

Summary of National Antimicrobial Point Prevalence Survey (PPS) of Acute Hospitals 2022

Key recommendations

1. Promote use of 'Access' antibiotics where appropriate.
2. Focus on promoting oral use of agents with excellent oral bioavailability.
3. Reduce surgical antibiotic prophylaxis extended beyond 24 hours duration.

Introduction

Since 2009 the annual national antimicrobial PPS has been completed in acute hospitals in Ireland with data submitted to the Health Protection Surveillance Centre (HPSC) for analysis. From 2009-2020 the PPS was coordinated by the Irish Antimicrobial Pharmacists Group (IAPG). From 2021 it was coordinated by the HSE National Antimicrobial Resistance & Infection Control (AMRIC) team and from 2022 the analysis was completed by the HSE National AMRIC team also.

The aim of a PPS is to gather information relating to antimicrobial prescribing for all inpatients in the hospital over a defined period (usually one day) to assess the success of quality improvement work and inform the development of antimicrobial stewardship action plans. The time period for data collection for the 2022 PPS was 15.9.22 to 12.10.22.

A number of refinements were made to the data collection criteria in 2022, following a review by the national acute hospital PPS 2022 review group, a working group of the HSE antimicrobial consumption group. This included removal of certain collection criteria (allergy details, correct dose, indication/reason documented, compliance with restriction policy, previous IV to Oral switch), addition of four new questions focussing on surgical antibiotic prophylaxis extended beyond 24 hours, and addition of three feedback questions to the general questions section (relating to usefulness of data, use of data locally and suggestions for improvements) as well as some changes in wording. See Appendix 1 for 2022 PPS patient data collection forum.

Results

General

- The 2022 national antimicrobial PPS included 53 hospitals, the highest number of participating hospitals to date (2021: 52, 2020: 48, 2019: 45), and 10,463 patients were reviewed (2021: 10,388, 2020: 8458, 2019: 8916).
- Of 10,463 patients surveyed in 2022, 9,132 were patients in public hospitals and 1,331 were patients in private hospitals.

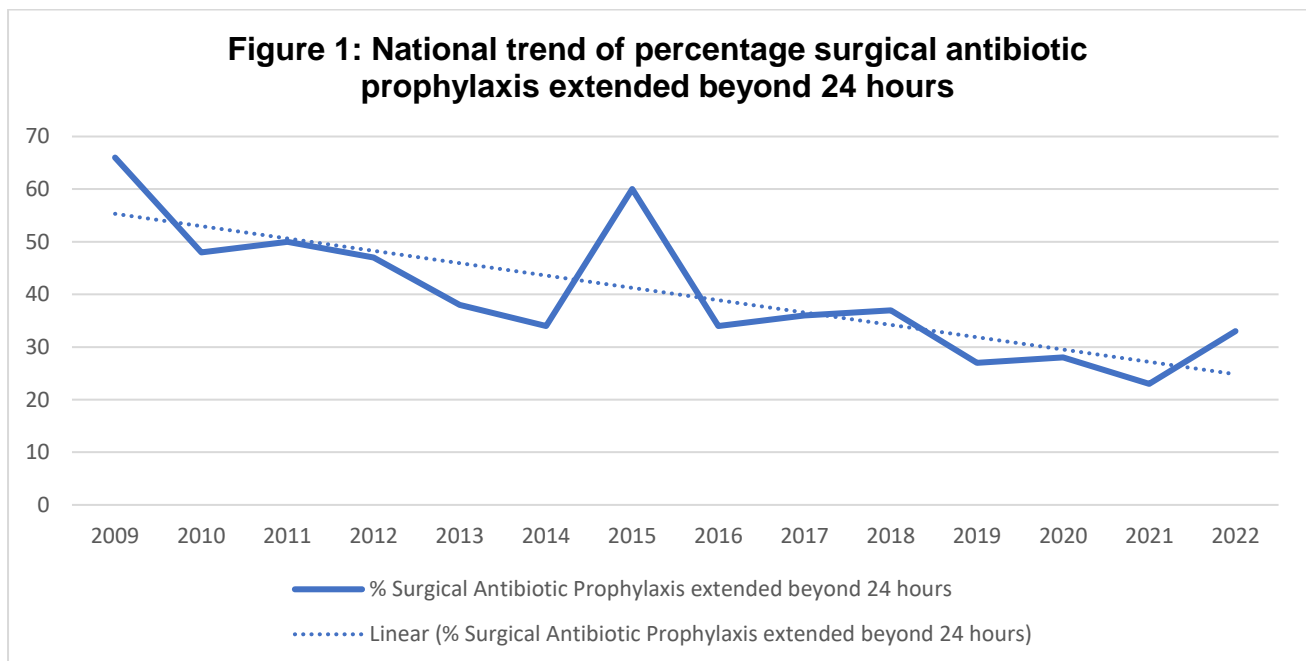
Prevalence of antimicrobial prescribing

- Out of 10,463 patients, 3884 received at least one antibiotic which equates to an overall prevalence of 37% (2021: 38%, 2020: 39%, 2019: 38%)
- The median prevalence of antimicrobial use by hospital was 39%, remaining largely unchanged over the last number of years (2021: 39%, 2020: 40%, 2019: 40%)
- The average hospital prevalence by model types was 38% in model 4 hospitals (n=7), 40% in model 3 hospitals (n=13), 34% in model 2 hospitals (n=8), 16% in maternity hospitals (single speciality) (n=5), 35% in paediatric hospitals (single speciality) (n=3), 42% in single speciality HSE hospitals (n=6), and 45% in private hospitals (n=11). See Appendix 2 for full list of participating hospitals by these groups.

- The total number of antimicrobial therapies prescribed was 5207. Among patients receiving at least one therapy, the average number of therapies per patient was 1.34 (2021: 1.33, 2020: 1.37, 2019: 1.38).

Indication and diagnosis

- The majority of indications for antimicrobial use was for community acquired infections. Fifty-three per cent of antimicrobials were prescribed for community infection (2021: 52%, 2020: 54%, 2019: 55%), 23% for healthcare associated infection (2021: 25%, 2020: 24%, 2019: 25%), 8% for medical prophylaxis (2021: 10%, 2020: 8%, 2019: 9%) and 11% for surgical antibiotic prophylaxis (2021: 9%, 2020: 10%, 2019: 8%), remaining broadly similar to previous years.
- There was an increase in the number of antimicrobials prescribed for surgical antibiotic prophylaxis from previous year (2022: 561, 2021: 476).
- In thirty-three percent of therapies prescribed for surgical antibiotic prophylaxis the duration extended beyond 24 hours. The trend since 2009 is shown in the figure 1.



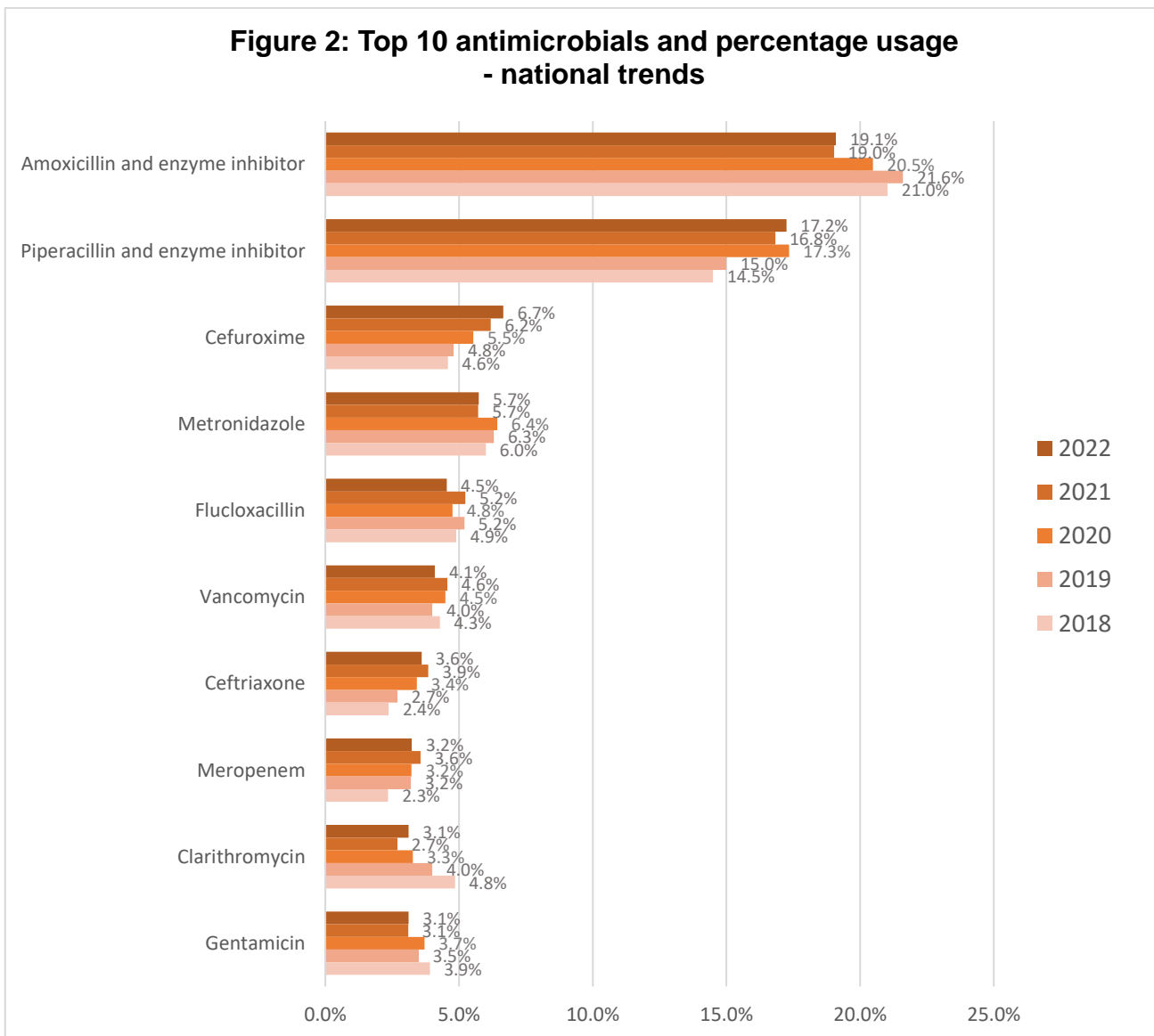
- Pneumonia, intra-abdominal and skin/soft tissue infections were the most common body sites with infection for which antimicrobials were prescribed: 26%, 15% and 12% respectively (2021: 26%, 14% and 12%).

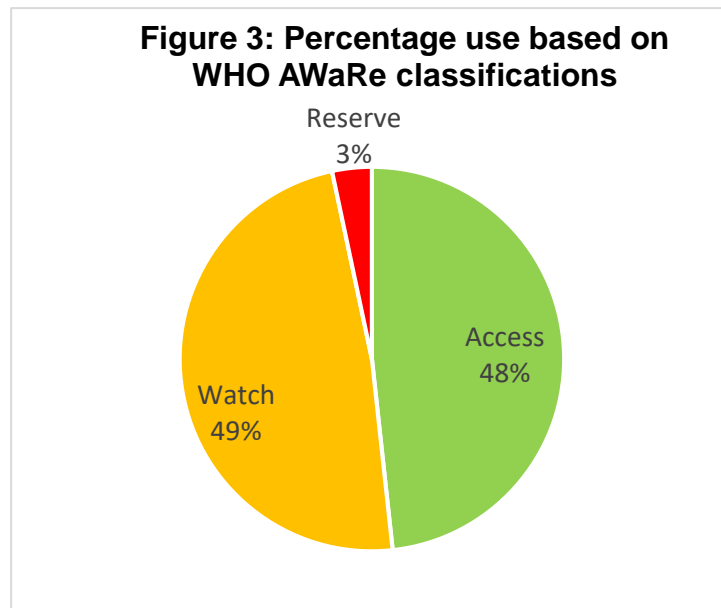
Antimicrobial agents prescribed

- Trends in the percentage usage for the top 10 antimicrobials are shown in Figure 2.
- Co-amoxiclav (19%) and piperacillin-tazobactam (17%) combined accounted for 36% of all prescriptions (2021: 36%, 2020: 38%, 2019: 37%). Over the last 5 years, while the total combined figure has not changed, there has been a slight reduction in co-amoxiclav use accompanied by an increase in piperacillin/tazobactam use.
- The overall prevalence of metronidazole prescription remained the same as the previous year (2022: 5.7%, 2021: 5.7%, 2020: 6.4%). There was a reduction in the prevalence of metronidazole use in combination with a second agent with anaerobic activity to 32% (2021: 34%, 2020 & 2019: 42%).
- Prevalence of clarithromycin prescription increased slightly in 2022 compared to the previous year (2022: 3.1%, 2021: 2.7%). This is on the background of a previous trend of decreasing use of clarithromycin, see figure 2.

- Cefuroxime showed an increasing trend in use over the last number of years (2022: 6.7%, 2021: 6.2%, 2020: 5.5%).
- Antibiotic treatments prescribed in the acute hospital PPS were assigned to the **WHO AWaRe classification**; 48% were 'Access' category, 49% 'Watch' category and 3% 'Reserve' category (Figure 3).
- The reserve antibiotics prescribed were aztreonam (1.0%), daptomycin (0.9%), linezolid (0.8%), colistin (0.2%), tigecycline (0.1%) and ceftazidime and beta-lactamase inhibitor (0.1%), ceftolozane and beta-lactamase inhibitor (0.1%), and meropenem-vaborbactam (0.1%).

Figure 2: Top 10 antimicrobials and percentage usage - national trends





Note: WHO set a target of at least 60% of total antibiotic consumption (both hospital and community consumption) being 'Access' group antibiotics.

Parenteral and oral route

- The majority of antimicrobials were administered via the intravenous route. An increase in observed results from previous years was seen in both the average proportion of intravenous therapies over all therapies (2022: 69%, 2021: 66%, 2020: 68%, 2019: 67%), and the median proportion of intravenous therapies over all therapies by hospital (2022: 69%, 2021: 67%, 2020: 68%, 2019: 67%).¹
- The proportion of all intravenous therapies suitable for oral switch as per local guidelines was 14%.
- More specifically, Table 1 shows the proportion of prescriptions for agents classified as agents of excellent oral bioavailability (i.e. >90%), that were administered by the parenteral route.

Table 1: Proportion of specific antibiotics with excellent oral bioavailability used in parenteral form

Agent	2022	2021	2020	2019
Clindamycin	66% (43/65)	66% (33/50)	63% (27/43)	67% (45/67)
Metronidazole	71% (211/233)	63% (186/297)	68% (193/286)	70% (207/294)
Linezolid	50% (20/40)	48% (21/44)	44% (14/32)	49% (16/33)
Ciprofloxacin	37.5% (39/104)	39% (45/115)	28% (32/113)	40% (53/132)
Levofloxacin	35% (12/34)	19% (7/36)	21% (5/24)	38% (15/40)

¹ The average proportion of intravenous (IV) therapies was calculated by using the total number of IV therapies over all therapies during the PPS, divided by the total number of participating hospitals. The median proportion of IV therapies was also calculated for the same dataset, which selects the mid-point of the dataset, this was used to eliminate bias from the calculation which could be introduced in the average calculation by outlier values.

Appropriateness of antimicrobials

- Eighty-six per cent of antimicrobial prescriptions were considered to be of appropriate duration at the time of the PPS (2021:84%, 2020: 89%).
- An increasing trend in the proportion of prescriptions with a planned review or duration documented was observed (2022: 53%, 2021: 47%, 2020: 45%, 2019: 42%). (Note: the phrasing in this question was changed from “review date or duration documented” to “planned review or duration documented” in 2022)
- The percentage of antimicrobials where choice was in line with local guideline or micro/ID approved remained stable at 85% (2021: 84%, 2020: 85%, 2019: 84%)

Surgical antibiotic prophylaxis duration extended beyond 24 hours

- Thirty-seven hospitals submitted data in relation to patients who received surgical antibiotic prophylaxis extended beyond 24 hours.
- Among all surgical antibiotic prophylaxis therapies extended beyond 24 hours, the most frequent surgical specialties recorded were trauma orthopaedic lower limb, urology, colorectal, and gynaecology (percentages of 15.5%, 14%, 12% and 12%, respectively).
- A specific reason for prescribing surgical antibiotic prophylaxis beyond 24 hours was documented in 31% (55/180) of these cases.
- Where a reason for continuing an antibiotic beyond 24 hours was given, 33% were observed to be in line with locally approved guidelines, 22% due to confirmed/suspected infection diagnosed pre-op/intra-op, 18% due to a drain in place, 9% due to confirmed/suspected infection diagnosed post-op and 18% for other reasons. The “other” reasons are included in Appendix 3, table 4.
- In the cases where prophylaxis was continued on the basis that drains remained in place (n=10) the specialities include: trauma orthopaedic lower limb (n=3), plastics (n=2), colorectal (n=2), otolaryngology (n=1), urology (n=1) and breast (n=1).
- For more detailed information and analysis of surgical antibiotic prophylaxis extended beyond 24 hours see Appendix 3.

General feedback

- Participants in the 2022 PPS rated the usefulness of the data collected to the hospital AMS programme on average 7.9/10 (n=48 hospitals), where one represented not at all useful and 10 represented highly useful.

Discussion

The 2022 national PPS had the highest number of participating hospitals to date and all participants are commended for contributing to this important national antimicrobial stewardship work. In 2022, the overall prevalence of antimicrobial use and median prevalence of antimicrobial use by hospital was similar to previous years. Encouraging findings included sustained high compliance with regard to choice of antimicrobial as per local guideline or micro/ID approval and continued high proportion of antimicrobial prescriptions of appropriate duration. It is noted that there would have been variation in acute hospital case load after the acute phase of the COVID-19 pandemic and this may limit comparability of this data with previous years.

The World Health Organization (WHO) Access, Watch and Reserve (AWaRe) classification of antibiotics is included in the national annual acute hospital PPS for the first time this year. The WHO AWaRe classification is a tool to evaluate and monitor antimicrobial use and support appropriate antimicrobial use.¹ ‘Access’ antibiotics are mostly first-line and second-line therapies that offer the

best therapeutic value, while minimising the potential for antimicrobial resistance (AMR). ‘Watch’ antibiotics have higher AMR potential and should be prioritised in stewardship and monitoring efforts. ‘Watch’ antibiotics include most of the highest priority agents in the WHO Critically Important Antimicrobials for Human Medicine.² ‘Reserve’ antibiotics include antibiotics of last resort and should be saved for treatment of confirmed or suspected infections due to multidrug-resistant organisms. The percentage of ‘Access’ group antibiotics out of all consumed antibiotics is a secondary outcome indicator for total antimicrobial consumption in humans. WHO’s 13th General Programme of Work 2019–2023 set a target of at least 60% of total antibiotic consumption (both hospital and community consumption) being ‘Access’ group antibiotics.³

The analysis of the 2022 PPS showed that ‘Access’ agents constituted 48% of agents prescribed. It is acknowledged that the proportion of ‘Access’ group antimicrobials prescribed in the hospital setting would be expected to be lower than in the community setting, due to differences in type and complexity of infections. However, as a crude comparison, the 2021 ESAC-Net antimicrobial consumption surveillance report showed that ‘Access’ agents constituted 55.6% of hospital sector consumption in Ireland that year.^{4,5} Over the last number of years there has been an increasing trend in the number of ‘Reserve’ antibiotics prescribed in the hospital sector in European countries. Encouragingly, 3.3% of antibiotics prescribed at the time of the PPS were assigned to the ‘Reserve’ category, which is lower than the EU/EEA population-weighted mean percentage of ‘Reserve’ antibiotics in 2021 which was 3.7%.⁴ Continued evaluation of the AWaRe classification in the national acute hospital PPS will allow for more meaningful analysis of trends and comparisons over time in order to inform AMS efforts both locally and nationally.

Overall use of both co-amoxiclav and piperacillin-tazobactam remains high in Ireland with a trend towards broader spectrum agents shown by the piperacillin-tazobactam increasing and co-amoxiclav decreasing. Due to the broad spectrum of these agents, they have a propensity to promote antimicrobial resistance.

In line with previous PPS, the majority of antimicrobial use was parenteral. The proportion of parenteral use saw an increase in 2022. This trend is concerning and highlights the need to promote clinical criteria and guidelines for intravenous-to-oral conversion, once the patient’s condition allows. As per [HSE AMRIC Antimicrobial Stewardship Guidance for all Healthcare Settings](#), oral prescribing should be used wherever possible and confers numerous benefits for patients, healthcare resources and the environment.

There was an increase in the proportion of certain agents with excellent oral bioavailability (metronidazole, linezolid, levofloxacin) that were used parenterally compared to 2021. Parenteral clindamycin use remained stable while there was a small decrease in the proportion of ciprofloxacin used parenterally. Overall there is increased capacity for intravenous-to-oral switches considering the number of agents prescribed parenterally which have excellent bioavailability and as growing evidence supports increased use of the oral route for infections that were traditionally only treated parenterally.

Metronidazole use remained stable compared to 2021, however there was an increase in overall parenteral use of this agent. A positive finding was the reduction in use of metronidazole in combination with agents with anaerobic activity seen in 2022. Since metronidazole is the most widely prescribed agent of the specific antibiotics with excellent oral bioavailability, it represents an opportunity for local and national improvement of prescribing practice, and consequently, patient safety.

There was a positive trend observed in the increasing proportion of prescriptions with a planned review or duration documented over the last number of years. Encouragingly, the proportion of antimicrobial prescriptions considered to be of appropriate duration has remained high over the last number of years. This demonstrates the success of antimicrobial stewardship efforts promoting and sustaining a prescribing culture that includes regular review and setting a maximum duration of

treatment where appropriate. The proportion of antimicrobial prescriptions where choice was in line with local guideline or micro/ID approved remains high over the last number of years.

There was an increase in the proportion of surgical antibiotic prophylaxis extended beyond 24 hours from 2021 to 2022. This is in contrast to the previous decreasing trend observed in the period 2018 to 2021. An increase in the percentage of antimicrobial agents prescribed for surgical antibiotic prophylaxis was also observed compared to previous years. It is recognised that changes in volume of surgical procedures performed as well as the category of patients receiving surgery during the acute phase of the COVID-19 pandemic may have impacted these results.

Surgical antibiotic prophylaxis has been the subject of a national quality improvement project. A national surgical antibiotic prophylaxis duration position statement was published in Q3 2021. Compliance with this position statement is now a key measure outlined in the HSE AMRIC action plan 2022-2025. Additional criteria specifically relating to surgical antibiotic prophylaxis extended beyond 24 hours was added to the 2022 PPS in order to support targeted quality improvement in line with the national consensus position statement. A specific reason for extending surgical antibiotic prophylaxis beyond 24 hours was documented in only 31% of patients. Increased documentation is a key area identified for quality improvement.

Almost three quarters of those had a valid reason for continuing; 33% of prescriptions with a documented reason for continuing surgical antibiotic prophylaxis beyond 24 hours were observed to be in line with locally approved guidelines, 22% due to confirmed/suspected infection diagnosed pre-op/intra-op and 9% due to confirmed/suspected infection diagnosed post-op. As per [National Position Paper on Surgical Antibiotic Prophylaxis Duration \(Oct 2021\)](#) antibiotic prophylaxis should not be continued on the basis that drains remain in place. This was cited as the reason for continuing antibiotic beyond 24 hours in 18% of cases. This and further detail available in Appendix 3 will support and promote hospital level actions which may include amendment of local protocols and documents, use of audit to support local quality improvement, and dissemination of the position statement through established governance structures and education.

Limitations

- It should be noted that when assigning the WHO AWaRe classification to the treatments both fosfomycin and minocycline were assigned to 'Watch' category (limit for inclusion as 'Watch' category for these agents was set at oral usage above 66%, in 2022 PPS 100% of use of these agents was oral). Rifamycin was assigned to the 'other' category (limit for inclusion as 'other' was set at above 66% of use due to its indication for prevention of hepatic encephalopathy in liver disease).
- It should be noted there was a change in the phrasing in one question from "review date or duration documented" to "planned review or duration documented" in 2022 and this may have influenced trends seen in this parameter.
- The list of potential reasons included in the PPS protocol for extending surgical antibiotic prophylaxis beyond 24 hours included infection related reasons and so the rationale for continuing antibiotics is treatment and no longer prophylaxis. This will need to be reviewed in future PPS protocol iterations.

Key recommendations

Key antimicrobial stewardship areas for local improvement, if applicable, which the survey has highlighted are as follows:

1. Promote use of 'Access' antibiotics where appropriate.
2. Focus on promoting oral use of agents with excellent oral bioavailability.
3. Reduce surgical antibiotic prophylaxis extended beyond 24 hours duration.

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

- Ensure widespread communication of PPS findings to highlight priority areas for quality improvement.
- Summarise PPS findings in infographic format which is easily digestible and highlights key points for all healthcare professionals and healthcare managers.
- Continue to collaborate with the National Clinical Programme for Surgery and the Royal College of Surgeons in Ireland and establish relationships with relevant speciality groups to maintain a focus on the position statement on surgical antibiotic prophylaxis duration.
- Start the process to create a national green/amber/red classification for antimicrobials in acute hospitals to support feedback and quality improvement.
- Promote oral use of antimicrobials with excellent oral bioavailability through development of supportive resources and in line with the HSE AMRIC Antimicrobial Stewardship Guidance for all Healthcare Settings.

Acknowledgements

We would like to acknowledge the work and input of all the antimicrobial pharmacists and multidisciplinary antimicrobial stewardship teams in the acute hospitals across Ireland who participated in the PPS 2022. We would also like to acknowledge the work of the Health Protection Surveillance Centre (HPSC) and in particular Ajay Oza, Senior Epidemiologist, HPSC.

References

1. World Health Organization (WHO). WHO Access, Watch, Reserve (AWaRe) classification of antibiotics for evaluation and monitoring of use, 2021. Geneva: WHO; 2021 (WHO/MHP/HPS/EML/2021.04). Available from: <https://www.who.int/publications/i/item/2021-aware-classification>
2. Sharland M, Pulcini C, Harbarth S, Zend M, Gandra S, Mathur S, et al. Classifying antibiotics in the WHO Essential Medicines List for optimal use—be AWaRe. *Lancet Infect Dis*, 2018 Jan;18:18–20. doi:10.1016/S1473-3099(17)30724-7.
3. World Health Organization (WHO). Thirteenth General Programme of Work (GPW13): metadata for impact measurement indicators. Geneva: WHO; 2020. Available from: <https://www.who.int/about/what-wedo/thirteenth-general-programme-of-work-2019---2023>
4. ECDC. Antimicrobial consumption in the EU/EEA (ESAC-net) Annual Epidemiological Report for 2021. https://www.ecdc.europa.eu/sites/default/files/documents/ESAC-Net_AER_2021_final-rev.pdf
5. Antimicrobial consumption dashboard (ESAC-net) available at: <https://www.ecdc.europa.eu/en/antimicrobial-consumption/surveillance-and-disease-data/database>



Appendix 2: List of participating Hospitals

Table 1: National acute hospital PPS 2022 - participating hospitals	
Model 4 hospitals	
Hospital Name	Hospital Group
Beaumont Hospital	RCSI Hospitals Group
St James's Hospital	Dublin Midlands Hospital Group
St Vincent's University Hospital, Elm Park	Ireland East Hospital Group
Tallaght University Hospital	Dublin Midlands Hospital Group
University Hospital Limerick	UL Hospitals Group
University Hospital Waterford	South / South West Hospital Group
Galway University Hospitals	Saolta University Health Care Group
Model 3 hospitals	
Hospital Name	Hospital Group
Naas General Hospital	Dublin Midlands Hospital Group
Midland Regional Hospital, Tullamore	Dublin Midlands Hospital Group
Cavan General Hospital	RCSI Hospitals Group
Our Lady of Lourdes Hospital, Drogheda	RCSI Hospitals Group
Our Lady's Hospital, Navan	Ireland East Hospital Group
Sligo University Hospital	Saolta University Health Care Group
South Tipperary General Hospital, Clonmel	South / South West Hospital Group
St Luke's Hospital, Kilkenny	Ireland East Hospital Group
Wexford General Hospital	Ireland East Hospital Group
Mercy University Hospital	South / South West Hospital Group
University Hospital Kerry, Tralee	South / South West Hospital Group
Mayo General Hospital, Castlebar	Saolta University Health Care Group
Portiuncula University Hospital, Ballinasloe	Saolta University Health Care Group
Model 2 hospitals	
Hospital Name	Hospital Group
St Columcille's Hospital, Loughlinstown	Ireland East Hospital Group
St Michael's Hospital, Dun Laoghaire	Ireland East Hospital Group
Ennis Hospital	UL Hospitals Group
Nenagh Hospital	UL Hospitals Group
St John's Hospital, Limerick	UL Hospitals Group
Bantry General Hospital	South / South West Hospital Group
South Infirmary/Victoria University Hospital, Cork	South / South West Hospital Group
Roscommon University Hospital	Saolta University Health Care Group
Maternity hospitals (single speciality)	
Hospital Name	Hospital Group
Coombe Women and Infants University Hospital	Dublin Midlands Hospital Group
National Maternity Hospital, Holles St.	Ireland East Hospital Group
Rotunda Hospital	RCSI Hospitals Group
University Maternity Hospital, Limerick	UL Hospitals Group
Cork University Maternity Hospital	South / South West Hospital Group
Paediatric hospitals (single speciality)	
Hospital Name	Hospital Group



Our Lady's Children's Hospital, Crumlin	Children's Health Ireland
Tallaght Children's Hospital	Children's Health Ireland
Children's University Hospital, Temple St.	Children's Health Ireland
Single speciality HSE hospitals	
Hospital Name	Hospital Group
Royal Victoria Eye and Ear Hospital, Dublin	Ireland East Hospital Group
St Luke's Hospital, Rathgar	Dublin Midlands Hospital Group
Cappagh National Orthopaedic Hospital	Ireland East Hospital Group
Croom Orthopaedic Hospital	UL Hospitals Group
Kilkreene Orthopaedic Hospital, Co. Kilkenny	South / South West Hospital Group
National Rehabilitation Hospital	Ireland East Hospital Group
Private Hospitals	
Hospital Name	Hospital Group
Bon Secours Hospital, Glasnevin	Private Hospital
Mater Private Hospital, Dublin	Private Hospital
Blackrock Clinic	Private Hospital
St Vincent's Private Hospital	Private Hospital
Bon Secours Hospital, Cork	Private Hospital
Bon Secours Hospital, Tralee	Private Hospital
Galway Clinic, Doughiska	Private Hospital
Beacon Hospital, Sandyford	Private Hospital
Bon Secours Hospital, Galway	Private Hospital
Hermitage Medical Clinic, Lucan	Private Hospital
Mater Private Hospital, Cork	Private Hospital

Appendix 3: Surgical Antibiotic Prophylaxis Extended beyond 24 hours

Table 1: Surgical antibiotic prophylaxis therapies >24 hours by surgical speciality (37 hospital with data)		
Surgical speciality	All hospitals number of prescriptions >24 hours	%
Trauma orthopaedic lower limb	28	15.5%
Urology	25	13.8%
Colorectal	22	12.2%
Gynaecology	21	11.6%
General surgery	12	6.6%
Paediatric surgery	12	6.6%
Otolaryngology	11	6.1%
Cardiothoracic	8	4.4%
Plastic surgery	6	3.3%
Vascular	6	3.3%
Breast surgery	5	2.8%
Neurosurgery	4	2.2%
Obstetrics	4	2.2%
Upper gastrointestinal and hepatobiliary	4	2.2%
Cardiology	2	1.1%
Maxillofacial and dental	2	1.1%
Transplant	2	1.1%
Ophthalmology	1	0.6%
Other	5	2.8%
NA	1	0.6%
Total	181	
		<i>37 hospitals with data</i>

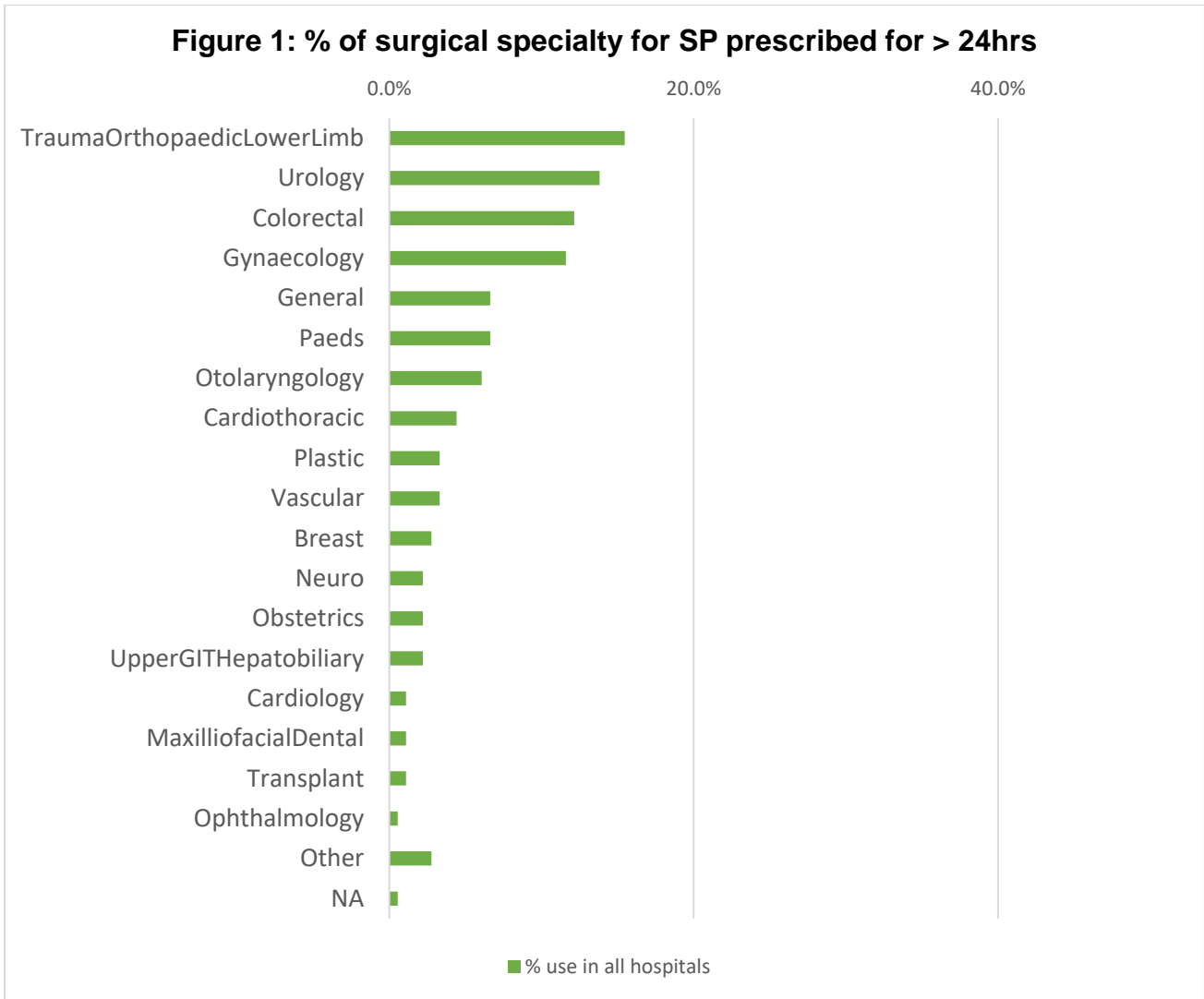


Table 2: Documented reason when surgical antibiotic prophylaxis was prescribed for more than 24 hours (35 hospital with data)

If surgical prophylaxis prescribed for more than 24 hours, was there a specific documented reason?	Yes	No	Not Applicable	Total
All hospitals	55	123	2	180

Figure 2: Surgical antibiotic prophylaxis prescribed for more than 24 hours - reason documented

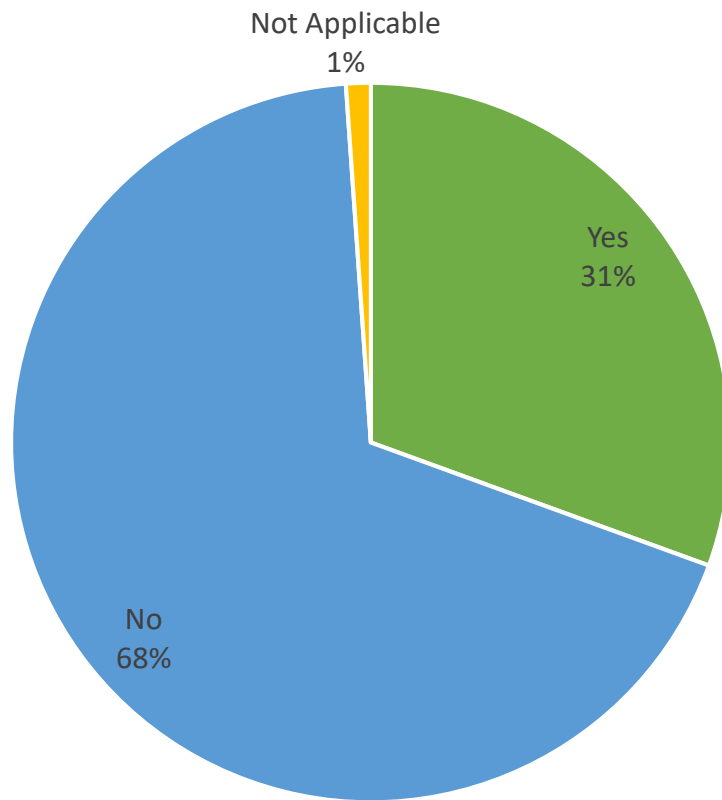


Table 3: Reason for extending surgical antibiotic prophylaxis beyond 24 hours (21 hospitals with data)

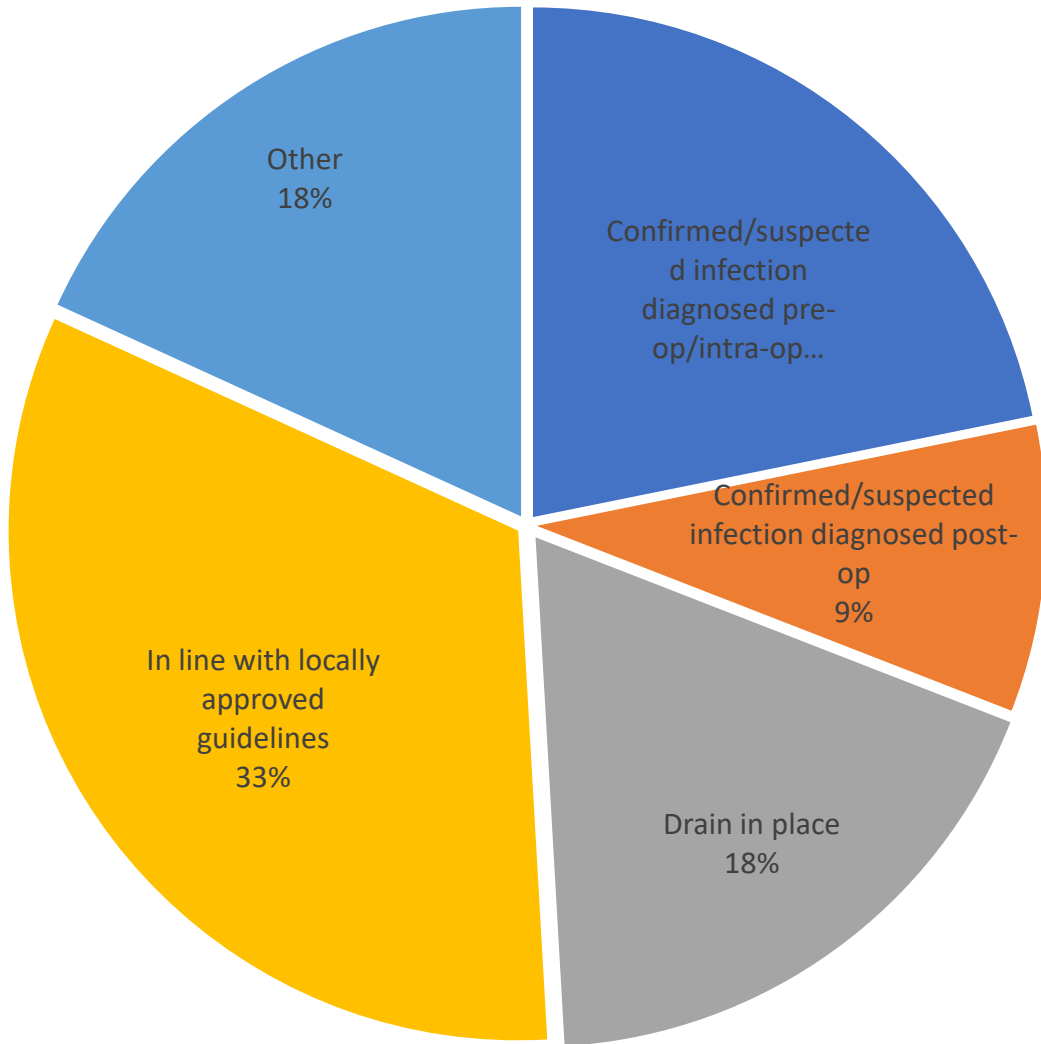
If 'Yes', what was the reason for continuing the antibiotics beyond 24 hours?	Confirmed/suspected infection diagnosed pre-op/intra-op	Confirmed/suspected infection diagnosed post-op	Drain in place	In line with locally approved guidelines	Other	Total
All hospitals	12	5	10	18	10	55

Table 4: 'Other' reasons for extending surgical antibiotic prophylaxis beyond 24 hours (10 responses, 4 hospitals)*

Chest remained open	3
Surgeons requested 5 days, moved from prophylaxis to treatment	3
Surgical preference for 48 hours	1
No	1
Urology team are treating the MSU result in an asymptomatic patient	2

*Note these responses were free typed by individual hospital data collectors.

Figure 3: Reason for extending surgical antibiotic prophylaxis beyond 24 hours



**Table 5: Surgical procedure stated if surgical antibiotic prophylaxis > 24 hours
No reason for extending surgical antibiotic prophylaxis beyond 24 hours documented
(n=123)***

Specialties	Procedures	Responses
Breast	Mastectomy and SLN biopsy	1
	Simple mastectomy, unilateral	2
Cardiology	Cardiology	1
	PPM replacement	1
Cardiothoracic	CABG	2
	Trachea reconstruction	1
	Mechanical aortic valve	1
Colorectal	Bowel resection with coloanal anastomosis	1
	Hemicolectomy	4
	Laparoscopic Anterior resection	2
	Small bowel resection	2
	Stoma reversal	2
	Surgical closure of enterostomy with resection and anastomosis	3
	Surgical closure of enterostomy with resection and anastomosis and hernia repair	1
General	Appendectomy	3
	Laparoscopic appendectomy	1
	Laparoscopic Gastric Bypass	2
	Reversal of hartmann's	1
	Small bowel resection	1
	Procedure not specified	1
Gynaecology	endomet	3
	Gynaecology	1
	hysterect	6
	Laparoscopy	1
	Laparoscopy and BSO	1
	Laparoscopy and cyst drainage	1
	oophorectomy	2
Maxillofacial and dental	Partial resection of mandible	1
	Had exploration of tongue ligation of lingual artery	1
Neuro	Combined posterolateral and posterior lumbar interbody spinal fusion	1
	Removal of lesion of cerebrum	1
Obstetrics	Obstetrics	1
	Elective lower segment caesarean section	1
Other	Anterior cervical decompression	1
	Bilateral lumbar decompression	1
	Hand surgery	1

	Procedure not specified	2
Otolaryngology	Excision exostoils ear	1
	Nasendoscopy	2
	Repair of CSF leak	1
	Septoplasty	1
	Thyroidectomy	1
	Tonsillectomy without adenoidectomy	1
	Neck dissection and wide resection	1
	Thyroidectomy & Parotidectomy & neck dissection	1
Paeds	Splenectomy	1
	Cleft palate	1
	Colorectal	3
	Paeds sternotomy	1
Plastic	Abdomino plasty	2
	Breast reduction	1
	Exc debridement skin & sbc tissue	1
	FESS	1
Trauma orthopaedic lower limb	Open rdctn fx ankle IF diats/fib/malus	2
	Spinal decompression	1
	IF fracture trochanteric/subcapitl femur	1
	Acetabulutum ORIF	1
	Arthroplasty	1
	Arthroscopic debridement of knee	1
	Fusion	1
	Insertion of spinal cord stimulator	1
	Osteotomy	1
	Spinal fusion	1
	TKR	1
	Total arthroplasty of hip, unilateral	1
	Total arthroplasty of knee, unilateral	4
	TraumaOrthopaedicLowerLimb	1
	Washout and debridement of open tibial fracture and IM nail left tibia	1
Revision of pubic symphysis	1	
UpperGITHepatobiliary	Pancreaticoduodenectomy w stoma frm	1
	Segmental resection of liver	1
Urology	Epididymectomy and hydrocelectomy	1
	Laser photoselective vaporization of the prostate	1
	Nephrostomy	1
	Post left Percutaneous nephrolithotomy	1
	Transurethral prostatectomy	2
	Transurethral resection of prostate	9
	Post left Percutaneous nephrolithotomy	1

	Procedure not specified	1
Vascular	Aortic aneurism repair	1
	Femoral angioplasty	1
	Haemorrhoidectomy	2
	Interruption sapheno-femoral jct VV	1
Reason for extending SAP beyond 24 hours was 'Drain in place' (n=10)*		
Speciality	Procedure	Responses
Breast	Mastectomy and reconstruction	1
Colorectal	Laparoscopic appendicectomy/gangrenous with pelvic collection	1
	Repair of inguinal hernia, unilateral	1
Otolaryngology	Otolaryngology	1
Plastic	Breast reduction	1
	Capsulectomy and Exchange of implant	1
TraumaOrthopaedicLowerLimb	Total hip replacement revision	1
	Left tibia open fracture with internal fixation	1
	Total hip replacement	1
Urology	Revision of abdo wound and sinus tract excision	1
Reason for extending SAP beyond 24 hours was 'Other' (n=10)*		
Specialities	Procedures	Responses
Neuro	Insertion of Deep Brain Stimulator	1
Paeds	Paeds Laparotomy	3
	Paeds sternotomy	3
TraumaOrthopaedicLowerLimb	TKR	1
Urology	Cystoscopy	2

*Note - where the procedure type was not available from the dropdown list, the response was free typed by individual hospital data collectors.