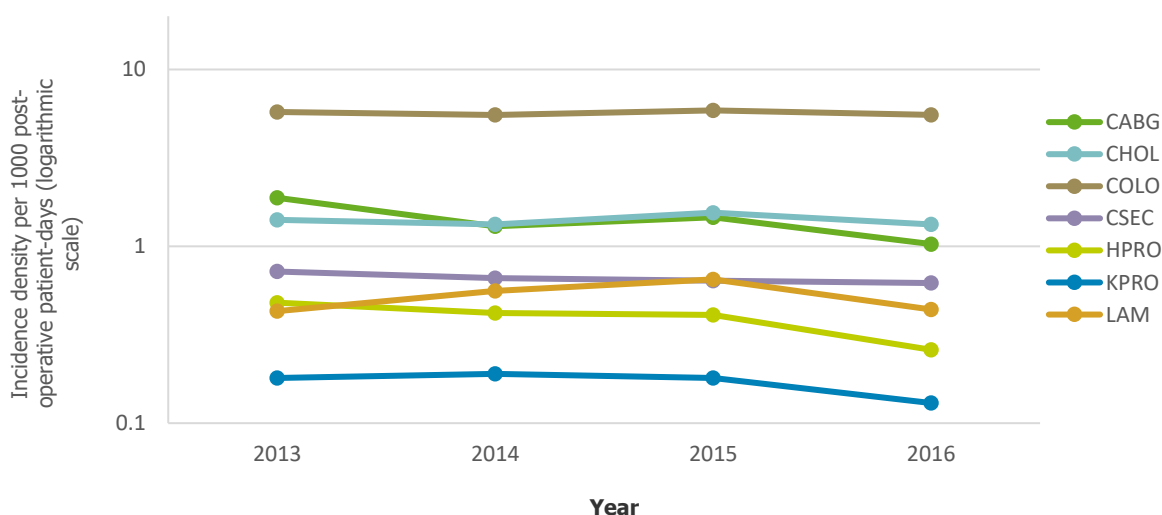


*CABG: coronary artery bypass graft, CHOL: cholecystectomy, COLO: colon surgery, CSEC: caesarean section, HPRO: hip prosthesis surgery, KPRO: knee prosthesis surgery, LAM: laminectomy*

*Source: Country reports from Austria, the Czech Republic, Estonia, Finland, France, Germany, Hungary, Italy, Lithuania, Malta, the Netherlands, Norway, Portugal, Slovakia and the United Kingdom (England, Northern Ireland, Scotland and Wales). See Table 1 for reporting hospitals and reported surgical procedures in EU/EEA countries.*

Trend analyses of yearly incidence density of in-hospital SSIs in 2013–2016 showed a decreasing trend for CABG ( $p<0.001$ ), CSEC ( $p<0.001$ ), HPRO ( $p<0.001$ ) and KPRO operations ( $p<0.001$ ) (Figure 4). No significant trends were observed for CHOL, COLO and LAM operations in 2013–2016.

**Figure 4. Trends of incidence density of in-hospital SSIs by year and type of surgical procedure, EU/EEA, 2013–2016**



*CABG: coronary artery bypass graft, CHOL: cholecystectomy, COLO: colon surgery, CSEC: caesarean section, HPRO: hip prosthesis surgery, KPRO: knee prosthesis surgery, LAM: laminectomy*

*Note: Only SSIs diagnosed in-hospital were included.*

Source: Country reports from Austria, the Czech Republic, Estonia, Finland, France, Germany, Hungary, Italy, Lithuania, Malta, the Netherlands, Norway, Portugal, Slovakia and the United Kingdom (England, Northern Ireland, Scotland and Wales). See Table 1 for the details of countries participating in the surveillance in each operation type.

Data on microorganisms were reported for 7 431 microorganisms in 5 171 SSIs from 13 countries with patient- or unit-based surveillance. Overall, *Staphylococcus aureus* (17.9%) and *Escherichia coli* (14.7%) were the most commonly reported microorganisms (Table 4). The distribution of microorganisms varied by type of surgical procedure. For CHOL and COLO operations, the majority of the reported microorganisms were Enterobacteriaceae. For all other types of surgical procedure, gram-positive cocci were the most commonly reported microorganisms.

**Table 4. Percentages of microorganisms identified in SSIs by type of surgical procedure; pooled data from 13 EU/EEA countries, 2016 (n=7 431)**

Microorganisms	CABG (n=695)	CHOL (n=461)	COLO (n=2 805)	CSEC (n=538)	HPRO (n=2 029)	KPRO (n=741)	LAM (n=162)	Total (n=7 431)
<b>Gram-positive cocci</b>	61.4	35.8	30.6	46.6	66.3	72.1	74.7	49.8
<i>Staphylococcus aureus</i>	18.7	7.8	3.8	23.1	29.9	35.1	42	17.9
Coagulase-negative staphylococci	34.5	2.4	1.7	5.8	19.4	21.5	21	12.3
<i>Enterococcus</i> species	7.1	20.4	22.4	10.8	10.8	6.1	4.9	14.8
<i>Streptococcus</i> species	0.6	4.6	2.3	6.3	4.1	6.5	3.1	3.5
Other gram-positive cocci	0.6	0.7	0.4	0.6	2.2	3	3.7	1.3
<b>Gram-positive bacilli</b>	1.9	0.9	0.5	0.7	2.8	2.8	1.9	1.5
<b>Gram-negative bacilli, Enterobacteriaceae</b>	24.6	44.7	47.8	29.1	18.1	11.1	16	31.6
<i>Escherichia coli</i>	5.0	21.0	25.8	13.0	6.7	2.4	6.8	14.7
<i>Citrobacter</i> species	1.7	4.1	1.8	0.7	0.7	0.4	0.0	1.4
<i>Enterobacter</i> species	4.7	5.4	4.5	3.7	2.9	2.3	3.7	3.8
<i>Klebsiella</i> species	5.8	9.3	6.9	4.1	1.9	1.2	2.5	4.7
<i>Proteus</i> species	2.7	1.5	2.9	5.8	3.7	3.0	1.9	3.2
<i>Serratia</i> species	2.9	0.7	0.4	0.6	0.9	1.2	0.0	0.8
Other Enterobacteriaceae	1.7	2.6	5.5	1.1	1.3	0.5	1.2	2.9
<b>Gram-negative non-fermentative bacilli</b>	5.5	2.8	9.3	2.2	3.8	5.4	5.6	6.1
<i>Acinetobacter</i> species	0.4	0.4	0.4	0.2	0.7	0.8	1.2	0.5
<i>Haemophilus</i> species	0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.1
<i>Pseudomonas aeruginosa</i>	4.3	2.2	8.1	1.7	2.9	3.2	3.7	4.9
Pseudomonadaceae family, other	0.4	0.0	0.5	0.2	0.1	0.8	0.6	0.4
<i>Stenotrophomonas maltophilia</i>	0.1	0.0	0.1	0.0	0.0	0.3	0.0	0.1
Other gram-negative non-fermentative bacilli	0.0	0.2	0.2	0.0	0.0	0.3	0.0	0.1
<b>Anaerobes</b>	0.7	4.8	5	16.4	2.1	1.8	0.6	4.2
<i>Bacteroides</i> species	0.0	2.2	3.7	1.3	0.4	0.3	0.6	1.8
Other anaerobes	0.7	2.6	1.2	15.1	1.7	1.5	0.0	2.4
<b>Other bacteria</b>	5.6	9.5	3.8	3.7	6.4	6.1	1.2	5.2
<b>Fungi, parasites</b>	0.3	1.5	3.0	0.9	0.3	0.5	0.0	1.5
<i>Candida</i> species	0.3	1.5	3.0	0.9	0.3	0.4	0.0	1.4
Other fungi or parasites	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0

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 the Austria, Czech Republic, Estonia, France, Germany, Hungary, Italy, Lithuania, Malta, the Netherlands, Portugal, Slovakia and the United Kingdom (England, Northern Ireland and Scotland).

## Discussion

The results presented in this report constitute a useful source for information on the incidence of SSIs in the EU/EEA. Even though the number of reporting EU/EEA countries declined by one country in comparison with 2015, the number of reported surgical procedures increased for all operation types, with the exception of COLO operations.

The observed inter-country variation and the fact that not all EU/EEA countries participate, limits the extent to which the results can be considered representative of the overall EU/EEA situation. In addition, national



representativeness, surgical practices and surveillance methods vary considerably from country to country, which makes it very difficult to compare data across countries. Two important factors influencing the percentage of SSIs are the length of the in-hospital follow-up period after surgery and the differences in post-discharge surveillance methods. This is particularly relevant for superficial SSIs that are mostly diagnosed in-hospital and easier missed post discharge (depending on the selected post-discharge surveillance method) and for those surgical procedures where a large proportion of SSIs can only be detected after hospital discharge. Inter-country comparisons should therefore focus on the incidence density of in-hospital SSIs: even though comparisons of incidence density are still limited by differences in post-operative discharge policy, they are not affected by the varying post-discharge surveillance methods.

As in the previous years, the percentage and incidence density of SSIs were the highest in COLO operations and the lowest in KPRO operations. However, the risk of SSI differs between the various types of surgical procedures because of the different population groups that undergo these operations and because of the different proportions of clean and contaminated operations for each operation type. Therefore, comparisons of SSI rates across countries and between years should only be attempted within a specific type of surgical procedure.

In 2013–2016, a statistically significant increasing trend could only be observed in the percentage of SSIs in LAM operations. However, even for LAM operations there was no significant trend in the incidence density of SSIs. It is important to note that after a continuous increase of the percentage of SSIs in LAM operations in 2012–2015, this percentage decreased in 2016 [10].

The 2013–2016 surveillance data show statistically significant decreasing trends for SSIs in several operation types, both with regard to percentage of SSIs and incidence density. A comparison of the 2013–2016 trends with those reported from EU/EEA countries for 2008–2011, shows that in most types of surgical procedures (and with the exception of LAM operations), a continuous downward trend was observed in the percentage or incidence density of SSIs, or both [11]. In most cases, however, the trends are driven by a small subset of countries with a decreasing or increasing trend.

When comparing the incidences of deep incisional or organ/space SSIs in the EU/EEA with the last available data reported from the United States, the incidences were still higher in the EU/EEA for almost all types of surgical procedure. However, the intensity of post-discharge surveillance, especially in certain EU/EEA countries, as well as the differences in SSI case definitions between the surveillance systems can, at least in part, explain these differences [12].

## Public health implications

Surveillance is a key component in the prevention of healthcare-associated infections and an important tool for monitoring the effectiveness of prevention and control measures [13]. Regular surveillance of SSIs in the participating EU/EEA countries may therefore have been a contributing factor to some of the observed decreasing trends in almost all types of surgical procedure. The increasing trend in the percentage of SSIs after LAM operations needs to be further monitored.

To strengthen the surveillance of SSIs in Europe, ECDC published an updated surveillance protocol that provides participating hospitals with an improved tool to compare their performance with that of similar hospitals. The updated protocol also covers the collection of data on structure and process indicators of SSI prevention, thus adding to the usefulness of the SSI surveillance [5,14]. ECDC will continue to provide support to countries that want to establish or improve their national surveillance networks. In addition to the SSI protocol update, ECDC has published a free software package (HelicsWin.Net) for SSI surveillance, which was made available to network coordination centres and hospitals in 2017 [15].

Finally, further efforts are needed, at European and national level, to increase the representativeness of SSI surveillance data by extending surveillance to more EU/EEA countries. Additional efforts should be made to encourage more hospitals to participate, especially in those countries where only a small number of hospitals participate. In 2018–2019, ECDC will intensify its disease surveillance efforts to support the collection of SSI surveillance data in all EU/EEA countries. ECDC will also promote the use of the structure and process indicators for the prevention of SSIs.



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## Tables

**Table A1. Percentage of unknown or missing values by TESSy variable and year, patient-based data, 2016**

Variable	Name of TESSy variable	Unknown or missing values (%)*
Gender	Gender	<0.1
In-hospital outcome	OutcomeHospital	49.8
Date of operation	DateOfOperation	0
Date of hospital admission	DateOfHospitalAdmission	32.5
Date of hospital discharge	DateOfHospitalDischarge	9.7
Data of last follow-up	DateOfLastFollowup	51.1
Operation code	OPCode	0
ICD-9-CM code	ICD9CMCode	43.4
Endoscopic operation	EndoscopicProc	5.5
Wound class	WoundClass	1.7
Duration of operation	OperationDur	1.7
ASA score	ASAClassification	3.6
Urgent operation	UrgentOperation	37.5
Prophylaxis	Prophylaxis	49.5
Type of infection	SSIType	0.4

Source: Country reports from Austria, Estonia, Finland, France, Germany, Hungary, Italy, Lithuania, Malta, the Netherlands, Norway, Portugal, Slovakia and the United Kingdom (England and Northern Ireland)

\*  $n=598\ 066$  surgical procedures and  $n=10\ 304$  SSIs

**Table A2.1. Percentage of SSIs and incidence density of in-hospital SSIs after coronary artery bypass graft operations, by country, EU/EEA, 2016**

Country	No. of operations	No. of SSIs (1)	Percentage of SSIs per 100 operations [95% CI] (2)	No. of operations with a known discharge date	No. of post-operative patient-days (3)	No. of in-hospital SSIs (% of all SSIs) (4)	Incidence density of SSIs per 1000 post-operative patient-days [95% CI] (5)
<b>Patient-based data</b>							
Austria	429	10	2.3 [1.1–4.3]	429	7 424	9 (90)	1.2 [0.6–2.3]
Estonia	132	4	3.0 [0.8–7.8]	132	1 727	4 (100)	2.3 [0.6–5.9]
France	1 182	45	3.8 [2.8–5.1]	1 182	15 495	24 (53)	1.5 [1.0–2.3]
Germany	13 445	387	2.9 [2.6–3.2]	9 720	123 611	103 (27)	0.8 [0.7–1.0]
Hungary	146	5	3.4 [1.1–8.0]	146	1 990	4 (80)	2.0 [0.5–5.1]
Italy	1 110	61	5.5 [4.2–7.1]	1 082	12 808	19 (31)	1.5 [0.9–2.3]
Lithuania	350	26	7.4 [4.9–10.9]	350	5 961	24 (92)	4.0 [2.6–6.0]
Malta	64	1	1.6 [0.0–8.7]	64	432	1 (100)	2.3 [0.1–12.9]
Netherlands	2 726	59	2.2 [1.6–2.8]	2 726	19 648	18 (31)	0.9 [0.5–1.4]
Norway*	1 341	52	3.9 [2.9–5.1]	1 340	9 586	8 (15)	0.8 [0.4–1.6]
Portugal	37	2	5.4 [0.7–19.5]	37	387	1 (50)	2.6 [0.1–14.4]
UK–England	6 635	132	2.0 [1.7–2.4]	6 635	76 076	67 (51)	0.9 [0.7–1.1]
<b>EU/EEA</b>	<b>27 597</b>	<b>784</b>	<b>2.8 [2.6–3.0]</b>	<b>23 843</b>	<b>275 145</b>	<b>282 (36)</b>	<b>1.0 [0.9–1.2]</b>

Source: Country reports from Austria, Estonia, France, Germany, Hungary, Italy, Lithuania, Malta, Norway, Portugal and the United Kingdom (England)

(1) Only SSIs diagnosed within 30 days after the operation are included; (2) percentage of SSIs = (number of SSIs × 100)/number of operations; (3) post-operative patient-days = date of discharge – date of operation + 1; (4) SSIs reported after discharge from hospital or with an unknown discharge date are excluded; (5) incidence density of SSIs = (number of in-hospital SSIs × 1000)/number of post-operative patient-days.

Incidence density of SSIs = (number of in-hospital SSIs × 1000)/number of post-operative patient-days.

\* Data from Norway include patient-reported SSIs.

**Table A2.2. Mean and percentile distributions of percentage of SSIs and incidence density of in-hospital SSIs after coronary artery bypass graft operations in hospitals stratified by NHSN risk index, EU/EEA, 2016**

NHSN risk index	No. of operations (1)	No. of SSIs	Mean and percentile distribution of percentages in hospitals (2)						No. of post-operative patient-days (3)	No. of in-hospital SSIs	Mean and percentile distribution of incidence densities in hospitals (4)					
			Mean	P10	P25	P50	P75	P90			Mean	P10	P25	P50	P75	P90
0	1 110	18	1.4	0	0	0	0	2.7	11 787	7	0.1	0	0	0	0	0
1	20 127	578	3.2	0	1.5	2.4	4.5	7.2	189 370	196	1.1	0	0	0.8	1.4	2.3
2 and 3	2 120	86	4.5	0	0	0	5.9	12.6	26 415	38	2	0	0	0	1.7	5.4
Unknown	4 240	102	2.8	0	0	0	2.4	4.7	47 573	41	0.8	0	0	0	1	1.6
<b>Overall</b>	<b>27 597</b>	<b>784</b>	<b>3.1</b>	<b>0.8</b>	<b>1.6</b>	<b>2.5</b>	<b>4.2</b>	<b>6.2</b>	<b>275 145</b>	<b>282</b>	<b>1.1</b>	<b>0</b>	<b>0.3</b>	<b>0.8</b>	<b>1.5</b>	<b>2.4</b>

Source: Country reports from Austria, Estonia, France, Germany, Hungary, Italy, Lithuania, Malta, Norway, Portugal and the United Kingdom (England)

(1) Operations from hospitals with less than 20 operations are excluded; (2) percentage of SSIs = (number of SSIs × 100)/number of operations, mean and percentiles in hospitals; (3) patient-days from hospitals with less than 20 operations with a known date of discharge are excluded; (4) incidence density of SSIs = (number of in-hospital SSIs × 1000)/number of post-operative patient-days, mean and percentiles in hospitals.

**Table A3.1. Percentage of SSIs and incidence density of in-hospital SSIs after cholecystectomy operations, by country, EU/EEA, 2016**

Country	No. of operations	No. of SSIs (1)	Percentage of SSIs per 100 operations [95% CI] (2)	No. of operations with a known discharge date	No. of post-operative patient-days (3)	No. of in-hospital SSIs (% of all SSIs) (4)	Incidence density of SSIs per 1000 post-operative patient-days [95% CI] (5)
<b>Patient-based data</b>							
Austria	889	10	1.1 [0.5–2.1]	889	4 162	4 (40)	1.0 [0.3–2.5]
France	8 554	65	0.8 [0.6–1.0]	8 554	28 563	16 (25)	0.6 [0.3–0.9]
Germany	18 643	221	1.2 [1.0–1.4]	14 539	78 461	85 (38)	1.1 [0.9–1.3]
Hungary	2 655	45	1.7 [1.2–2.3]	2 655	11 018	27 (60)	2.5 [1.6–3.6]
Italy	6 137	64	1.0 [0.8–1.3]	4 542	19 332	12 (19)	0.6 [0.3–1.1]
Lithuania	1 080	11	1.0 [0.5–1.8]	1 080	4 125	9 (82)	2.2 [1.0–4.1]
Netherlands	6 185	197	3.2 [2.8–3.7]	6 185	14 542	27 (14)	1.9 [1.2–2.7]
Norway*	5 720	197	3.4 [3.0–4.0]	5 718	14 137	31 (16)	2.2 [1.5–3.1]
Portugal	4 349	99	2.3 [1.9–2.8]	4 349	16 988	41 (41)	2.4 [1.7–3.3]
Slovakia	515	10	1.9 [0.9–3.6]	515	1 929	4 (40)	2.1 [0.6–5.3]
UK–England	463	10	2.2 [1.0–4.0]	463	939	2 (20)	2.1 [0.3–7.7]
<b>EU/EEA</b>	<b>55 190</b>	<b>929</b>	<b>1.7 [1.6–1.8]</b>	<b>49 489</b>	<b>194 196</b>	<b>258 (28)</b>	<b>1.3 [1.2–1.5]</b>

Source: Country reports from Austria, France, Germany, Hungary, Italy, Lithuania, the Netherlands, Norway, Portugal, Slovakia and the United Kingdom (England)

**Table A3.2. Mean and percentile distributions of percentage of SSIs and incidence density of in-hospital SSIs after cholecystectomy operations in hospitals stratified by NHSN risk index, EU/EEA, 2016**

NHSN risk index	No. of operations (1)	No. of SSIs	Mean and percentile distribution of percentages in hospitals (2)						No. of post-operative patient-days (3)	No. of in-hospital SSIs	Mean and percentile distribution of incidence densities in hospitals (4)					
			Mean	P10	P25	P50	P75	P90			Mean	P10	P25	P50	P75	P90
0	35 060	462	1.2	0	0	0	1.5	3.3	96 363	66	0.4	0	0	0	0	1.9
1	13 268	258	2.1	0	0	0	1.6	7.1	57 884	106	1.7	0	0	0	0	4.8
2 and 3	4 416	170	3.7	0	0	0	0	11.1	31 787	79	1.9	0	0	0	0	7.1
Unknown	2 446	39	1	0	0	0	0	3.3	8 162	7	0.7	0	0	0	0	0
<b>Overall</b>	<b>55 190</b>	<b>929</b>	<b>1.4</b>	<b>0</b>	<b>0</b>	<b>0.5</b>	<b>2.2</b>	<b>4.2</b>	<b>194 196</b>	<b>258</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1.3</b>	<b>3.8</b>

Source: Country reports from Austria, France, Germany, Hungary, Italy, Lithuania, the Netherlands, Norway, Portugal, Slovakia and the United Kingdom (England)

(1) Operations from hospitals with less than 20 operations are excluded; (2) percentage of SSIs = (number of SSIs × 100)/number of operations, mean and percentiles in hospitals; (3) patient-days from hospitals with less than 20 operations with a known date of discharge are excluded; (4) incidence density of SSIs = (number of in-hospital SSIs × 1000)/number of post-operative patient-days, mean and percentiles in hospitals.

**Table A4.1. Percentage of SSIs and incidence density of in-hospital SSIs after colon surgery, by country, EU/EEA, 2016**

Country	No. of operations	No. of SSIs (1)	Percentage of SSIs per 100 operations [95% CI] (2)	No. of operations with a known discharge date	No. of post-operative patient-days (3)	No. of in-hospital SSIs (% of all SSIs) (4)	Incidence density of SSIs per 1000 post-operative patient-days [95% CI] (5)
<b>Patient-based data</b>							
Austria	336	34	10.1 [7.0–14.1]	336	4 485	33 (97)	7.4 [5.1–10.3]
France	3 821	229	6.0 [5.2–6.8]	3 821	43 602	176 (77)	4.0 [3.5–4.7]
Germany	11 231	844	7.5 [7.0–8.0]	8 750	110 983	362 (43)	3.3 [2.9–3.6]
Hungary	1 048	138	13.2 [11.1–15.6]	1 048	12 508	110 (80)	8.8 [7.2–10.6]
Italy	4 369	231	5.3 [4.6–6.0]	3 097	35 544	66 (29)	1.9 [1.4–2.4]
Lithuania	311	34	10.9 [7.6–15.3]	311	3 619	32 (94)	8.8 [6.0–12.5]
Malta	61	11	18.0 [9.0–32.3]	61	918	7 (64)	7.6 [3.1–15.7]
Netherlands	4 439	484	10.9 [10.0–11.9]	4 439	42 077	321 (66)	7.6 [6.8–8.5]
Norway*	3 230	350	10.8 [9.7–12.0]	3 228	28 847	202 (58)	7.0 [6.1–8.0]
Portugal	3 635	622	17.1 [15.8–18.5]	3 635	45 872	503 (81)	11.0 [10.0–12.0]
UK–England	4 355	349	8.0 [7.2–8.9]	4 355	49 596	288 (83)	5.8 [5.2–6.5]
<b>Unit-based data</b>							
Czech Republic	181	14	7.7 [4.2–13.0]	181	2 082	8 (57)	3.8 [1.7–7.6]
<b>EU/EEA</b>	<b>37 017</b>	<b>3 340</b>	<b>9.0 [8.7–9.3]</b>	<b>33 262</b>	<b>380 133</b>	<b>2 108 (63)</b>	<b>5.5 [5.3–5.8]</b>

Source: Country reports from Austria, the Czech Republic, France, Germany, Hungary, Italy, Lithuania, Malta, the Netherlands, Norway, Portugal and the United Kingdom (England)

(1) Only SSIs diagnosed within 30 days after the operation are included; (2) percentage of SSIs = (number of SSIs × 100)/number of operations; (3) post-operative patient-days = date of discharge – date of operation +1; (4) SSIs reported after discharge from hospital or with an unknown discharge date are excluded; (6) incidence density of SSIs = (number of in-hospital SSIs × 1000)/number of post-operative patient-days.

\* Data from Norway include patient-reported SSIs.

**Table A4.2. Mean and percentile distributions of percentage of SSIs and incidence density of in-hospital SSIs after colon surgery in hospitals stratified by NHSN risk index, EU/EEA, 2016**

NHSN risk index	No. of operations (1)	No. of SSIs	Mean and percentile distribution of percentages in hospitals (2)						No. of post-operative patient-days (3)	No. of in-hospital SSIs	Mean and percentile distribution of incidence densities in hospitals (4)					
			Mean	P10	P25	P50	P75	P90			Mean	P10	P25	P50	P75	P90
0	10 678	803	7	0	0	4.5	10.1	15.4	92 467	497	4.3	0	0	0	6.9	11.7
1	14 890	1 319	8.9	0	1.9	6.7	13.1	19.8	154 417	831	4.8	0	0	3.2	8	12.3
2 and 3	9 271	1 059	12.4	0	0	9.1	18.2	30.6	109 774	672	6.2	0	0	3.2	9.2	15.7
Unknown	1 997	145	9.3	0	0	0	9.4	25.8	21 393	100	4.7	0	0	0	5	16
<b>Overall</b>	<b>36 836</b>	<b>3 326</b>	<b>8.6</b>	<b>1.5</b>	<b>3.5</b>	<b>7.4</b>	<b>12.1</b>	<b>17.1</b>	<b>378 051</b>	<b>2 100</b>	<b>4.9</b>	<b>0</b>	<b>1.4</b>	<b>3.9</b>	<b>7.3</b>	<b>10.7</b>

Source: Country reports from Austria, France, Germany, Hungary, Italy, Lithuania, the Netherlands, Norway, Portugal and the United Kingdom (England)

(1) Operations from hospitals with less than 20 operations are excluded; (2) percentage of SSIs = (number of SSIs × 100)/number of operations, mean and percentiles in hospitals; (3) patient-days from hospitals with less than 20 operations with a known date of discharge are excluded; (4) incidence density of SSIs = (number of in-hospital SSIs × 1000)/number of post-operative patient-days, mean and percentiles in hospitals.

**Table A5.1. Percentage of SSIs and incidence density of in-hospital SSIs after caesarean sections, by country, EU/EEA, 2016**

Country	No. of operations	No. of SSIs (1)	Percentage of SSIs per 100 operations [95% CI] (2)	No. of operations with a known discharge date	No. of post-operative patient-days (3)	No. of in-hospital SSIs (% of all SSIs) (4)	Incidence density of SSIs per 1000 post-operative patient-days [95% CI] (5)
<b>Patient-based data</b>							
Austria	3 165	15	0.5 [0.3–0.8]	3 165	17 476	2 (13)	0.1 [0.0–0.4]
Estonia	436	19	4.4 [2.6–6.8]	436	1 974	6 (32)	3.0 [1.1–6.6]
France	12 926	204	1.6 [1.4–1.8]	12 926	79 311	47 (23)	0.6 [0.4–0.8]
Germany	21 944	115	0.5 [0.4–0.6]	17 721	92 898	17 (15)	0.2 [0.1–0.3]
Hungary	3 289	46	1.4 [1.0–1.9]	3 289	17 989	19 (41)	1.1 [0.6–1.6]
Italy	7 317	55	0.8 [0.6–1.0]	5 431	25 143	6 (11)	0.2 [0.1–0.5]
Lithuania	1 340	7	0.5 [0.2–1.1]	1 340	7 020	6 (86)	0.9 [0.3–1.9]
Netherlands	6 745	76	1.1 [0.9–1.4]	6 745	28 550	4 (5)	0.1 [0.0–0.4]
Norway*	9 102	349	3.8 [3.4–4.3]	9 098	45 109	60 (17)	1.3 [1.0–1.7]

Country	No. of operations	No. of SSIs (1)	Percentage of SSIs per 100 operations [95% CI] (2)	No. of operations with a known discharge date	No. of post-operative patient-days (3)	No. of in-hospital SSIs (% of all SSIs) (4)	Incidence density of SSIs per 1000 post-operative patient-days [95% CI] (5)
Portugal	3 173	70	2.2 [1.7–2.8]	3 173	14 251	7 (10)	0.5 [0.2–1.0]
UK–Northern Ireland	6 175	309	5.0 [4.5–5.6]	6 175	23 854	8 (3)	0.3 [0.1–0.7]
UK–Wales	7 099	372	5.2 [4.7–5.8]	6 754	38 644	63 (17)	1.6 [1.3–2.1]
<b>Unit-based data</b>							
UK–Scotland	17 175	258	1.5 [1.3–1.7]				
EU/EEA	99 886	1 895	1.9 [1.8–2.0]	76 253	392 219	245 (13)	0.6 [0.5–0.7]**

Source: Country reports from Austria, Estonia, France, Germany, Hungary, Italy, Lithuania, the Netherlands, Norway, Portugal and the United Kingdom (Northern Ireland, Scotland and Wales)

(1) Only SSIs diagnosed within 30 days after the operation are included; (2) percentage of SSIs = (number of SSIs × 100)/number of operations; (3) post-operative patient-days = date of discharge – date of operation + 1; (4) SSIs reported after discharge from hospital or with an unknown discharge date are excluded; (5) incidence density of SSIs = (number of in-hospital SSIs × 1000)/number of post-operative patient-days.

\* Data from Norway include patient-reported SSIs. \*\* Scotland not included: no denominator provided.

**Table A5.2. Mean and percentile distributions of percentage of SSIs and incidence density of in-hospital SSIs after caesarean sections in hospitals stratified by NHSN risk index, EU/EEA, 2016**

NHSN risk index	No. of operations (1)	Number of SSIs	Mean and percentile distribution of percentages in hospitals (2)						No. of post-operative patient-days (3)	No. of in-hospital SSIs	Mean and percentile distribution of incidence densities in hospitals (4)					
			Mean	P10	P25	P50	P75	P90			Mean	P10	P25	P50	P75	P90
0	65 643	1 261	1.6	0	0	0.7	2.4	5.2	308 806	184	0.5	0	0	0	0	1.8
1	11 034	246	2.2	0	0	0	1.4	7.3	51 561	40	0.7	0	0	0	0	0
2 and 3	596	25	5.3	0	0	0	0	20	2 949	5	1.6	0	0	0	0	0
Unknown	5 438	105	1.6	0	0	0	0	3.9	28 903	16	0.1	0	0	0	0	0
<b>Overall</b>	<b>82 711</b>	<b>1 637</b>	<b>1.7</b>	<b>0</b>	<b>0</b>	<b>0.9</b>	<b>2.5</b>	<b>5.1</b>	<b>392 219</b>	<b>245</b>	<b>0.6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.4</b>	<b>1.8</b>

Source: Country reports from Austria, Estonia, France, Germany, Hungary, Italy, Lithuania, the Netherlands, Norway, Portugal and the United Kingdom (Northern Ireland and Wales)

(1) Operations from hospitals with less than 20 operations are excluded; (2) percentage of SSIs = (number of SSIs × 100)/number of operations, mean and percentiles in hospitals; (3) patient-days from hospitals with less than 20 operations with a known date of discharge are excluded; (4) incidence density of SSIs = (number of in-hospital SSIs × 1000)/number of post-operative patient-days, mean and percentiles in hospitals.

**Table A6.1. Percentage of SSIs and incidence density of in-hospital SSIs after hip prosthesis operations, by country, EU/EEA, 2016**

Country	No. of operations	No. of SSIs (1)	Percentage of SSIs per 100 operations [95% CI] (2)	No. of operations with a known discharge date	No. of post-operative patient-days (3)	No. of in-hospital SSIs (% of all SSIs) (4)	Incidence density of SSIs per 1000 post-operative patient-days [95% CI] (5)
<b>Patient-based data</b>							
Austria	4 874	62	1.3 [1.0–1.6]	4 874	65 897	32 (52)	0.5 [0.3–0.7]
Finland	7 825	153	2.0 [1.7–2.3]	6 076	25 856	4 (3)	0.2 [0.0–0.4]
France	17 344	239	1.4 [1.2–1.6]	17 344	128 671	30 (13)	0.2 [0.2–0.3]
Germany	70 941	662	0.9 [0.9–1.0]	51 935	601 939	108 (16)	0.2 [0.1–0.2]
Hungary	951	19	2.0 [1.2–3.1]	951	9 699	11 (58)	1.1 [0.6–2.0]
Italy	7 513	72	1.0 [0.7–1.2]	6 009	70 820	18 (25)	0.3 [0.2–0.4]
Lithuania	1 544	3	0.2 [0.0–0.6]	1 544	11 078	1 (33)	0.1 [0.0–0.5]
Malta	174	7	4.0 [1.6–8.3]	174	1 468	3 (43)	2.0 [0.4–6.0]
Netherlands	25 295	403	1.6 [1.4–1.8]	25 295	110 225	37 (9)	0.3 [0.2–0.5]
Norway*	12 253	282	2.3 [2.0–2.6]	12 240	61 968	19 (7)	0.3 [0.2–0.5]
Portugal	2 863	49	1.7 [1.3–2.3]	2 863	26 440	26 (53)	1.0 [0.6–1.4]
UK–England	63 070	305	0.5 [0.4–0.5]	63 069	473 358	119 (39)	0.3 [0.2–0.3]
UK–Northern Ireland	2 229	3	0.1 [0.0–0.4]	2 229	13 262	1 (33)	0.1 [0.0–0.4]
<b>Unit-based data</b>							
UK–Scotland	8 870	55	0.6 [0.5–0.8]				
EU/EEA	225 746	2 314	1.0 [1.0–1.1]	194 603	1 600 681	409 (18)	0.3 [0.2–0.3]**

Source: Country reports from Austria, Finland, France, Germany, Hungary, Italy, Lithuania, Malta, the Netherlands, Norway, Portugal and the United Kingdom (England, Northern Ireland and Scotland)

(1) Only superficial SSIs diagnosed within 30 days or deep or organ/space SSIs diagnosed within 90 days after the operation are included; (2) percentage of SSIs = (number of SSIs × 100)/number of operations; (3) post-operative patient-days = date of discharge – date of operation +1; (4) SSIs reported after discharge from hospital or with an unknown discharge date are excluded; (6) incidence density of SSIs = (number of in-hospital SSIs × 1000)/number of post-operative patient-days.

\* Data from Norway include patient-reported SSI. \*\*Scotland not included: no denominator provided.

**Table A6.2. Mean and percentile distributions of percentage of SSIs and incidence density of in-hospital SSIs after hip prosthesis operations in hospitals stratified by NHSN risk index, EU/EEA, 2016**

NHSN risk index	No. of operations (1)	Number of SSIs	Mean and percentile distribution of percentages in hospitals (2)						No. of post-operative patient-days (3)	No. of in-hospital SSIs	Mean and percentile distribution of incidence densities in hospitals (4)					
			Mean	P10	P25	P50	P75	P90			Mean	P10	P25	P50	P75	P90
0	132 496	928	0.9	0	0	0	1.1	2.6	816 160	118	0.2	0	0	0	0	0
1	69 868	1 089	1.5	0	0	0	2.2	4.3	652 796	228	0.3	0	0	0	0	0.9
2 and 3	6 433	160	3.5	0	0	0	0	6.7	65 151	49	0.6	0	0	0	0	0
Unknown	8 079	82	0.9	0	0	0	0	0.8	66 574	14	0.1	0	0	0	0	0
<b>Overall</b>	<b>216 876</b>	<b>2 259</b>	<b>1.1</b>	<b>0</b>	<b>0</b>	<b>0.7</b>	<b>1.8</b>	<b>2.9</b>	<b>1 600 681</b>	<b>409</b>	<b>0.3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.8</b>

Source: Country reports from Austria, Finland, France, Germany, Hungary, Italy, Lithuania, Malta, the Netherlands, Norway, Portugal and the United Kingdom (England and Northern Ireland)

(1) Operations from hospitals with less than 20 operations are excluded; (2) percentage of SSIs = (number of SSIs × 100)/number of operations, mean and percentiles in hospitals; (3) patient-days from hospitals with less than 20 operations with a known date of discharge are excluded; (4) incidence density of SSIs = (number of in-hospital SSIs × 1000)/number of post-operative patient-days, mean and percentiles in hospitals.

**Table A7.1. Percentage of SSIs and incidence density of in-hospital SSIs after knee prosthesis operations, by country, EU/EEA, 2016**

Country	No. of operations	No. of SSIs (1)	Percentage of SSIs per 100 operations [95% CI] (2)	No. of operations with a known discharge date	No. of post-operative patient-days (3)	No. of in-hospital SSIs (% of all SSIs) (4)	Incidence density of SSIs per 1000 post-operative patient-days [95% CI] (5)
<b>Patient-based data</b>							
Austria	3 663	32	0.9 [0.6–1.2]	3 663	46 880	11 (34)	0.2 [0.1–0.4]
Finland	6 782	90	1.3 [1.1–1.6]	5 150	21 850	1 (1)	0.0 [0.0–0.3]
France	12 164	107	0.9 [0.7–1.1]	12 164	88 125	14 (13)	0.2 [0.1–0.3]
Germany	40 984	169	0.4 [0.4–0.5]	29 720	315 183	24 (14)	0.1 [0.0–0.1]
Hungary	541	8	1.5 [0.6–2.9]	541	7 170	4 (50)	0.6 [0.2–1.4]
Italy	2 496	17	0.7 [0.4–1.1]	2 048	23 441	6 (35)	0.3 [0.1–0.6]
Lithuania	699	0	0.0 [0.0–0.5]	699	5 333	0 (NaN)	0.0 [0.0–0.7]
Malta	347	4	1.2 [0.3–3.0]	345	1 738	0 (0)	0.0 [0.0–2.1]
Netherlands	20 044	173	0.9 [0.7–1.0]	20 044	76 855	7 (4)	0.1 [0.0–0.2]
Portugal	2 693	37	1.4 [1.0–1.9]	2 693	20 101	15 (41)	0.7 [0.4–1.2]
UK–England	65 039	201	0.3 [0.3–0.4]	65 039	347 846	39 (19)	0.1 [0.1–0.2]
UK–Northern Ireland	1 461	7	0.5 [0.2–1.0]	1 461	9 092	2 (29)	0.2 [0.0–0.8]
<b>Unit-based data</b>							
UK–Scotland	6 259	5	0.1 [0.0–0.2]				
<b>EU/EEA</b>	<b>163 172</b>	<b>850</b>	<b>0.5 [0.5–0.6]</b>	<b>143 567</b>	<b>963 614</b>	<b>123 (14)</b>	<b>0.1 [0.1–0.2]*</b>

Source: Country reports from Austria, Finland, France, Germany, Hungary, Italy, Lithuania, Malta, the Netherlands, Portugal and the United Kingdom (England, Northern Ireland and Scotland)

(1) Only superficial SSIs diagnosed within 30 days or deep or organ/space SSIs diagnosed within 90 days after the operation are included; (2) percentage of SSIs = (number of SSIs × 100)/number of operations; (3) post-operative patient-days = date of discharge – date of operation +1; (4) SSIs reported after discharge from hospital or with an unknown discharge date are excluded; (6) incidence density of SSIs = (number of in-hospital SSIs × 1000)/number of post-operative patient-days.

\* Scotland not included: no denominator provided.



**Table A7.2. Mean and percentile distributions of percentage of SSIs and incidence density of in-hospital SSIs after knee prosthesis operations in hospitals stratified by NHSN risk index, EU/EEA, 2016**

NHSN risk index	No. of operations (1)	No. of SSIs	Mean and percentile distribution of percentages in hospitals (2)						No. of post-operative patient-days (3)	No. of in-hospital SSIs	Mean and percentile distribution of incidence densities in hospitals (4)					
			Mean	P10	P25	P50	P75	P90			Mean	P10	P25	P50	P75	P90
0	107 571	425	0.5	0	0	0	0.4	1.4	609 048	53	0.1	0	0	0	0	0
1	40 397	329	0.9	0	0	0	0.5	3	287 094	49	0.2	0	0	0	0	0
2 and 3	3 809	64	1.2	0	0	0	0	0	33 516	17	0.3	0	0	0	0	0
Unknown	5 136	27	0.4	0	0	0	0	0	33 956	4	0.4	0	0	0	0	0
<b>Overall</b>	<b>156 913</b>	<b>845</b>	<b>0.6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.9</b>	<b>1.9</b>	<b>963 614</b>	<b>123</b>	<b>0.1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.3</b>

Source: Country reports from Austria, Finland, France, Germany, Hungary, Italy, Lithuania, Malta, the Netherlands, Portugal and the United Kingdom (England and Northern Ireland)

(1) Operations from hospitals with less than 20 operations are excluded; (2) percentage of SSIs = (number of SSIs × 100)/number of operations, mean and percentiles in hospitals; (3) patient-days from hospitals with less than 20 operations with a known date of discharge are excluded; (4) incidence density of SSIs = (number of in-hospital SSIs × 1000)/number of post-operative patient-days, mean and percentiles in hospitals.

**Table A8.1. Percentage of SSIs and incidence density of in-hospital SSIs after laminectomy operations, by country, EU/EEA, 2016**

Country	No. of operations	No. of SSIs (1)	Percentage of SSIs per 100 operations [95% CI] (2)	No. of operations with a known discharge date	No. of post-operative patient-days (3)	No. of in-hospital SSIs (% of all SSIs) (4)	Incidence density of SSIs per 1000 post-operative patient-days [95% CI] (5)
<b>Patient-based data</b>							
France	1 269	13	1.0 [0.5–1.8]	1 269	7 529	4 (31)	0.5 [0.1–1.4]
Germany	6 918	18	0.3 [0.2–0.4]	4 818	40 093	4 (22)	0.1 [0.0–0.3]
Hungary	464	11	2.4 [1.2–4.2]	464	3 465	7 (64)	2.0 [0.8–4.2]
Italy	2 048	32	1.6 [1.1–2.2]	1 437	6 974	0 (0)	0.0 [0.0–0.5]
Netherlands	1 082	17	1.6 [0.9–2.5]	1 082	2 904	0 (0)	0.0 [0.0–1.3]
Portugal	854	2	0.2 [0.0–0.8]	854	3 540	0 (0)	0.0 [0.0–1.0]
UK–England	8 885	96	1.1 [0.9–1.3]	8 885	61 879	41 (43)	0.7 [0.5–0.9]
UK–Northern Ireland	423	3	0.7 [0.1–2.1]	423	2 841	1 (33)	0.4 [0.0–2.0]
<b>EU/EEA</b>	<b>21 943</b>	<b>192</b>	<b>0.9 [0.8–1.0]</b>	<b>19 232</b>	<b>129 225</b>	<b>57 (30)</b>	<b>0.4 [0.3–0.6]</b>

Source: Country reports from France, Germany, Hungary, Italy, the Netherlands, Portugal, Romania and the United Kingdom (England and Northern Ireland)

(1) Only SSIs diagnosed within 30 days after the operation are included; (2) percentage of SSIs = (number of SSIs × 100)/number of operations; (3) post-operative patient-days = date of discharge – date of operation + 1; (4) SSIs reported after discharge from hospital or with an unknown discharge date are excluded; (6) incidence density of SSIs = (number of in-hospital SSIs × 1000)/number of post-operative patient-days.

**Table A8.2. Mean and percentile distributions of percentage of SSIs and incidence density of in-hospital SSIs after laminectomy operations in hospitals stratified by NHSN risk index, EU/EEA, 2016**

NHSN risk index	No. of operations (1)	No. of SSIs	Mean and percentile distribution of percentages in hospitals (2)						No. of post-operative patient-days (3)	No. of in-hospital SSIs	Mean and percentile distribution of incidence densities in hospitals (4)					
			Mean	P10	P25	P50	P75	P90			Mean	P10	P25	P50	P75	P90
0	12 089	63	0.4	0	0	0	0	1.8	53 784	8	0.1	0	0	0	0	0
1	6 847	79	0.9	0	0	0	0.2	2.3	47 491	26	0.3	0	0	0	0	0
2 and 3	1 393	40	1.4	0	0	0	0	7.3	15 863	20	0.4	0	0	0	0	0.1
Unknown	1 614	10	0.4	0	0	0	0	0.7	12 087	3	0.1	0	0	0	0	0
<b>Overall</b>	<b>21 943</b>	<b>192</b>	<b>0.7</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.8</b>	<b>2.4</b>	<b>129 225</b>	<b>57</b>	<b>0.2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.5</b>

Source: Country reports from France, Germany, Hungary, Italy, the Netherlands, Portugal and the United Kingdom (England and Northern Ireland)

(1) Only SSIs diagnosed within 30 days after the operation are included; (2) percentage of SSIs = (number of SSIs × 100)/number of operations; (3) post-operative patient-days = date of discharge – date of operation + 1; (4) SSIs reported after discharge from hospital or with an unknown discharge date are excluded; (6) incidence density of SSIs = (number of in-hospital SSIs × 1000)/number of post-operative patient-days.