Report on Antimicrobial Point Prevalence Survey in Acute Hospitals in Ireland 2024
Surgical Antibiotic Prophylaxis Report

Key findings

- Surgical antibiotic prophylaxis prescriptions accounted for 10.8% (n=534) of antimicrobials prescribed as recorded in the 2024 acute hospital PPS.
- All participating hospitals reported having local surgical antibiotic guidelines in place that aligned with the HSE/NCPS surgical antibiotic prophylaxis duration position statement.
- 26.0% of surgical antibiotic prophylaxis prescriptions were extended beyond 24 hours. This represented a decrease from the previous two years but did not reach the HSE AMRIC target for 2024 of 22% of surgical antibiotic prophylaxis extended beyond 24 hours.
- Almost a quarter of surgical antibiotic prophylaxis prescriptions were deemed to be of inappropriate duration by the local hospital antimicrobial stewardship team.
- Of the surgical antibiotic prophylaxis prescriptions extended beyond 24 hours, 65.5% had no reason for extension documented.

Key recommendations

- As per the HSE/NCPS surgical antibiotic prophylaxis duration position statement, if surgical antibiotic prophylaxis is indicated for a surgical procedure, most patients only require a single dose.
- Surgical antibiotic prophylaxis should not be continued for the reason of drains remaining in place.
- If surgical antibiotic prophylaxis is extended beyond 24 hours, clear documentation of the reason for extension should be provided.
- Local trends and reasons for extending surgical antibiotic prophylaxis beyond 24 hours should be identified so that the reduction of the inappropriate extension of antimicrobial therapies can be targeted.
- The HSeLanD module on surgical antibiotic prophylaxis should be completed by all who prescribe, dispense or administer surgical antibiotic prophylaxis. This includes surgeons, anaesthetists, nurses, pharmacists and trainees of these disciplines.
- Engage with the local antimicrobial stewardship team to advance quality improvement efforts aimed at reducing the duration of surgical antibiotic prophylaxis, based on local findings.

This document is a summary report of key findings in relation to surgical antibiotic prophylaxis from the results of the National Antimicrobial Point Prevalence Survey in Acute Hospitals in Ireland 2024.

For further details on background, results, recommendations, limitations, acknowledgements and references refer to National Report available on antibioticprescribing.ie.

1. General results

- Forty-three hospitals participated in the 2024 national acute hospital antimicrobial PPS.
- The total number of patients included in the 2024 acute hospital PPS was 9,103, of which 3,728 were on antimicrobials, representing a prevalence of 40.9%. This is an increase compared to previous years.
- The prevalence of antimicrobial use varies by speciality (Figure 1). ICU showed the highest prevalence of antimicrobial use at 57.6%, followed by surgical with a prevalence of 55.6%.

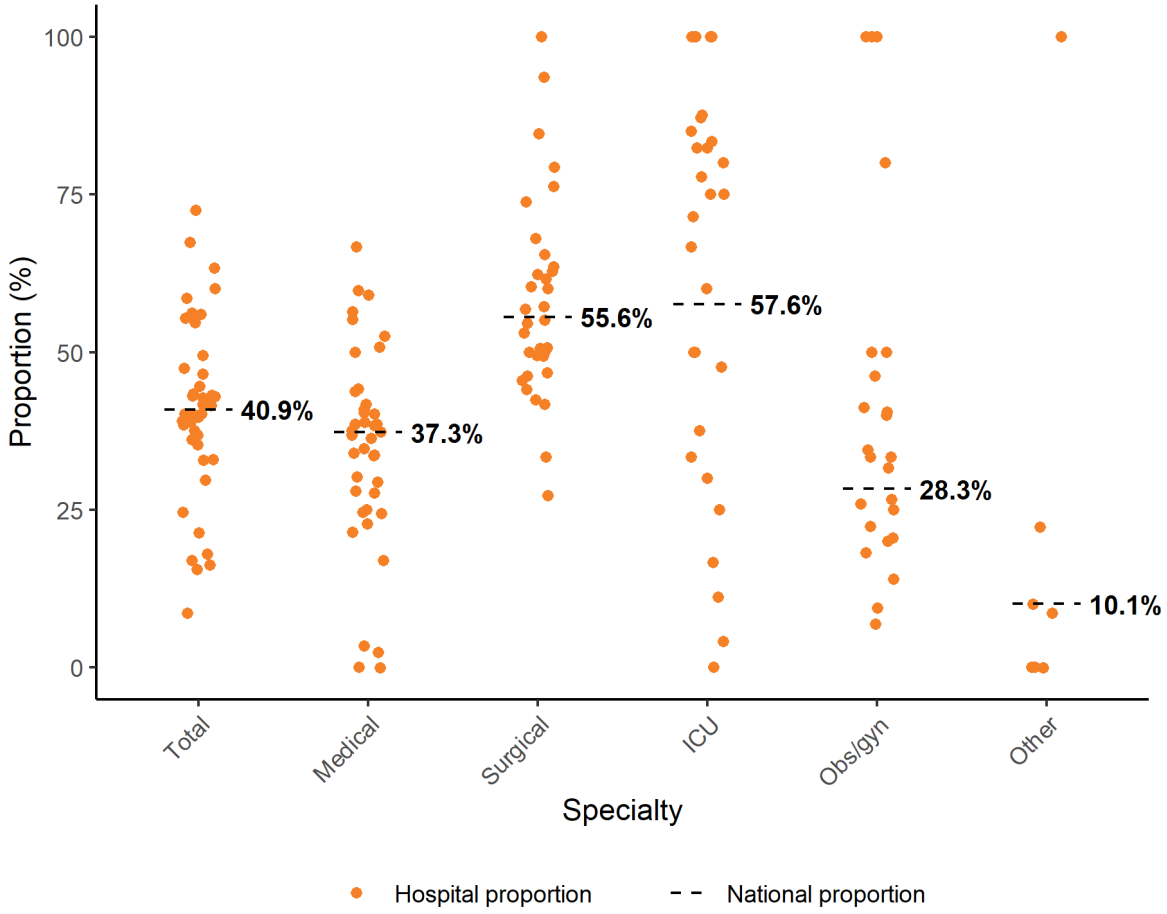

Figure 1: Patients receiving antimicrobials, by specialty

2. Results for surgical antibiotic prophylaxis

2.1. Proportion of antimicrobial use for surgical antibiotic prophylaxis

- Of a total of 4,935 antimicrobial prescriptions that were recorded during 2024 acute hospital PPS, surgical antibiotic prophylaxis accounted for 10.8% (n=534). This proportion has remained stable over the last number of years (2023: 11.2% (n=678), 2022: 10.8% (n=561)).

2.2. Choice of antimicrobial

- Of all surgical antibiotic prophylaxis prescriptions, 16.1% (n=86) were not in line with guidelines or microbiologist/infectious diseases physician advice.

2.3. Duration of antimicrobial use

- 24.2% (n=129) of all surgical antibiotic prophylaxis prescriptions were deemed to be of inappropriate duration by the local hospital antimicrobial stewardship team.
- 26.0% (n=139) of surgical antibiotic prophylaxis prescriptions were extended beyond 24 hours (Figure 2). This represents a decrease from the previous two years (2023: 29.5%, 2022: 33%).

HSE AMRIC action plan 2022-2025 surgical antibiotic prophylaxis target:

- 2024 target: 22% of surgical antibiotic prophylaxis extended beyond 24 hours
- 2025 target: 20% of surgical antibiotic prophylaxis extended beyond 24 hours

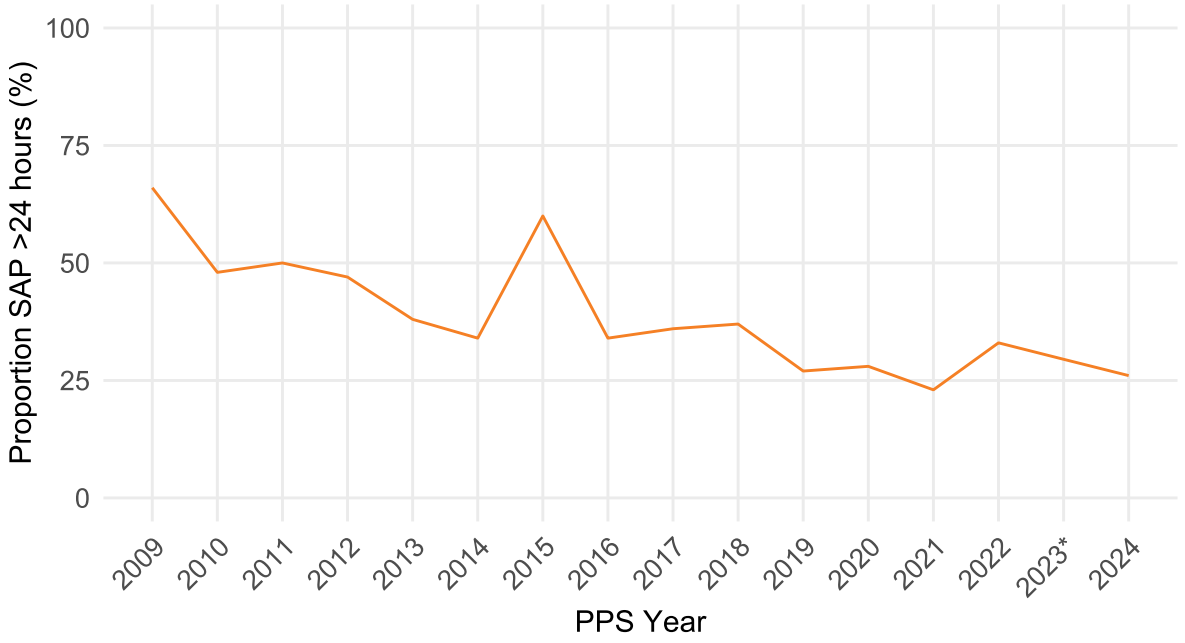

*Figure 2: Historical trend in proportion of surgical prophylaxis extended beyond 24 hours. *2023, 2017 and 2012 results taken from ECDC PPS of Hospital-Acquired Infections & Antimicrobial Use in European Acute Care Hospitals.*

2.3.1. Duration of antimicrobial use by hospital

- As shown in Table , Model 4 hospitals had the highest proportion of surgical antibiotic prophylaxis prescriptions extended beyond 24 hours at 39.6% (n=38/96). Specialty hospitals had the lowest proportion, at 16.3% (n=17/104).
- In contrast, speciality hospitals had the highest proportion of single dose surgical prophylaxis prescriptions, at 46.2% (n=48/104; Table). Model 2 hospitals had the lowest proportion, at 25.6% (n=10/39).

Table 1: Surgical prophylaxis prescriptions, by hospital model.

Hospital model	>24 hours		One day		Single dose		**Total**
	(n)	*(%)*	(n)	*(%)*	(n)	*(%)*	**(n)**
Model 2	10	*25.6*	19	*48.7*	10	*25.6*	**39**
Model 3	28	*31.5*	28	*31.5*	33	*37.1*	**89**
Model 4	38	*39.6*	30	*31.2*	28	*29.2*	**96**
Private	46	*22.3*	86	*41.7*	74	*35.9*	**206**
Specialty (Specialist)	17	*16.3*	39	*37.5*	48	*46.2*	**104**
Total	**139**	***26.0***	**202**	***37.8***	**193**	***36.1***	**534**

2.3.2. Duration of antimicrobial use by specialty

- The highest relative proportion of surgical antibiotic prophylaxis prescriptions that extended beyond 24 hours existed in the orthopaedics and general surgery categories, at 31.7% (n=44/139) and 30.2% (n=42/139) respectively (Figure 3 and Table A1). This was followed by the ENT & maxillofacial (14.4%), obstetrics and gynaecology (10.1%) and urology (5.0%) categories.

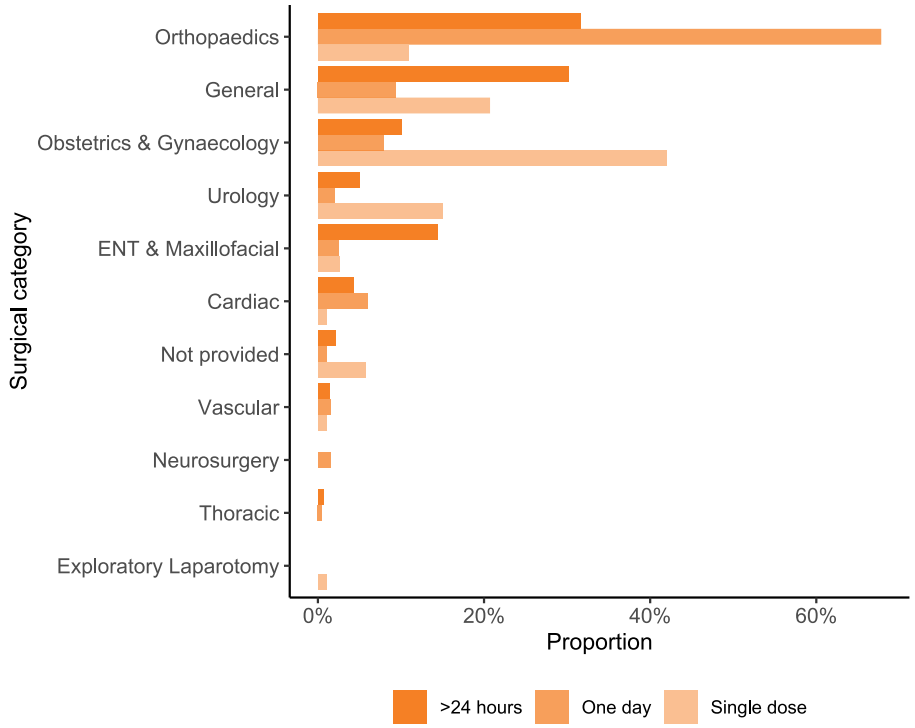

Figure 3: Relative proportions of surgical categories with surgical antimicrobial prophylaxis. The proportion for each surgical category represents their relative proportion within each surgical antimicrobial prophylaxis duration category. Note: As per 2024 acute hospital PPS protocol, data is not captured for all surgeries within a specific surgical category where antibiotics are not prescribed.

2.3.3. Rationale for extending surgical antibiotic prophylaxis duration

- 65.5% (n=91/139) of surgical antibiotic prophylaxis prescriptions that were extended beyond 24 hours had no reason documented for this (Figure 4 and Table A2).
    - As stated in the national position statement, surgical antibiotic prophylaxis duration may be extended to 48 hours for certain categories of surgical procedures: maxillofacial surgery, cardiac surgery, and head and neck surgery. Of the surgical antibiotic prophylaxis prescriptions that were extended beyond 24 hours with no documented reason, 14.3% (n=13/91) were prescribed for patients with the aforementioned surgical procedures. This represents potentially appropriate extension of surgical antibiotic prophylaxis duration.
    - The remaining 85.7% (n=78/91) of surgical antibiotic prophylaxis prescriptions with no documented reason for extension beyond 24 hours represent an inappropriate extension of duration.
    - These are distributed among the following surgical categories and are outside those listed in the national position statement as categories of surgical procedures where duration may be extended to 48 hours: orthopaedics (n=29), general (n=26), obstetrics & gynaecology (n=11), urology (n=4), ENT and maxillofacial (n=2), vascular (n=2) and thoracic (n=1).
    - In the orthopaedics category, the most common surgical procedures were hip prosthesis (n=8), knee prosthesis (n=7) and open reduction of fracture (n=6). In the general surgery category, the most common surgical procedures were colon surgery (n=7) and general abdominal surgery (n=6). In the obstetrics and gynaecology category, minimally invasive procedures/ non-NHSN procedures accounted for 6 surgical procedures.
    - These surgical categories and procedures therefore represent areas for targeted quality improvement. See Table A4 for further breakdown of this subgroup.
- 34.5% (n=48/139) of surgical antibiotic prophylaxis prescriptions that were extended beyond 24 hours had a reason documented for this. This is a slight improvement from 30.9% (n=55/178) in 2022 (Figure 4 and Table A2).
    - Of these, 25.0% (n=12/48) were observed to be in line with locally approved guidelines i.e., appropriate, compared to 32.7% (n=18/55) in 2022.
    - The reason reported as “drain in place” i.e., inappropriate, was given in a further 25.0% (n=12/48) of these prescriptions, compared to 18.2% (n=10/55) in 2022. See Table A3 for further detail.
    - “Other” reasons were cited in 50.0% (n=24/48) of these, compared to 49.1% (n=27/55) in 2022. (Figure and Table A2).
    - A summary of the free text answers provided for 24 prescriptions where “Other” reasons were given for continuing the antimicrobials beyond 24 hours is provided in Table A5. Based on the free-text descriptions provided, the reasons for 12 of the 24 prescriptions were interpreted to be for suspected/ confirmed infection. Improvements will be made to the protocol for next iterations to exclude such patients.

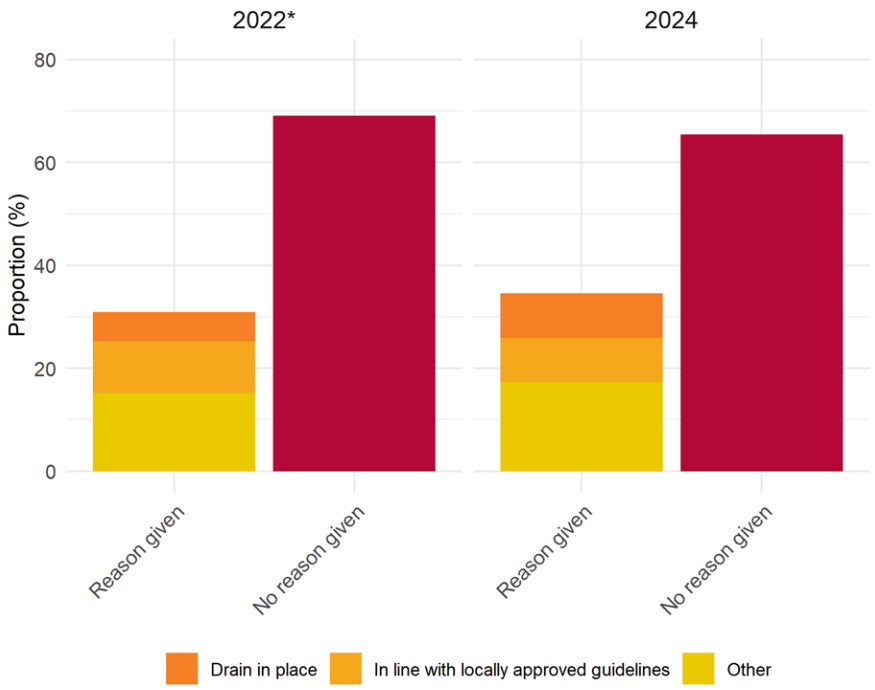

*Figure 4: Reasons for extending surgical prophylaxis. *Additional categories existed in the 2022 PPS. These were included in the "Other" category in this figure.*

- All 43 hospitals participating in the 2024 PPS had local surgical antibiotic guidelines in place that aligned with the national surgical antibiotic prophylaxis duration position statement.

3. Discussion

Proportion of patients on antimicrobials in Irish acute hospitals remains high.

In the 2024 acute hospital PPS the proportion of patients on antimicrobials was the highest proportion since 2019. The 2023 European Union Council Recommendations for Ireland call for a 27% reduction in overall antimicrobial use in the community and acute sectors by 2030. Hence, there is a need to strengthen efforts to address unnecessary and inappropriate prescribing of antimicrobials in the acute hospital setting. Reduction of both the inappropriate use and the extended duration of surgical antibiotic prophylaxis have been identified as key areas for quality improvement.

Overall, Ireland performs well on surgical antibiotic prophylaxis duration, but there remains opportunity for improvement, particularly in model 4 hospitals.

Compared to previous years, there was an increase in the proportion of appropriate surgical antibiotic prophylaxis duration for 2024. The 2023 ECDC PPS showed that Ireland had amongst the highest rate of compliance with surgical antibiotic prophylaxis guidance, ranking 7th lowest of 31 countries in surgical antibiotic prophylaxis duration greater than or equal to 24 hours. Irish acute hospitals continue to build on this and drive quality improvement in the appropriate duration of surgical antibiotic prophylaxis.

Widespread knowledge and awareness exist of the national position statement on surgical antibiotic prophylaxis duration.

All participating hospitals reported having local surgical antibiotic guidelines in place that aligned with the HSE/NCPS surgical antibiotic prophylaxis duration position statement. This is indicative of widespread knowledge and awareness of the national position statement among antimicrobial stewardship teams in the acute hospital setting.

National proportion of surgical antibiotic prophylaxis greater than 24 hours in 2024 did not meet the 2024 national target of 22%.

Compliance with the national surgical antibiotic prophylaxis position statement (published in Q3 2021) is a key measure outlined in the HSE AMRIC action plan 2022-2025. Although great progress has been made, in 2024, the national proportion of surgical antibiotic prophylaxis with a duration of more than 24 hours (26.0%) is still above the 2024 national target of 22%. Furthermore, almost a quarter of surgical antibiotic prophylaxis prescriptions were deemed to be of inappropriate duration by the local hospital antimicrobial stewardship team. Model 4 hospitals had the highest proportion of surgical antibiotic prophylaxis prescriptions extending beyond 24 hours (39.6%). Variation in patient profile, sub-specialities and case mix likely contribute to variation in this metric between hospital models. In collaboration with surgical teams, there is a need to focus and support stewardship initiatives to target surgical antibiotic prophylaxis in Model 4 hospitals, as these carry the highest burden of antimicrobial prescribing for this indication.

The majority of surgical antibiotic prophylaxis prescriptions with a duration of beyond 24 hours had no documented reason.

To identify areas for improvement related to surgical antibiotic prophylaxis, additional questions were added to the national acute hospital PPS from 2022 onward. This included a question on whether a reason was documented when surgical antibiotic prophylaxis extended beyond 24 hours. The 2024 acute hospital PPS found that for most of these particular surgical antibiotic prophylaxis prescriptions (65.5%), there was no specific documented reason for the extension. This result is similar to that in the 2022 acute hospital PPS. Documentation is a key

component of comprehensive patient care as it allows timely and accurate communication between healthcare professionals, while contributing to the safety and quality of patient care.

Opportunity to focus quality improvement efforts in reducing the inappropriate extension of surgical antibiotic prophylaxis in the orthopaedics, general, and obstetrics & gynaecology surgical categories.

The national position statement states that surgical antibiotic prophylaxis duration may be extended to 48 hours for certain categories of surgical procedures: maxillofacial surgery, cardiac surgery, and head and neck surgery. Most prescriptions of extended duration surgical antibiotic prophylaxis without a documented reason—and outside the allowances of the national position statement—occurred in the orthopaedics, general surgery, and obstetrics & gynaecology categories.

Opportunity to reduce inappropriately extended surgical antibiotic prophylaxis for the reason of drains remaining in place.

The national position statement on surgical antibiotic prophylaxis duration recommends that antibiotic prophylaxis should not be continued because drains remain in place. This was cited as a reason in 25.0% of surgical antibiotic prophylaxis prescriptions with a documented reason of extension beyond 24 hours. This represents a disimprovement from 2022.

There is a need for acute hospital surgical and antimicrobial stewardship teams to identify local trends and reasons for extending surgical antibiotic prophylaxis beyond 24 hours and to target a reduction in the inappropriate extension of antimicrobial therapy. Documenting the reasons for extension will support and promote hospital level actions, such as audits and targeted education to support local quality improvement.

3.1. Key recommendations

Key antimicrobial stewardship areas for local improvement identified in the 2024 acute hospital PPS:

- As stated in the HSE/NCPS surgical antibiotic prophylaxis duration position statement, if surgical antibiotic prophylaxis is indicated for a surgical procedure, most patients only require a single dose.
- Surgical antibiotic prophylaxis should not be continued for the reason of drains remaining in place.
- If surgical antibiotic prophylaxis is extended beyond 24 hours, clear documentation of the reason for extension should be included.
- Local trends and reasons for extending surgical antibiotic prophylaxis beyond 24 hours should be identified so that the reduction of the inappropriate extension of antimicrobial therapies can be targeted.
- The HSeLanD module on surgical antibiotic prophylaxis should be completed should be completed by all who prescribe, dispense or administer surgical antibiotic prophylaxis. This includes surgeons, anaesthetists, nurses, pharmacists and trainees of these disciplines
- Engage with the local antimicrobial stewardship team to advance quality improvement efforts aimed at reducing the duration of surgical antibiotic prophylaxis, based on local findings.

To address recommendations outlined in this report, the HSE National AMRIC team will:

- Work with stakeholders, including healthcare professionals, senior leaders and healthcare managers, across the health regions to support collaboration and shared learning.
- Build on the positive progress achieved to date and maintain a focus on the national position statement on surgical antibiotic prophylaxis duration through continued collaboration with the National Clinical Programme for Surgery and the Royal College of Surgeons in Ireland, while establishing relationships with relevant speciality groups.
- Provide a tailored surgical antibiotic prophylaxis report and utilise its findings to collaborate with national surgical colleagues in further directing and driving surgical antibiotic prophylaxis stewardship efforts.

Appendix

Table A1: Number and relative proportions of surgical categories with antimicrobial prophylaxis.

Surgical category	>24 hours		One day		Single dose		**Total**
	(n)	*(%)*	(n)	*(%)*	(n)	*(%)*	**(n)**
Cardiac	6	*4.3*	12	*5.9*	2	*1.0*	**20**
ENT & Maxillofacial	20	*14.4*	5	*2.5*	5	*2.6*	**30**
General	42	*30.2*	19	*9.4*	40	*20.7*	**101**
Neurosurgery	0	*0.0*	3	*1.5*	0	*0.0*	**3**
Exploratory Laparotomy	0	*0.0*	0	*0.0*	2	*1.0*	**2**
Not provided	3	*2.2*	2	*1.0*	11	*5.7*	**16**
Obstetrics & Gynaecology	14	*10.1*	16	*7.9*	81	*42.0*	**111**
Orthopaedics	44	*31.7*	137	*67.8*	21	*10.9*	**202**
Thoracic	1	*0.7*	1	*0.5*	0	*0.0*	**2**
Urology	7	*5.0*	4	*2.0*	29	*15.0*	**40**
Vascular	2	*1.4*	3	*1.5*	2	*1.0*	**7**
Total	**139**	***100.0***	**202**	***100.0***	**193**	***100.0***	**534**

Table A2: Reasons for extending surgical prophylaxis.

Reason	2022		2024	
	(n)	*(%)*	(n)	*(%)*
Reason given	55	*30.9*	48	*34.5*
Drain in place	*10*	*5.6*	*12*	*8.6*
In line with locally approved guidelines	*18*	*10.1*	*12*	*8.6*
Other	*27*	*15.2*	*24*	*17.3*
No reason given	123	*69.1*	91	*65.5*
Total	**178**	***100.0***	**139**	***100.0***

Table A3: Surgical antibiotic prophylaxis duration for more than 24 hours with reason of drain in place, by surgical category and operative procedure.

Surgical category	Operative procedure	Total (n)
General (n=6)	Breast surgery	2
	Herniorrhaphy	2
	Appendix surgery	1
	Colon surgery	1
ENT & Maxillofacial (n=3)	Neck surgery	3
Orthopaedics (n=2)	Spinal fusion	2
Obstetrics & Gynaecology (n=1)	Ovarian surgery	1
Total		**12**

Table A4: Surgical antibiotic prophylaxis duration for more than 24 hours with no reason given, by surgical category and operative procedure (the following surgical categories have been removed from this table: "ENT & Maxillofacial - Neck surgery" and "cardiac – all surgical procedures")*

Surgical category*	Operative procedure*	Total (n)
Orthopaedics (n=29)	Hip prosthesis	8
	Knee prosthesis	7
	Open reduction of fracture	6
	Spinal fusion	4
	Ortho-Upper limb surgery excl. open reduction # long bones	3
	Minimally invasive or non-NHSN procedure	1
General (n=26)	Colon surgery	7
	General-Abdominal Surgery	6
	Appendix surgery	3
	Breast surgery	3
	Bile duct, liver or pancreatic surgery	2
	Gastric surgery	1
	Herniorrhaphy	1
	Small bowel surgery	1
	Spleen surgery	1
	Minimally invasive or non-NHSN procedure	1
Obstetrics & Gynaecology (n=11)	Minimally invasive or non-NHSN procedure	6
	Abdominal hysterectomy	4
	Vaginal hysterectomy	1
Urology (n=4)	Kidney surgery	3
	Prostate surgery	1
ENT & Maxillofacial (n=2)	Minimally invasive or non-NHSN procedure	2
Vascular (n=2)	Abdominal aortic aneurysm repair	1
	Carotid endarterectomy	1
Thoracic (n=1)	Thoracic surgery	1
Not provided		3
Total		**78**

**N.B. As per national position statement the maximum duration of antibiotic prophylaxis can be extended to 48 hours for the following categories of surgical procedure: maxillofacial surgery, cardiac surgery, and head and neck surgery. These instances of appropriate extension have been removed from this table.*

Table A5: "Other" reasons (provided for 24 prescriptions with duplicate reasons removed) for continuing the antimicrobials beyond 24 hours. (Note: Responses were free text. Where possible responses have been grouped, otherwise responses quoted directly.)

Reason
• 48 hours post pyeloplasty and stent
• Benzylpenicillin gentamicin started in Maternity hospital, Patient transferred awaiting surgery and used as SP. Metronidazole stat dose added. Pragmatic approach but not in guideline. (2 prescriptions) *
• Cover for infection*
• Patient unwell after OT went to ICU. Antibiotics continue as per microbiology advice.*
• High risk of infection (4 prescriptions) *
• Awaiting theatre (4 prescriptions)
• Complicated history of talus septic arthritis*
• No clear reason
• Complicated fracture (2 prescriptions)
• As per consultant usual protocol (2 prescriptions)
• May get temps during initial healing days
• Intra-op findings*
• Extended prophylaxis until cultures available (2 prescriptions) *
• Open laparotomy post elective c-section. Post partum haemorrhage following cervical suture removal. Bakri Balloon inserted. Open laparotomy to complete suturing, blood loss 2.6L*

*Interpreted to be for suspected/confirmed infection type reasons based on the descriptions given in free text