



**National Public Health
Service for Wales**

**Gwasanaeth Iechyd Cyhoeddus
Cenedlaethol Cymru**

Report on Point Prevalence Survey of Antimicrobial Prescribing in Secondary Care in Wales

2008

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Version: 1 Antimicrobial PPS - Wales	Page: 1 of 49	Welsh Antibacterial Resistance Programme: Surveillance Unit

INTRODUCTION

Issues in Antimicrobial Usage

While the use of antimicrobial agents has revolutionised our ability to treat infections, it is associated inevitably with the risk of development and spread of antimicrobial resistance leading to infections that are increasingly difficult to treat, and antimicrobial-associated adverse events, importantly *Clostridium difficile*-associated disease (CDAD).

It has been estimated that between 20-50% of antimicrobial use, both in the Community and in Hospitals, is “inappropriate”. This means that patients and society may be exposed to a significant unnecessary risk of resistant infections and CDAD. In addition there is a financial cost, not only in terms of unnecessary antimicrobial use, but also the additional cost of treating resistant infections and CDAD.

Surveillance of Antimicrobial Usage in Secondary Care

A key step in improvement of antimicrobial use is the surveillance and assessment of current antimicrobial usage. This can be achieved using a number of complementary methods:

- Gross surveillance of antimicrobial usage at the hospital, specialty or ward/unit level: This can provide comparative information regarding the choice and quantity of agents used, but does not address the indications or appropriateness of antimicrobial use. Data for hospitals across Wales can be accessed via the NPHS report at (<http://howis.wales.nhs.uk/sites3/page.cfm?orgld=457&pid=20791>).
- Point Prevalence Survey (PPS): In this type of survey, the prescription chart of every patient in a ward or hospital on a set day is checked to see if an antibiotic has been prescribed, and the reasons for the prescription are recorded. This local information about which antibiotics are used and why can be used to target interventions.
- Local unit/ward audits: Audit can be used to explore in detail the indications, dose, duration etc. of antimicrobial prescriptions in order to identify areas for improvement.

The current report provides a simple overview of data collected as part of the first All-Wales Point Prevalence Survey (PPS) of antibacterial usage in secondary care; the PPS was supported and carried out by pharmacists in nineteen hospitals across Wales during November/December 2008 to mark the first European antibacterial awareness day (18th November 2008). This report allows for comparison between units, although it should be noted that, for this first survey, ward coverage was variable between different hospitals. Thus comparisons should be made with caution. More detailed data for each hospital unit is published separately for local use.

We would be grateful for any feedback regarding content and format of the report.

HOSPITAL INFORMATION

Data for 22 hospitals is included in these analyses:

- Aberdare Hospital (ABD)
- Brecon War Memorial Hospital (BWMH)
- Caerphilly Miners Hospital (CMH)
- Cardiff Royal Infirmary & West Wing (CRI & WW)
- Llandough Hospital (LLH)
- Llandrindod Wells Hospital (LWH)
- Morryston Hospital (MOR)
- Neath Port Talbot Hospital (NPT)
- Nevill Hall Hospital (NHH)
- Prince Charles Hospital (PCH)
- Prince Philip Hospital (PPH)
- Princess of Wales Hospital (POW)
- Royal Glamorgan Hospital (RGL)
- Royal Gwent Hospital (RGW)
- Rookwood Hospital (RKW)
- Singleton Hospital (SIN)
- University Hospital of Wales (UHW)
- Velindre Hospital (VEL)
- Withybush General Hospital (WBH)
- Wrexham Maelor Hospital (WMH)
- West Wales General Hospital (WWGH)
- Ysbyty Gwynedd (YGB)
- Ystradgynlais hospital (YST)

Note: Due to small numbers the data for Brecon, Llandrindod & Ystradgynlais hospitals has been combined with Nevill Hall (NHH*), and Aberdare has been combined with Prince Charles hospital (PCH*).

Ward Information

Patients from two hundred & twenty six wards (COE teams counted as wards) were included in the PPS. The ward specialty (general medicine, intensive care or surgery), the number of patients surveyed on the ward, and the number of patients prescribed antimicrobials at or before 8:00 am on the day of the PPS are shown in **Table 1** in **Appendix 1**.

Speciality Information

- 818 general medicine patients were prescribed antimicrobials (**30%**)
- 558 surgical patients were prescribed antimicrobials (**32%**)
- 23 mixed ward patients were prescribed antimicrobials (**20.8%**)
- 61 ITU/SCBU patients were prescribed antimicrobials (**49.6%**)
- 43 paediatric patients were prescribed antimicrobials (**33.1%**)

For the purposes of the report only systemic antimicrobial data is included in the analysis.

PATIENT INFORMATION

- 4888 patients were surveyed
- 2764 of the patients were general medicine patients (**56.9%**)
- 1787 of the patients were surgical patients (**36.6%**)
- 72 of the patients were from mixed medical/surgical wards (**1.5%**)
- 123 of the patients were ITU/SCBU patients (**2.5%**)
- 142 of the patients were paediatric patients (**2.5%**)
- Of the 4888 patients surveyed 1503 were prescribed systemic antimicrobial/s (**31%**).
 - 1503 were prescribed systemic antimicrobials (including antibacterials, antifungals, antivirals & TB regimens)
 - 1483 were prescribed systemic antibacterials only (including rifampicin but not ethambutol, isoniazid or pyrazinamide)
 - Data collected for topical agents and antiseptics are not included in these analyses
- The proportion of patients prescribed antimicrobial/s in the Wales PPS (**31%**) is comparable to the proportion published for the ESAC 2008 PPS (**32%**); comprising prescribing in 46 hospitals across Europe.

http://app.esac.ua.ac.be/esac_webpps

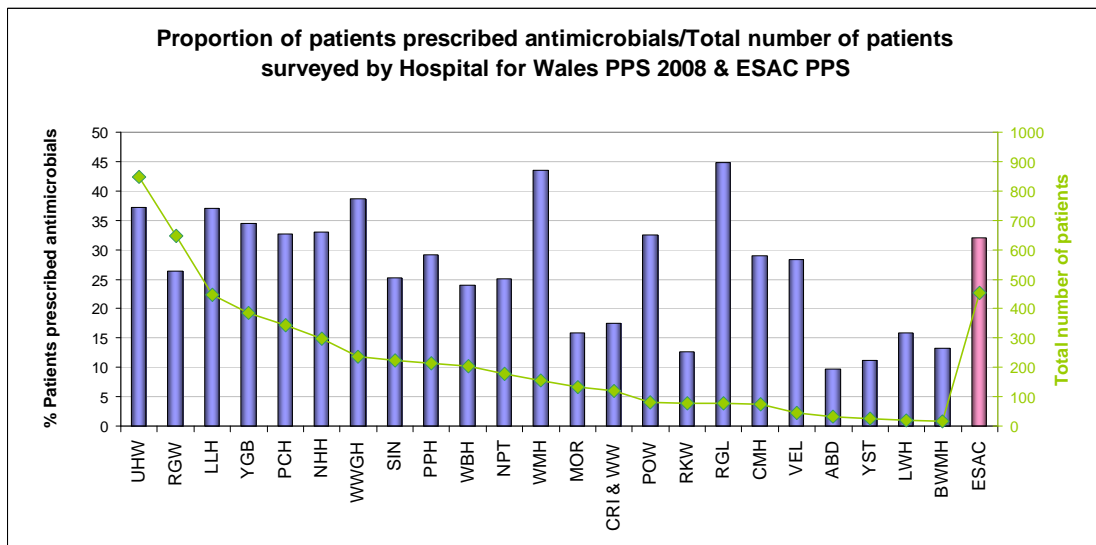


Figure 1: Proportion of patients prescribed antimicrobials and total number surveyed.

The total number of patients surveyed and the proportion of patients for whom antimicrobials were prescribed on the day of the PPS are shown in **Figure 1** along with the figures for the ESAC 2008 PPS. The ESAC PPS figures show the median number of patients (453 patients) and the median proportion of patients prescribed antimicrobials (**32%**) for the 46 hospitals included in the PPS. **Note:** The hospitals included in the ESAC PPS surveyed all hospital in-patients where as a number of the hospitals that took part in the Wales PPS limited their survey to certain specialities e.g. general medicine and surgery.

The age and gender of the 1503 patients prescribed antimicrobials is shown in **Figure 2**. Nearly than half of the patients that were prescribed an antibacterial/s were 75 years or more in age (**45.4%**); in this PPS study group **48%** of the patients were male and **52%** were female. The age group and genders of patients at individual hospital level is shown in **Tables 2 & 3** in **Appendix 1**.

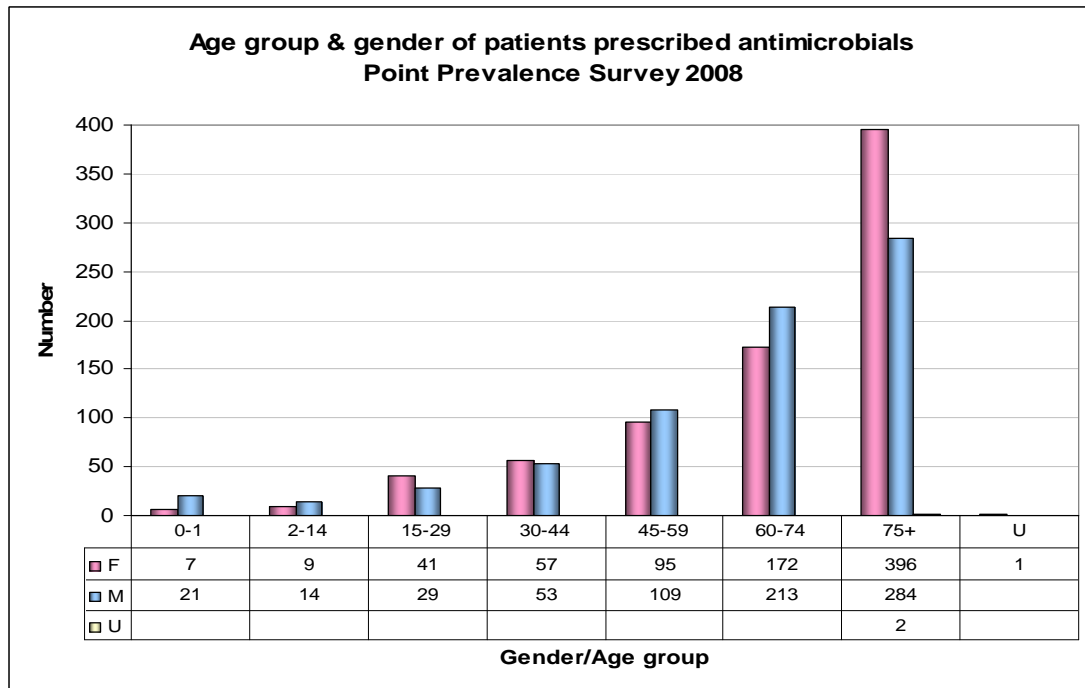


Figure 2: Age group & gender of patients prescribed antimicrobials (n = 1503)

CLINICAL INDICATIONS

The PPS included four main indications for antibacterial usage:

- **A** – Community acquired infection
- **B** – Hospital acquired infection
- **C** – Surgical prophylaxis
- **D** – Medical prophylaxis

Of the 4888 patients surveyed antibacterial agents were prescribed for the following clinical indications (See **Figure 3**):

- 687 patients were prescribed antibacterials for a community acquired infection only (**14.1%**)
- 469 patients were prescribed antibacterials for a hospital acquired infection only (**9.6%**)
- 196 patients were prescribed antibacterials for surgical prophylaxis only (**4%**)
- 60 patients were prescribed antibacterials for medical prophylaxis only (**1.2%**)
- 28 patients were prescribed antibacterials for community acquired infection and a hospital acquired infection (**0.6%**)
- 4 patients were prescribed antibacterials for community acquired infection and surgical prophylaxis (**0.1%**)
- 15 patients were prescribed antibacterials for community acquired infection and medical prophylaxis (**0.3%**)
- 1 patient was prescribed antibacterials for a community acquired infection and an unknown indication (**< 0.1%**)
- 4 patient was prescribed antibacterials for hospital acquired infection and surgical prophylaxis (**0.1%**)
- 10 patients were prescribed antibacterials for hospital acquired infection and medical prophylaxis (**0.2%**)
- 1 patients was prescribed antibacterials for a hospital acquired infection and an unknown indication (**< 0.1%**)
- 1 patient was prescribed antibacterials for surgical prophylaxis and medical prophylaxis (**< 0.1%**)
- 7 patients were prescribed antibacterials for an unknown indication (**0.1%**)
- 3405 patients were not prescribed antibacterials (**69.7% - NoABx**)

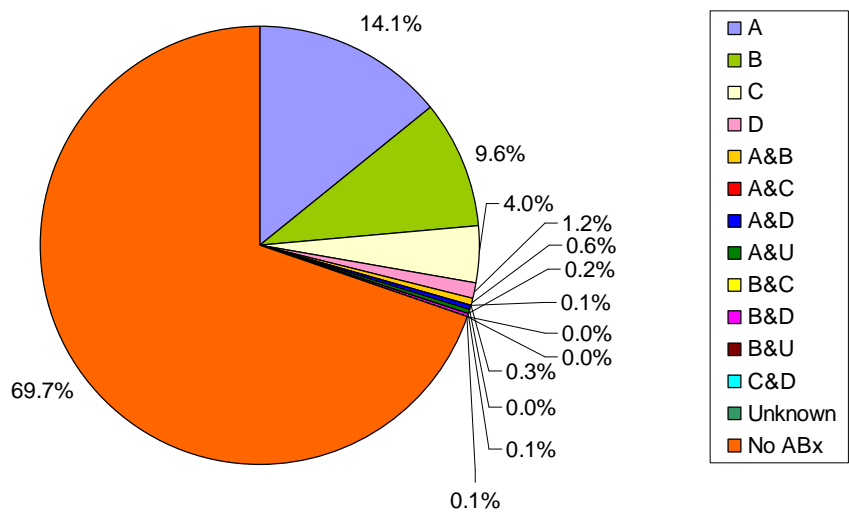


Figure 3: Clinical indication for antibacterial prescribing in patients (n = 4888)
 Figure 2 shows that 24.2% of patients were prescribed an antibacterial for an infection (A&B), 5.3% as prophylaxis (C&D), 0.6% for infection & prophylaxis (A, B, C & D) and 0.2% for an unknown indication (U).

Indication for antibacterial

The indications recorded for the antimicrobial prescriptions (including antiviral, antifungal, and anti-TB) in the 1503 patients are shown in **Figure 4**.

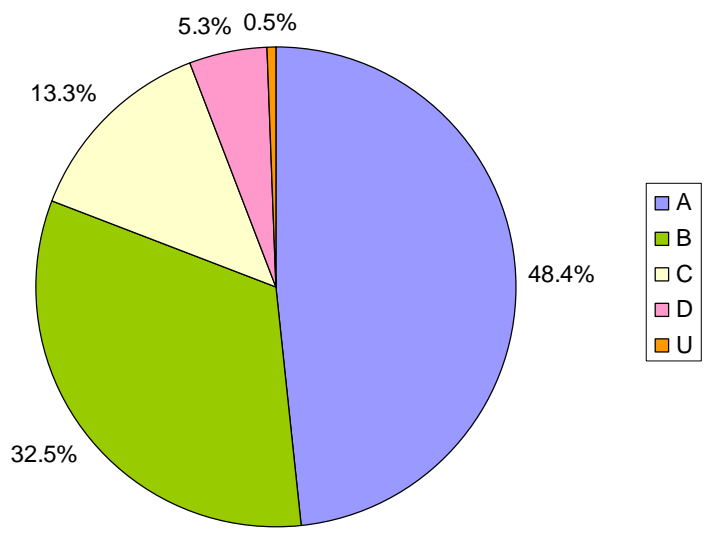


Figure 4: Antimicrobial prescribing by indication (n = 2233)

- 1103 antimicrobials were prescribed for community acquired infections (48.4%)
- 700 antimicrobials were prescribed for hospital acquired infections (32.5%)
- 286 antimicrobials were prescribed for surgical prophylaxis (13.3%)
- 132 antimicrobials were prescribed for medical prophylaxis (5.3%)
- 12 antimicrobials were prescribed for an unknown or mixed indication (where unsure if indication was A or B) (0.5%)

The proportions of antimicrobials prescribed for the indications (A-D) differ to the median proportions recorded in the ESAC 2008 PPS but fall within the interquartile range (25%-75% IQR)

- Wales PPS prescribing for indications A&B (infections) = **81%**
- **ESAC PPS** prescribing for indications A&B (infections) = **74%**
(IQR 58% - 84%)
- Wales PPS prescribing for indications C&D (prophylaxis) = **19%**
- **ESAC PPS** prescribing for indications C&D (prophylaxis) = **26%**
(IQR 15% - 41%)

The indication for each of the antibacterial prescribed for the patients in each of the hospitals is shown in **Table 4** in **Appendix 1**. Unsurprisingly the hospital with the highest number of antimicrobials prescribed on the day of the PPS was **UHW** (512 antimicrobials were prescribed for 315 patients). The indications for the antimicrobials were: 186 (**36.3%**) for community acquired infections, 201 (**39.3%**) for hospital acquired infections, 55 (**10.7%**) surgical prophylaxis, 68 (**13.3%**) medical prophylaxis and 2 (**0.4%**) were prescribed for unknown indications.

The proportion of instances where the reason for an antimicrobial prescription was recorded in the patient notes is shown in **Table 1**. Overall, the reason for a prescription was recorded in **83.9%** of cases; the reason for the prescription was less likely to be recorded in the notes when the antimicrobial was being prescribed as surgical prophylaxis (**61.5%**) or medical prophylaxis (**72.7%**). The figures for individual hospitals are shown in **Table 5** in **Appendix 1**.

Table 1: Reason for prescription recorded in the notes

Indication	No	Yes	Unknown	Total	% Yes
A	126	976	2	1104	88.4%
B	77	625		702	89.1%
C	110	176		286	61.5%
D	36	96		132	72.7%
Unknown	9			9	0%
All indications	358	1873	2	2233	83.9%

For the indications A-D the median proportion of 'reason recorded in notes' in the Wales PPS was **81%** (IQR 70%-89%); slightly higher than the median rate published for the ESAC PPS of **78%** (IQR 54%-89%).

ANTIMICROBIAL INFORMATION

Sixty-two different antimicrobials were prescribed as treatment/prophylaxis in this patient group (see **Table 2**); comprising 2233 issues to 1503 patients:

Table 2: Antimicrobials included in PPS group

Antimicrobial	ATC Code	No. of Scripts	Antimicrobial	ATC Code	No. of Scripts
Co-amoxiclav	J01CR02	286	Fusidic Acid	J01XC01	10
Metronidazole	J01XD01	280	Azithromycin	J01FA10	9
Cefuroxime	J01DC02	193	Amikacin	J01GB06	8
Ciprofloxacin	J01MA02	178	Amphotericin	J02AA01	7
Clarithromycin	J01FA09	161	Cefradine	J01DB09	6
Flucloxacillin	J01CF05	118	Ceftriaxone	J01DD04	6
Amoxicillin	J01CA04	116	Tobramycin	J01GB01	6
Trimethoprim	J01EA01	94	Caspofungin	J02AX04	5
Gentamicin	J01GB03	73	Aztreonam	J01DF01	4
Vancomycin	J01XA01	73	Moxifloxacin	J01MA14	4
Piperacillin/Tazobactam	J01CR05	70	Ethambutol	J04AK02	3
Cefotaxime	J01DD01	56	Linezolid	J01XX08	3
Benzylpenicillin	J01CE01	46	Voriconazole	J02AC03	3
Cefalexin	J01DB01	42	Isoniazid	J04AC01	2
Meropenem	J01DH02	41	Minocycline	J01AA08	2
Doxycycline	J01AA02	31	Oxytetracycline	J01AA06	2
Teicoplanin	J01XA02	31	Valganciclovir	J05AB14	2
Fluconazole	J02AC01	29	Daptomycin	J01XX09	1
Penicillin V	J01CE02	29	Darunavir	J05AE10	1
Erythromycin	J01FA01	22	Etravirine	J05AG04	1
Aciclovir	J05AB01	19	Ganciclovir	J05AB06	1
Imipenem	J01DH51	19	Lamivudine	J05AF05	1
Ceftazidime	J01DD02	18	Neomycin	J01GB05	1
Nitrofurantoin	J01XE01	18	Norfloxacin	J01MA06	1
Levofloxacin	J01MA12	16	Ofloxacin	J01MA01	1
Clindamycin	J01FF01	15	Pyrazinamide	J04AK01	1
Cefaclor	J01DC04	13	Ritonavir	J05AE03	1
Itraconazole	J02AC02	13	Tenofovir	J05AF07	1
Rifampicin	J04AB02	13	Tetracycline	J01AA07	1
Colistin	J01XB01	12	Tigecycline	J01AA12	1
Co-trimoxazole	J01EE01	12	Zidovudine	J05AF01	1
Total numbers of antimicrobials prescribed					2233

The top ten antimicrobials make up **70.4%** of all prescriptions in PPS; data for individual hospital prescribing of the top 10 is show in **Table 6** in **Appendix 1**. The top ten antimicrobial comprise:

- **Co-amoxiclav**
- **Cefuroxime**
- **Clarithromycin**
- **Amoxicillin**
- **Gentamicin**
- **Metronidazole**
- **Ciprofloxacin**
- **Flucloxacillin**
- **Trimethoprim**
- **Vancomycin**

Figure 5 shows the proportion of patients included in the PPS that were prescribed antimicrobials by specialty. Unsurprisingly, the ITUs had the highest proportion with **49.6%** of patients prescribed antimicrobials. There was little difference between the proportions prescribed in general medicine, surgery and paediatrics (**29.6%**, **31.2%** and **31.2%** respectively). The overall rate of prescribing was **30.7%**.

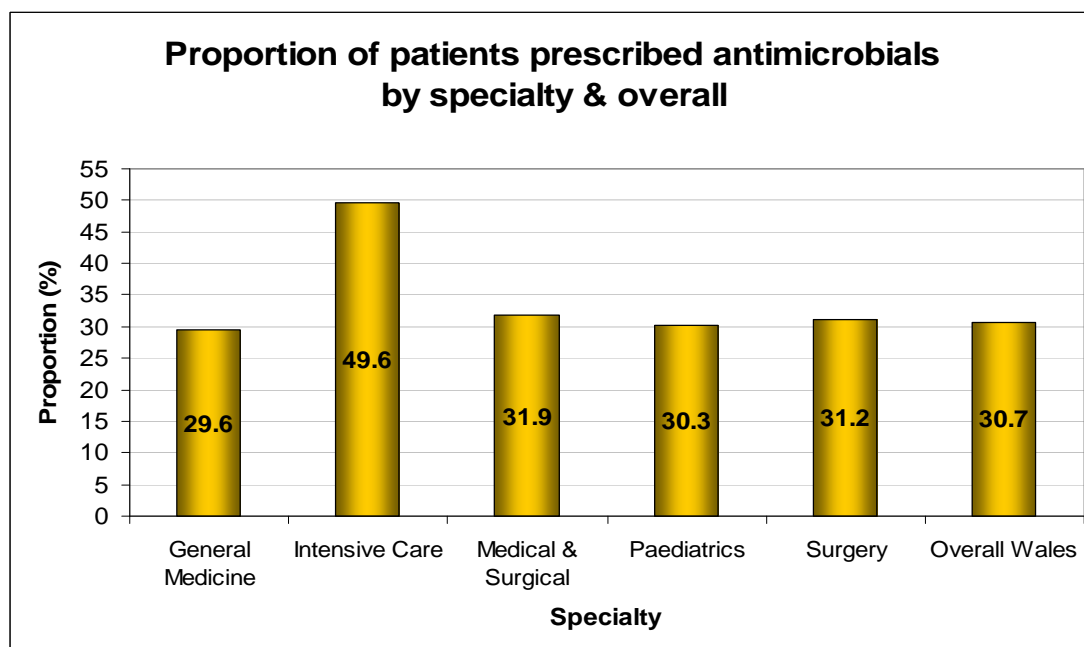


Figure 5: Antimicrobial prescribing by specialty

The proportion of oral and parenteral antibacterial prescribing at specialty level for each individual hospital/hospital group is shown in **Table 7** in **Appendix 1**. Unsurprisingly, the ITUs use more parenteral antibacterials than other specialties (**88.6%** parenteral prescribing overall). For all specialties surveyed the median proportion of parenteral antimicrobials prescribed in the Wales PPS was **45%** (IQR 22%-52%); this is significantly lower than the median rate of parenteral antimicrobial prescribing published for the ESAC PPS: **74%** (IQR 59%-79%) but the difference can probably be explained by the bias towards surveying general medicine in the Wales PPS.

Figure 6 shows the number of different antimicrobials (J01, J02, J04 and J05) and antibacterials (J01 only) prescribed in each PPS:

- The number of antimicrobials ranged from **52** (UHW) to **7** (Rookwood)
- The number of antibacterials ranged from **35** (UHW) to **7** (Rookwood)

563 of the 1483 patients (**38%**) were prescribed more than one antibacterial. There were 191 different combinations of antibacterial prescribed in this PPS patient group; the most common combinations were:

- Cefuroxime plus metronidazole (prescribed for 73 patients)
- Co-amoxiclav plus clarithromycin (prescribed for 57 patients)
- Co-amoxiclav plus metronidazole (prescribed for 28 patients)
- Benzylpenicillin plus flucloxacillin (prescribed for 23 patients)

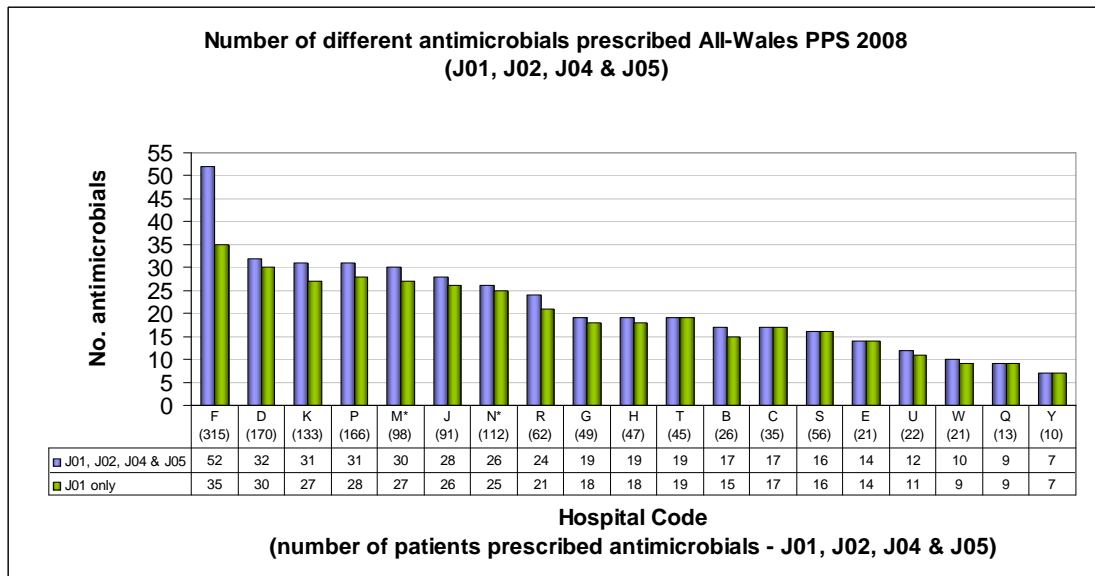


Figure 6: Number of antimicrobials/antibacterials

Figure 7 shows the proportion of antibacterials prescribed by indication (**A-D**); monotherapy was prescribed in **55.3%** of patients with community acquired infections (**A**), compared to **67.4%** with hospital acquired infections (**B**), **62.1%** surgical prophylaxis (**C**) and **64.5%** for medical prophylaxis (**D**). The figures for individual hospitals are shown in **Table 8** in **Appendix 1**.

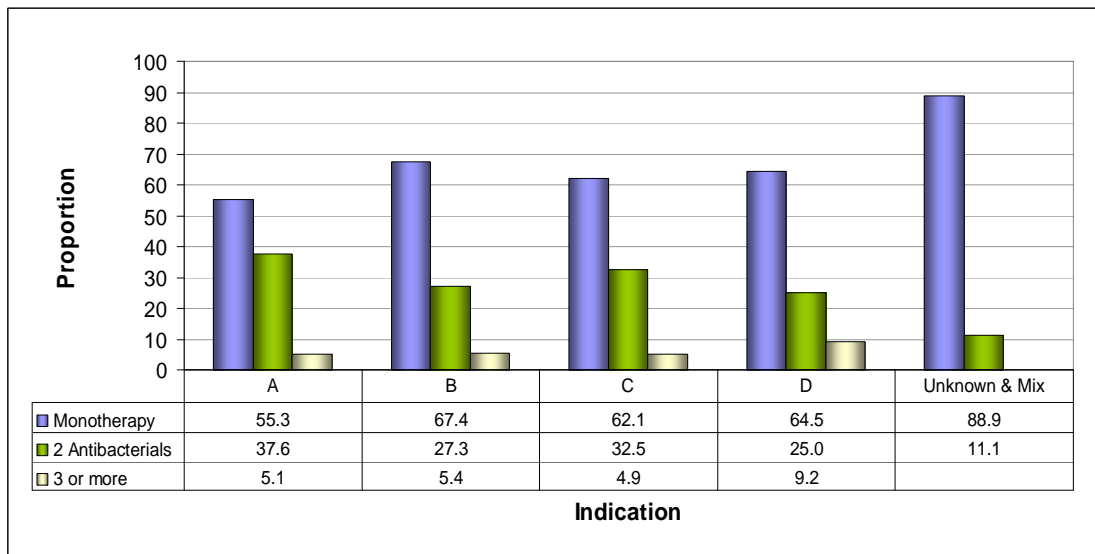


Figure 7: Prescriptions for antibacterial usage by indication

DIAGNOSIS GROUPS

The PPS included ten diagnosis groups based on anatomical site:

- Central nervous system (CNS)
- Eye
- Ear, nose, throat, mouth or larynx (ENT)
- Respiratory tract (RESP)
- Cardiovascular system (CVS)
- Gastrointestinal tract including liver and biliary tree (GI)
- Skin, soft tissue, bone and joint (SSTBJ)
- Urinary tract (UTI)
- Genitourinary tract (GUOB)
- No clear anatomical site (Not Defined)

Note: The code **MIX** has been added in instances where an antimicrobial has been prescribed for more than one diagnosis group e.g. RESP & UTI.

COMMUNITY ACQUIRED INFECTIONS (INDICATION A)

Community acquired infections (CAI) were the most common indication requiring an antimicrobial prescription.

- 735 of the 4888 patients surveyed were prescribed antibacterials for CAI (15%)
- Of the 1483 patients in the survey that were prescribed antibacterials, 735 (49.6%) were indicated for CAI (**Indication A**).
- 1103 **antimicrobials** were prescribed for CAI
- 1063 **antibacterials** were prescribed for CAI

Figure 8 shows that the number of antimicrobials prescribed by diagnosis group for each hospital/hospital group. 489 of the 1104 antimicrobials that were prescribed for indication A were for respiratory tract infections (**RESP**).

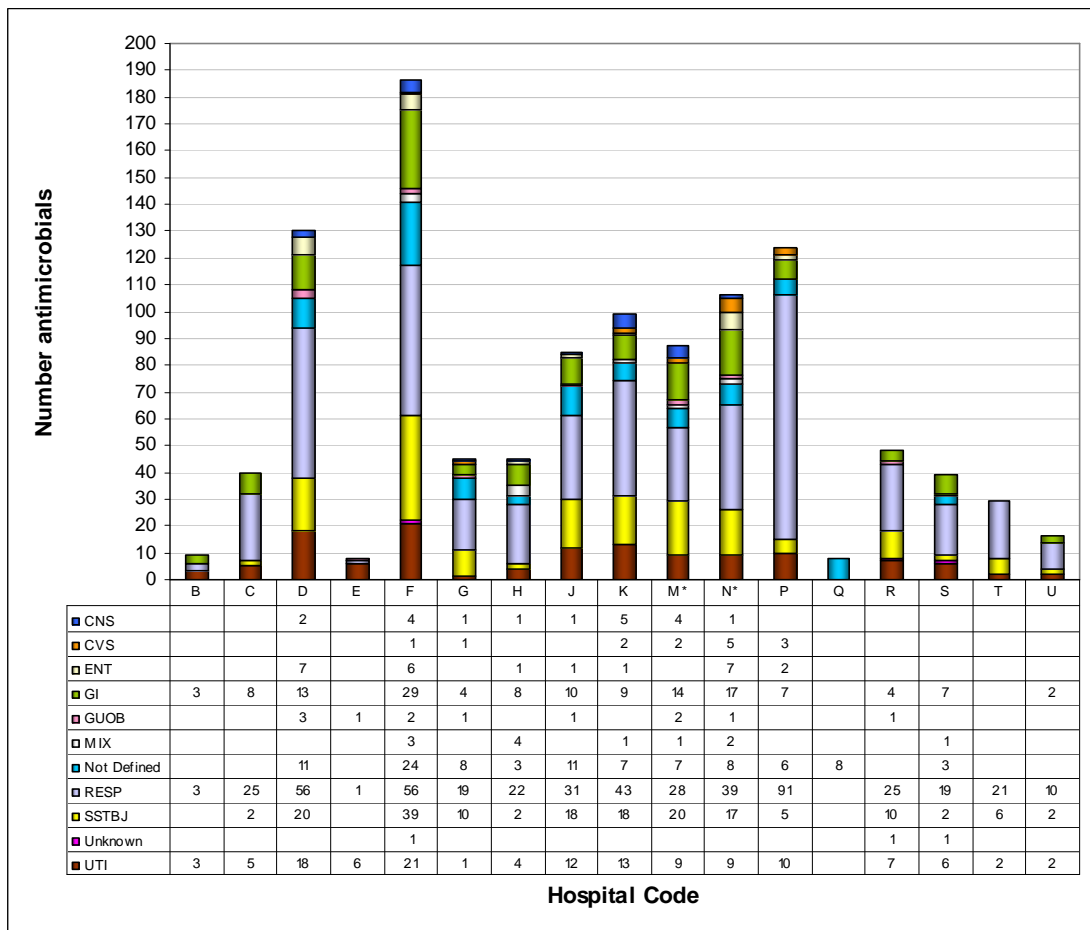


Figure 8: Antimicrobials prescribed for indication A by diagnosis group

Figure 9 shows the proportion of antimicrobials prescribed by diagnosis group for each hospital/hospital group with for indication A, with highest proportion of antimicrobials overall being prescribed for respiratory tract infections (RESP).

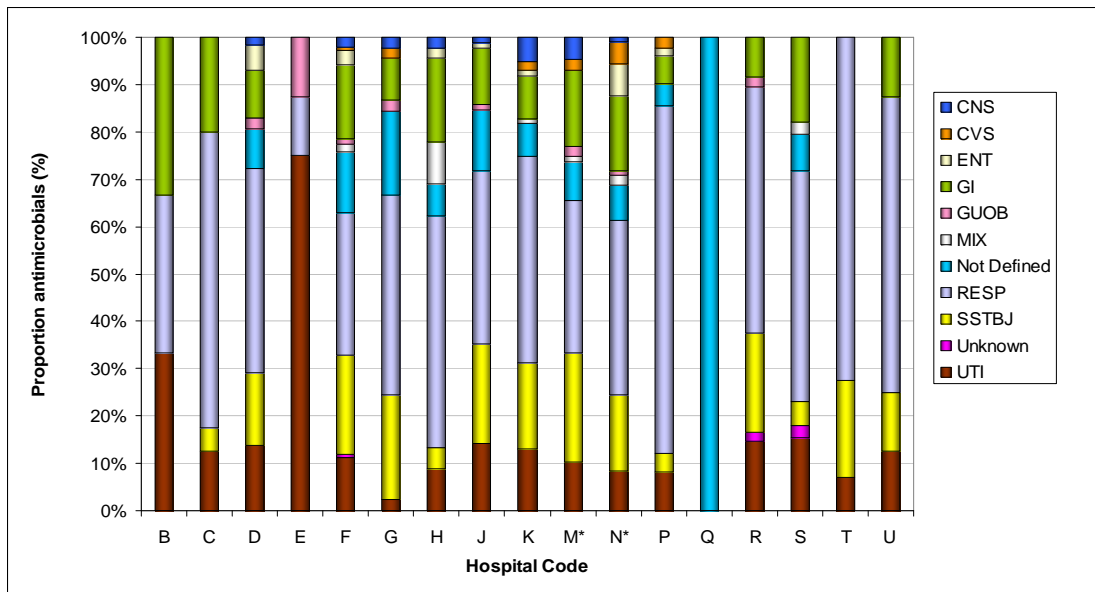


Figure 9: Proportion of antimicrobials prescribed by diagnosis group

The numbers of patients prescribed antibacterials for CAI, the diagnosis group and the number of antibacterials prescribed per patient are shown in **Table 3**. The table shows that most UTIs were treated with monotherapy where as other infections were more likely to have combination therapy in varying proportions dependent on site.

Table 3: Numbers of patients prescribed antibacterials for community acquired infections (A) by diagnosis group - excluding TB regimens

Diagnosis Code	Monotherapy	2 Antibacterials	3 or More	Total
CNS	7 (78%)	1 (11%)	1 (11%)	9
CVS	1 (14%)	4 (57%)	2 (29%)	7
ENT	8 (57%)	4 (29%)	2 (14%)	14
GI	35 (43%)	40 (49%)	6 (7%)	81
GUOB	4 (50%)	4 (50%)		8
MIX	3 (75%)	1 (25%)		4
Not Defined	27 (51%)	25 (47%)	1 (2%)	53
RESP	164 (52%)	136 (44%)	12 (4%)	312
SSTBJ	39 (40%)	46 (48%)	12 (12%)	97
Unknown	2 (100%)			2
UTI	108 (91%)	10 (8%)	1 (1%)	119
Total	398 (56.4%)	271 (38.4%)	37 (5.2%)	706

The most common community acquired infections were:

- RTI – 312 diagnoses (44.2%)
- UTI – 119 diagnoses (16.9%)
- SSTBJ – 97 diagnoses (13.7%)
- GI – 81 diagnoses (11.5%)

Note: In all instances the rates may be very slightly higher as the 4 patients with multiple-diagnoses (MIX) and patients with mixed indications e.g. community acquired infection (A) & surgical prophylaxis (C) are excluded from this data set.

Community Acquired RTI

The antibacterials prescribed for the treatment of community acquired respiratory tract infections (CA-RTI) are shown in **Figure 9**. Clarithromycin (**26%** of all prescriptions), co-amoxiclav (**23%**) and amoxicillin (**14%**) were the most commonly prescribed antibacterials; making up **63%** of all prescriptions for community acquired RTI in total. The pattern of prescribing varied widely with **70 different regimens** including monotherapies and combinations being prescribed. For some hospitals e.g. Llandough the wide variation in regimens can be explained by the inclusion of cystic fibrosis (CF) patients in this PPS; this is also likely to be the cases for other major hospitals with CF patients. Also some antibacterials were prescribed for more than one diagnosis e.g. RTI & UTI.

The BTS guidelines for treatment of a community acquired RTI are amoxicillin or co-amoxiclav +/- clarithromycin:

170 patients were prescribed antibacterials listed in the guidelines (**54%**)

- **52** co-amoxiclav plus clarithromycin
- **44** co-amoxiclav monotherapy
- **38** amoxicillin monotherapy
- **19** amoxicillin plus clarithromycin
- **17** clarithromycin monotherapy

Figure 10 shows that the number of antimicrobials prescribed for CA-RTI at individual hospital level.

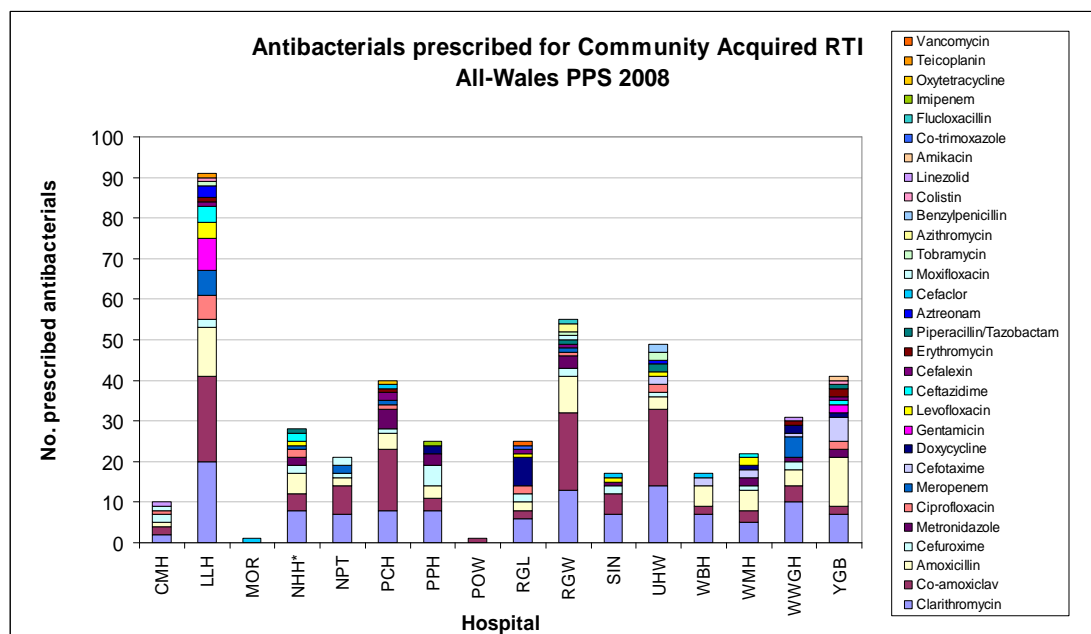


Figure 10: Antimicrobials prescribed for CA- RTI

Dosing regimens for Community Acquired RTI

Co-amoxiclav: Figure 11 shows that **57%** of patients diagnosed with a community acquired respiratory tract infection (CA-RTI) that were prescribed co-amoxiclav were prescribed 0.625g oral co-amoxiclav TDS, and **36%** were prescribed 1.2g parenteral co-amoxiclav TDS.

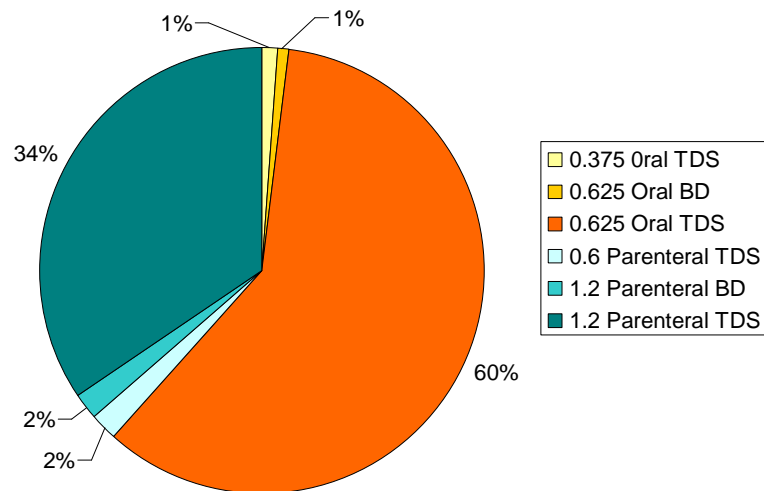


Figure 11: Prescribed dosage for treatment of CA-RTI with co-amoxiclav

Amoxicillin: Figure 12 shows that **71%** of patients with CA-RTI that were prescribed amoxicillin were prescribed 0.5g oral amoxicillin TDS and **11%** were prescribed 1g oral amoxicillin TDS.

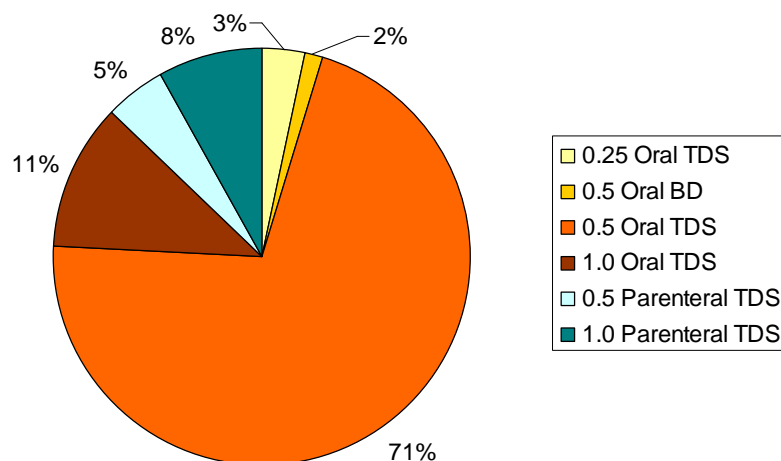


Figure 12: Prescribed dosage for treatment of CA-RTI with amoxicillin

Clarithromycin: **Figure 13** shows that **78%** of patients with CA-RTI that were prescribed clarithromycin were prescribed 0.5g oral clarithromycin BD and **16%** were 0.5g parenteral clarithromycin BD.

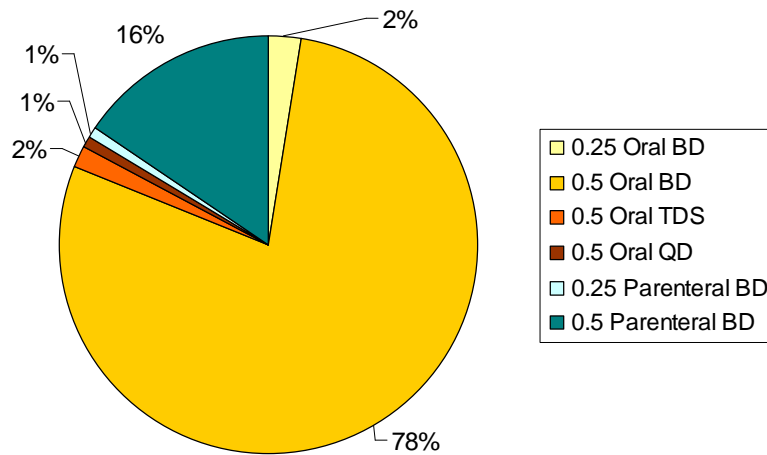


Figure 13: Prescribed dosage for treatment of CA-RTI with clarithromycin

The doses prescribed by individual hospitals for these three antibacterials for the treatment of CA-RTI are shown in **Table 9** in **Appendix 1**.

Community Acquired UTI

The antibacterials prescribed for the treatment of community acquired respiratory tract infections (CA-UTI) are shown in **Figure 14**. Trimethoprim (**27%**), ciprofloxacin (**25%**) and co-amoxiclav (**17%**) were the most commonly prescribed antibacterials, comprising **69%** of prescriptions for CA-UTI in total. The pattern of prescribing varied widely with **26 different regimens** including monotherapies and combinations being prescribed; the most common were:

- Trimethoprim monotherapy (31 prescriptions)
- Ciprofloxacin monotherapy (28 prescriptions)

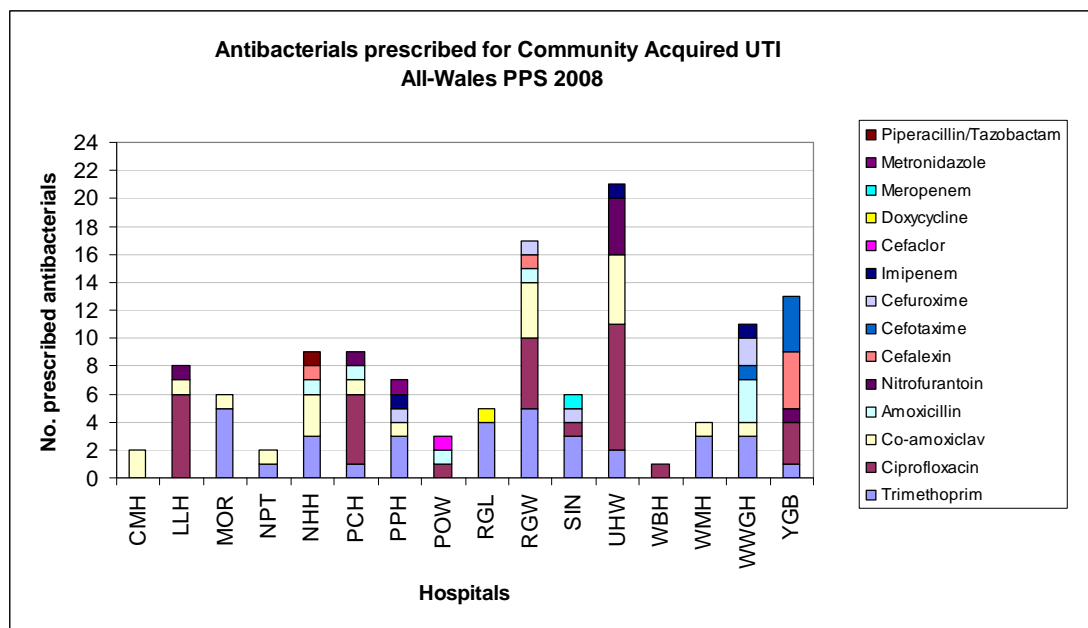


Figure 14: Antimicrobials prescribed for CA-UTI

There was little variation in the dosing regimens:

- **97%** of prescriptions for trimethoprim - 0.2g oral BD
- **97%** of prescriptions for ciprofloxacin - 0.5g oral BD
- **63%** of prescriptions for co-amoxiclav - 0.625g oral TDS & 21% of prescriptions - 1.2g parenteral TDS

Community Acquired SSTBJ Infections

The antibacterials prescribed for the treatment of community acquired skin, soft tissue, bone & joint infections (CA-SSTBJI) are shown in **Figure 15**. Flucloxacillin (**30%**), benzylpenicillin (**11%**) and metronidazole (**11%**) were the most commonly prescribed antibacterials, comprising **52%** of prescriptions for community acquired SSTBJ infection in total. The pattern of prescribing varied widely with **50 different regimens** including monotherapies and combinations being prescribed. The most common regimens were:

- Benzylpenicillin plus flucloxacillin (13 prescriptions)
- Flucloxacillin monotherapy (12 prescriptions)

Figure 15 shows that the number of antimicrobials prescribed for CA-SSTBJI at individual hospital level.

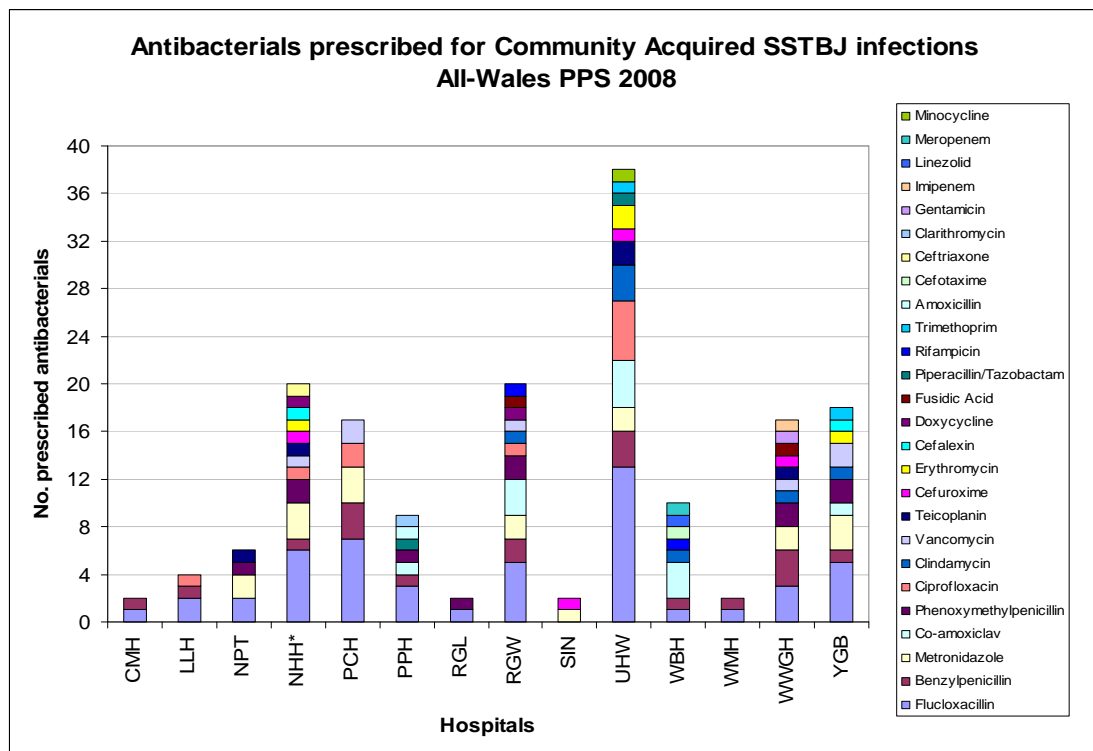


Figure 15: Antimicrobials prescribed for CA-SSTBJI

Dosing regimens for Community Acquired SSTBJI

Flucloxacillin: Figure 16 shows the variation in prescribing: **30%** of patients diagnosed with a CA-SSTBJI that were prescribed flucloxacillin were prescribed 0.5g oral flucloxacillin TDS and **28%** were prescribed 1g parenteral flucloxacillin QDS.

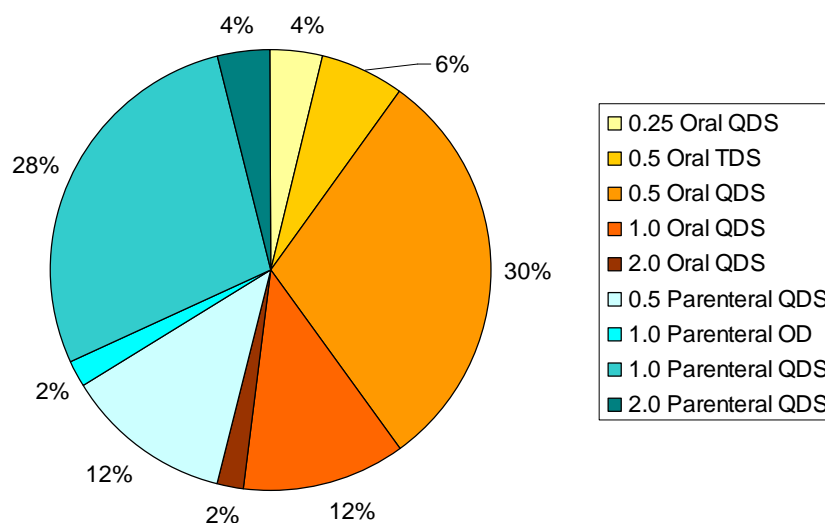


Figure 16: Prescribed dosage for treatment of CA-SSTBJI with flucloxacillin

HOSPITAL ACQUIRED INFECTIONS (INDICATION B)

Hospital acquired infections (HAI) were the second most common indication requiring an antimicrobial prescription.

- 512 of the 4888 patients surveyed were prescribed antibacterials for HAI (10.5%)
- Of the 1483 patients in the survey that were prescribed antibacterials, 512 (34.5%) were indicated for HAI (Indication B).
- 703 **antimicrobials** were prescribed for HAI
- 675 **antibacterials** were prescribed for HAI

Figure 17 shows that the number of antimicrobials prescribed by diagnosis group for each hospital. 160 of the 675 antimicrobials prescribed in this group were for respiratory tract infections (RESP), 158 were for skin, soft tissue, bone & joint infections (SSTBJ) & 136 were for gastrointestinal infections (GI).

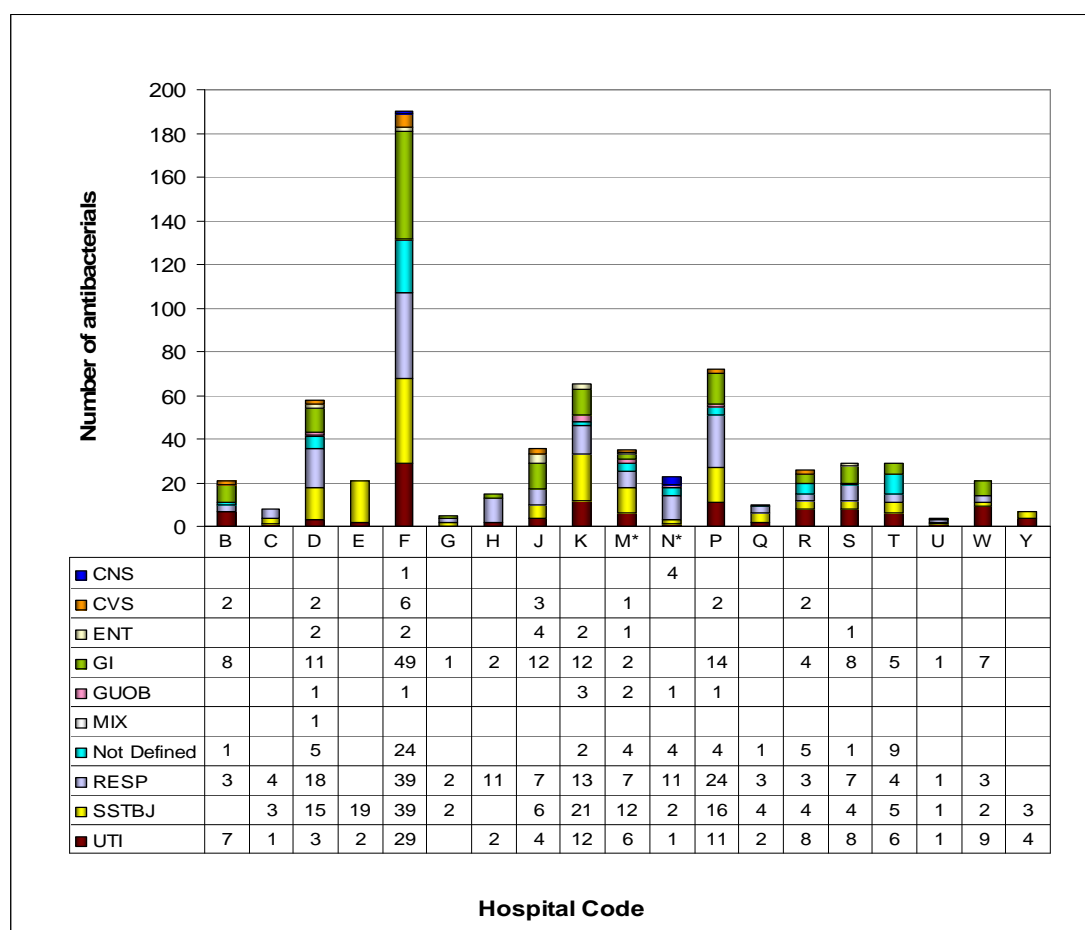


Figure 17: Antimicrobials prescribed for indication B by diagnosis group

The numbers of patients prescribed antibacterials for community acquired infections, the diagnosis group and the number of antimicrobials prescribed per patient are shown in Table 4. The table shows that most UTIs were treated with monotherapy where as other infections were more likely to have combination therapy in varying proportions dependent on site.

Table 4: Numbers of patients prescribed antibacterials for hospital acquired infections (B) by diagnosis group

Diagnosis Code	Monotherapy	2 Antibacterials	3 or More	Total
CNS		2 (100%)		2
CVS	2 (20%)	7 (70%)	1 (10%)	10
ENT	6 (75%)	2 (25%)		8
GI	49 (56%)	31 (35%)	8 (9%)	88
GUOB	5 (80%)		1 (20%)	6
MIX	1 (100%)			3
Not Defined	20 (50%)	17 (43%)	3 (7%)	40
RESP	88 (73%)	29 (24%)	4 (3%)	121
SSTBJ	64 (59%)	36 (33%)	8 (8%)	108
UTI	91 (91%)	8 (8%)	1 (1%)	100
Total	326 (69%)	132 (26%)	26 (5%)	484

The most common hospital acquired infections were:

- RTI – 121 diagnoses (25%)
- SSTBJ – 108 diagnoses (22.3%)
- UTI – 100 diagnoses (20.6%)
- GI – 88 diagnoses (18.2%)

Note: In all instances the rates may be very slightly higher as the patient with multiple-diagnoses (MIX) and the patients with mixed indications e.g. hospital acquired infections (B) & medical prophylaxis (D) are excluded from this data.

The PPS included five sub-indications within hospital acquired infection (B):

- **B1** – Post-operative infection
- **B2** – Other intervention related infections
- **B3** – *C. difficile* associated diarrhoea
- **B4** – Other hospital acquired infection
- **B5** – Infection present on admission from another hospital

The diagnosis groups & sub-indications within the hospital acquired infection group are shown in **Table 5**. Sub-indication **B4** was the most common in this PPS group accounting for **46%** of prescribing for hospital acquired infections.

Table 5: Diagnosis group by sub-indication

Diagnosis Group	B	B1	B2	B3	B4	B5
CNS		1	2			2
CVS	1	1	6		4	6
ENT		2		1	8	1
GI	1	47	8	58	16	6
GUOB		5	3		1	
MIX						1
Not Defined		11	10		34	5
RESP	6	23	9		114	8
SSTBJ		79	16		49	14
UTI	1	7	16	2	86	4
All diagnosis	9	176	70	61	312	47

- **B** – 67% of antibacterials prescribed for a non-defined HAI were for RESP infections
- **B1** – 44.9% of antibacterials prescribed for post-operative infection were for SSTBJ infections
- **B2** – 50% of antibacterials prescribed for intervention related infections were for urinary (UTI) and skin related (SSTBJ) infections.
- **B3** – 58 antibacterials were prescribed for the treatment of *C. difficile*, this sub-indication contained three misclassifications with a diagnosis groups of ENT & UTI
- **B4** – 114 of the 313 antibacterials prescribed for other HAI were for respiratory tract infections (**36.4%**) and 86 were for UTIs (**27.5%**).
- **B5** – 14 of the 48 antibacterials prescribed for infection present on admission from another hospital were for SSTBJ infections (**29.2%**).

Note: The antibacterials prescribed for hospital acquired infections are shown in **Table 10** in **Appendix 1**. The most commonly prescribed antibacterials for this indication were:

- Metronidazole – 112 prescriptions (**16.6%**)
- Co-amoxiclav – 78 prescriptions (**11.6%**)
- Ciprofloxacin – 72 prescriptions (**10.7%**)

The choice of antibacterial was large especially e.g. for **SSTBJ** 27 different antibacterials were prescribed, for **RESP** 20 different antibacterials were prescribed and for **Not defined** 19 different antibacterials were prescribed. The antibacterials prescribed for the sub-indications B, B1, B2, B3, B4 and B5 are shown in **Table 11** in **Appendix 1**.

Sub-indication B3 – *C. difficile* infection

For the 58 patients that were prescribed an antibacterial for the treatment of hospital acquired *C. difficile* infection 46 were prescribed metronidazole (**79%**) and 12 were prescribed vancomycin (**21%**).

Hospital Acquired RTI

The antibacterials prescribed for the treatment of hospital acquired respiratory tract infections (HA-RTI) are shown in **Figure 18**. Co-amoxiclav (**24%** of all prescriptions), clarithromycin (**13%**) and piperacillin/tazobactam (**10%**) were the most commonly prescribed antibacterials; making up **47%** of all prescriptions for HA-RTI in total. The pattern of prescribing varied widely with **41 different regimens** including monotherapies and combinations being prescribed amongst 121 patients.

The most common regimens were:

- **26** co-amoxiclav monotherapy (**21%**)
- **12** piperacillin/tazobactam monotherapy (**10%**)
- **12** amoxicillin monotherapy (**10%**)

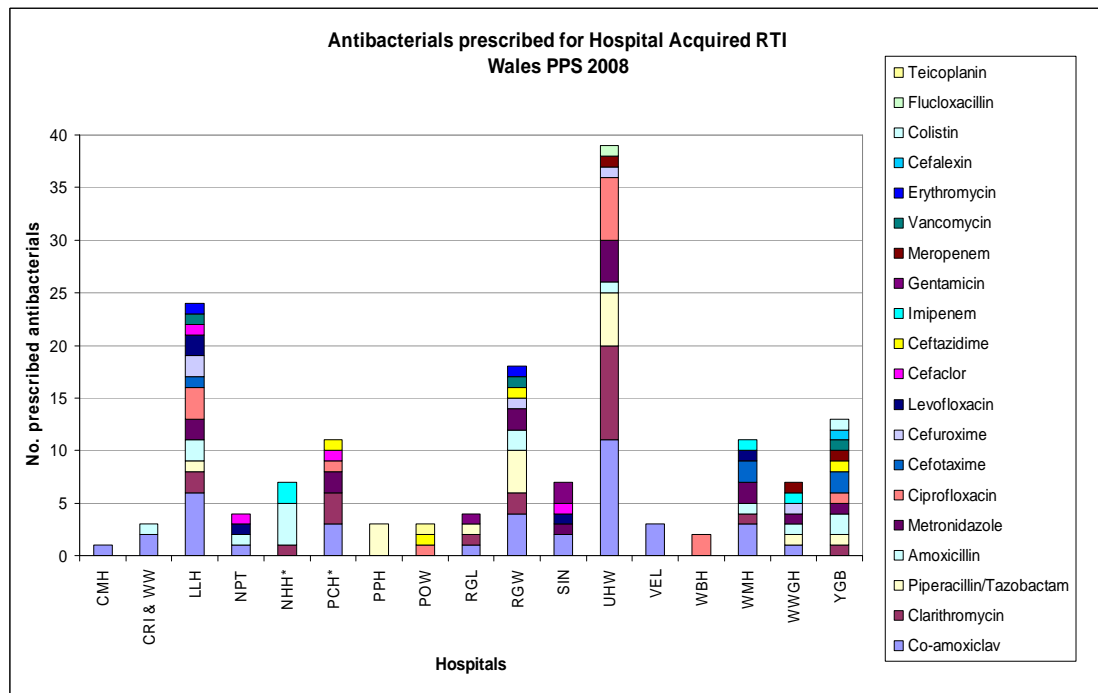


Figure 18: Antimicrobials prescribed for HA-RTI

Dosing regimens for Hospital Acquired RTI

Co-amoxiclav: Figure 19 shows that 54% of patients diagnosed with a HA-RTI that were prescribed co-amoxiclav were prescribed 0.625g oral co-amoxiclav TDS, and 37% were prescribed 1.2g parenteral co-amoxiclav TDS. These dosing rates are comparable to those for community acquired RTI.

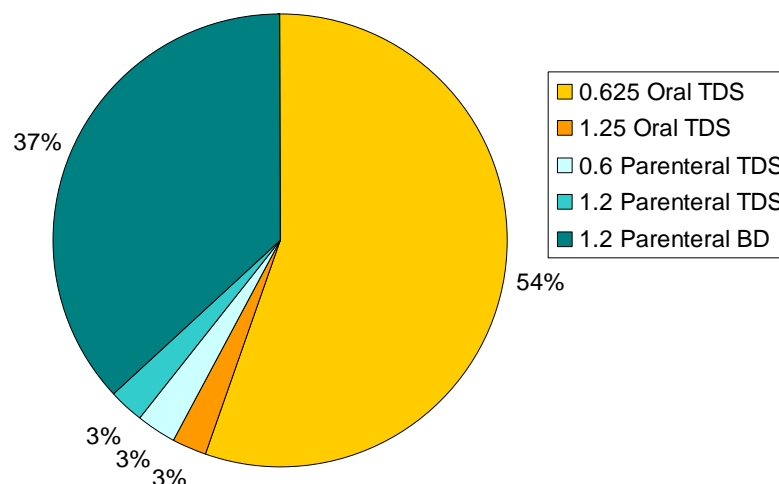


Figure 19: Prescribed dosage for treatment of HA-RTI with co-amoxiclav

The co-amoxiclav dosing prescribed by individual hospitals for the treatment of HA-RTI is shown in **Table 12** in **Appendix 1**.

Hospital Acquired SSTBJ Infections

The antibacterials prescribed for the treatment of community acquired skin, soft tissue, bone & joint infections (HA-SSTBJ) are shown in **Figure 20**. Flucloxacillin (**23.4%**), ciprofloxacin (**10.1%**) & co-amoxiclav (**9.5%**) were the most commonly prescribed antibacterials, comprising **38.6%** of prescriptions for HA-SSTBJI in total. The pattern of prescribing varied widely with **54 different regimens** prescribed, including monotherapies and combinations being prescribed. The most common regimens were:

- Flucloxacillin monotherapy (17 prescriptions)
- Co-amoxiclav monotherapy (10 prescriptions)

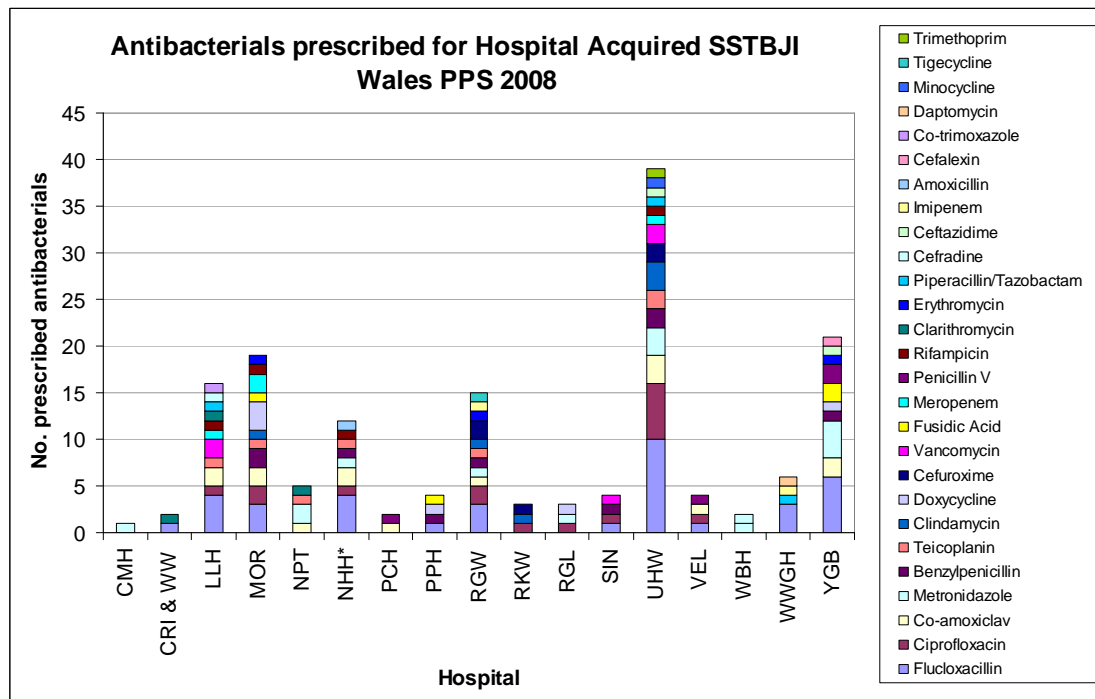


Figure 20: Antimicrobials prescribed for HA-SSTBJI

Hospital Acquired UTI

The antibacterials prescribed for the treatment of hospital acquired respiratory tract infections (HA-UTI) are shown in **Figure 21**. Trimethoprim (36%), ciprofloxacin (28%) and co-amoxiclav (10%) were the most commonly prescribed antibacterials, comprising 74% of prescriptions for HA-UTI in total. The pattern of prescribing showed some variation between hospitals with **20 different regimens** including monotherapies & combination therapies being prescribed; the most common were:

- Trimethoprim monotherapy (36 prescriptions)
- Ciprofloxacin monotherapy (24 prescriptions)

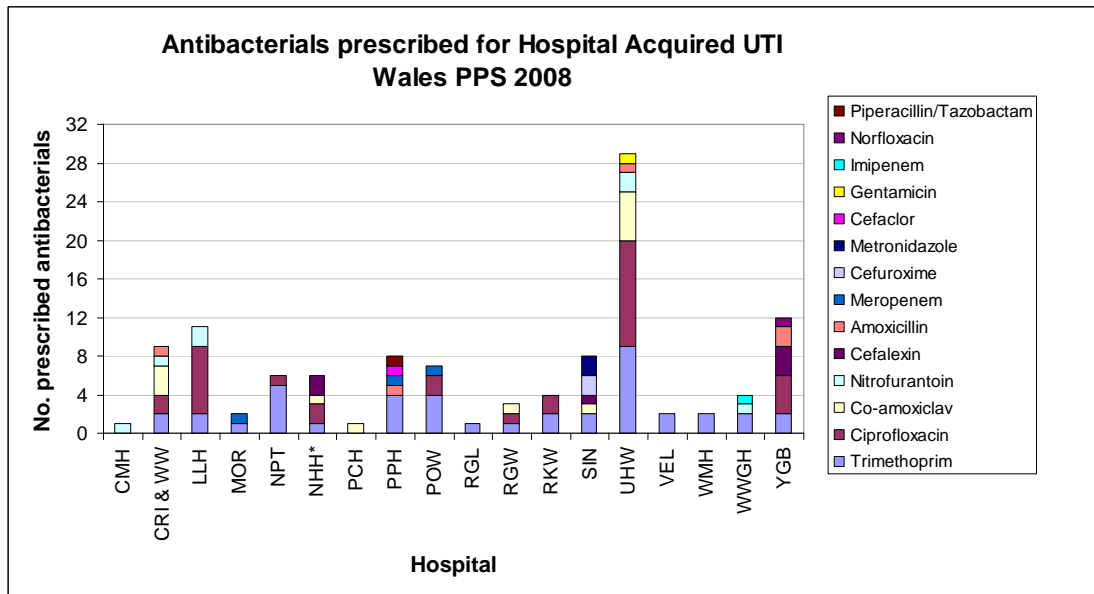


Figure 21: Antimicrobials prescribed for HA-UTI

SURGICAL PROPHYLAXIS (INDICATION C)

The antibacterials prescribed for surgical prophylaxis (**C**) are show in **Table 6**.

- 206 of the 4888 patients surveyed were prescribed antimicrobial/s for surgical prophylaxis (**4.9%**)
- Of the 1523 patients in the survey that were prescribed antibacterials, 206 (**13.5%**) were indicated for surgical prophylaxis (**C**).
- 22 different antibacterials were prescribed within this group.

Table 6: Antibacterials prescribed by diagnosis group – indication C

Antibacterial	Antibacterial Prophylaxis Diagnosis group										Total
	MIX	CNS	CVS	ENT	GI	GyOB	RES	SBJ	UTI		
Cefuroxime		2	10	1	21	4		62			100
Metronidazole				2	26	8		8			44
Co-amoxiclav				6	10	10		4	8		38
Gentamicin			1	1	3	1		8	20		34
Teicoplanin			9					2			11
Flucloxacillin								10			10
Ciprofloxacin					3			1	5		9
Amoxicillin					2				4		6
Benzylpenicillin								5			5
Trimethoprim									5		5
Vancomycin			3					1			4
Cefalexin					1			2			3
Cefotaxime	1				2						3
Penicillin V			1					2			3
Clarithromycin								2			2
Cefradine								1			1
Co-trimoxazole							1				1
Doxycycline						1					1
Erythromycin				1							1
Fusidic Acid								1			1
Nitrofurantoin									1		1
Piperacillin/Tazobactam	1										1
All antibacterials	2	2	24	11	68	24	1	109	43		284

- Cefuroxime was the most commonly prescribed antibacterial for surgical prophylaxis (**35.2%**)
- 236 of the antibacterials prescribed for surgical prophylaxis were for IV administration (**83.1%**)

Figure 22 shows that 109 of the 284 antibacterials prescribed (**39%**) for surgical prophylaxes were for skin, soft tissue bone & joint (Proph SBJ).

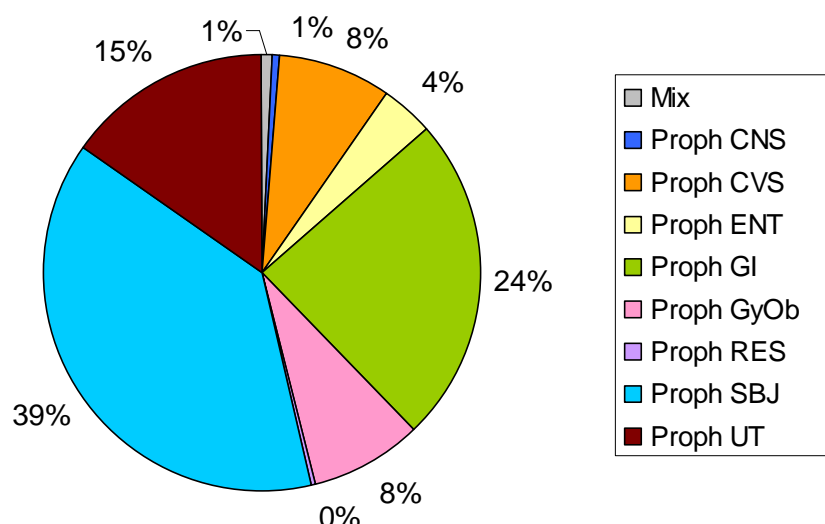


Figure 22: Antibacterial prescribed for indication **C** by diagnosis group

The PPS included three categories within surgical prophylaxis (**C**) based on the number of doses of antibacterial prescribed:

- C1 – Single dose
- C2 – One day
- C3 – > 1 day

The number of antibacterials prescribed for surgical prophylaxis and the proportion for more than one day duration (**C3**) is shown in **Table 7**.

Table 7: Antibacterials prescribed by sub- indication C1, C2 & C3

Antibacterial	C1	C2	C3	Proportion C3
Cefuroxime	12	51	37	37
Metronidazole	5	10	29	65.9
Co-amoxiclav	9	8	21	55.3
Gentamicin	31	1	2	5.9
Teicoplanin	1	2	8	72.7
Flucloxacillin		1	9	90
Ciprofloxacin	1	1	7	77.8
Amoxicillin	4	1	1	16.7
Benzympenicillin		1	4	80
Trimethoprim		1	4	80
Vancomycin	3	1		0
Cefalexin		1	2	66.7
Cefotaxime		1	2	66.7
Penicillin V			3	100
Clarithromycin		1	1	50
Cefradine			1	100
Co-trimoxazole			1	100
Doxycycline			1	100
Erythromycin			1	100
Fusidic Acid			1	100
Nitrofurantoin			1	100
Piperacillin/Tazobactam			1	100
All antibacterials	66	81	137	48.2%

Table 8 shows the diagnosis subgroups and the proportion of antibacterials that were prescribed for more than one day duration (**C3**); although it appears that prophylaxis prior to urinary tract (**Proph UT**) surgery or skin, soft tissue bone & joint (**Proph SBJ**) surgery is less likely to be prescribed for more than one day than for the other diagnosis groups, the numbers are really too small to draw any conclusions.

Table 8: Diagnosis subgroup by sub- indication C1, C2 & C3

Diagnosis subgroup	Indication C1	Indication C2	Indication C3	Proportion C3 > 1 day
Mix			2	100
Proph CNS	2			
Proph CVS	4	5	15	62.5
Proph ENT	1	3	7	63.6
Proph GI	11	16	41	60.3
Proph GyOb	7	3	14	58.3
Proph RES			1	100
Proph SBJ	13	51	45	41.3
Proph UT	28	3	12	27.9
All diagnosis	66	81	137	48.2%

The diagnosis subgroups and sub-indications at individual hospital level are shown in **Table 13** in **Appendix 1**, and the top four antibacterials (cefuroxime, metronidazole, co-amoxiclav & gentamicin) and the sub-indications are shown in **Table 14** in **Appendix 1**.

MEDICAL PROPHYLAXIS (INDICATION D)

The antibacterials prescribed for medical prophylaxis (D) are show in **Table 9**.

- 86 of the 4888 patients surveyed were prescribed antimicrobial/s for medical prophylaxis (1.8%)
- Of the 1523 patients in the survey that were prescribed antibacterials, 86 (5.6%) were indicated for medical prophylaxis (D).
- 23 different antibacterials were prescribed within this group.

Table 9: Antibacterials prescribed by diagnosis group – indication D

Antibacterial	Prophylaxis Diagnosis group									
	BAC	SIRS	UND	CNS	GI	GyOb	RES	SBJ	UT	Total
Ciprofloxacin		1	2		7		1		1	12
Trimethoprim						1			9	10
Penicillin V	3				4		2			9
Colistin							8			8
Co-trimoxazole	1						6			7
Metronidazole					5	2				7
Azithromycin							6			6
Cefalexin						2			4	6
Doxycycline			1			1	2			4
Flucloxacillin							4			4
Gentamicin		1					1		2	4
Piperacillin/Tazobactam		4								4
Amoxicillin							1		2	3
Co-amoxiclav				1		1			1	3
Vancomycin		2						1		3
Erythromycin						1		1		2
Nitrofurantoin									2	2
Tobramycin							2			2
Benzylpenicillin							1			1
Cefradine									1	1
Cefuroxime					1					1
Meropenem		1								1
Oxytetracycline								1		1
All antibacterials	4	9	3	1	17	8	34	3	22	101

- Ciprofloxacin was the most commonly prescribed antibacterial for this group (12%)
- Because of the diverse group of patients surveyed e.g. oncology, CF patients, spinal injuries there are diagnosis within this group e.g. BAC, SIRS and UND that would normally fall into indication A or B & so these diagnosis were analysed individually.

SPECIFIC DIAGNOSIS GROUPS

Bacteraemia

Antibacterials that were prescribed for bacteraemia are shown in **Figure 23**.

- 54 of the 4888 patients surveyed were prescribed antimicrobial/s for the treatment of bacteraemia (1.1%)
- Of the 54 patients diagnosed with a bacteraemia:
 - 24 (44.4%) were classed as **Indication A**
 - 26 (48.2%) were classed as **Indication B**
 - 4 (7.4%) were classed as **Indication D**
- 20 different antibacterials were prescribed within this group.

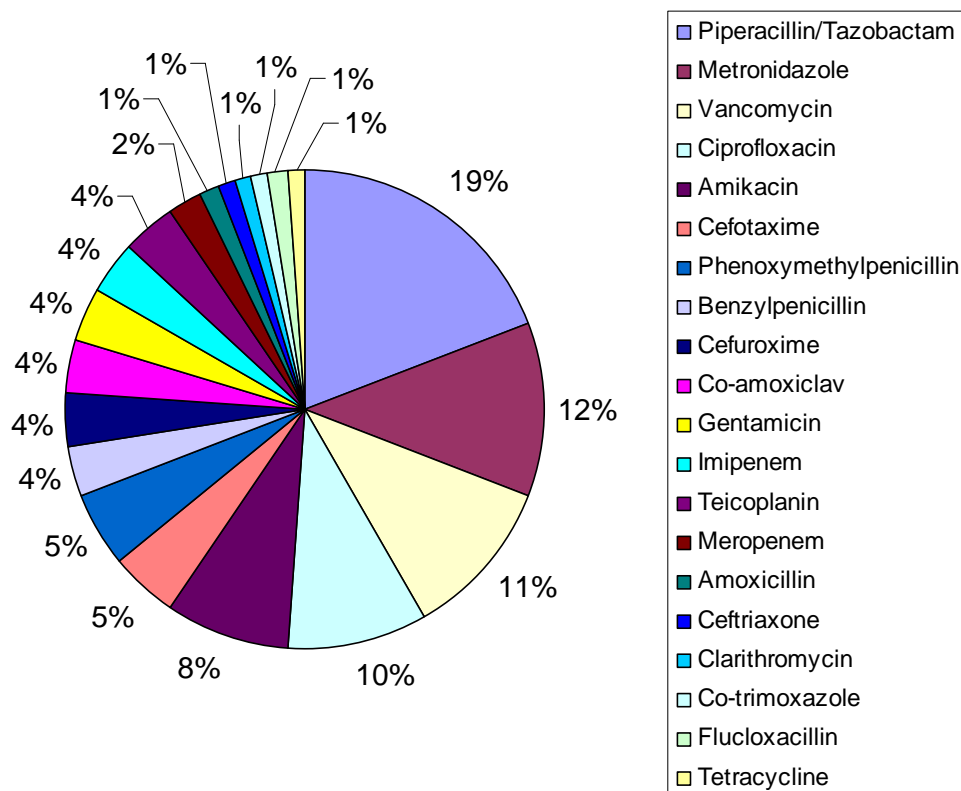


Figure 23: Antibacterials prescribed for bacteraemia (%)

Piperacillin/tazobactam (19%), metronidazole (12%), vancomycin (11%) and ciprofloxacin (10%) were the most commonly prescribed antibacterials, comprising **52%** of prescriptions for bacteraemias (86 antibacterials in total). The pattern of prescribing showed some variation between hospitals with **20 different regimens** including monotherapies & combination therapies being prescribed; the most common were:

- Ciprofloxacin monotherapy (6 prescriptions)
- Amikacin plus Piperacillin/tazobactam (5 prescriptions)

Pneumonia

Antibacterials that were prescribed for pneumonia are shown in **Figure 24**.

- 194 of the 4888 patients surveyed were prescribed antimicrobial/s for the treatment of pneumonia (**4%**)
- Of the 194 patients diagnosed with pneumonia:
 - 138 (**71.1%**) were classed as **Indication A**
 - 56 (**28.9%**) were classed as **Indication B**
- 25 different antibacterials were prescribed within this group.

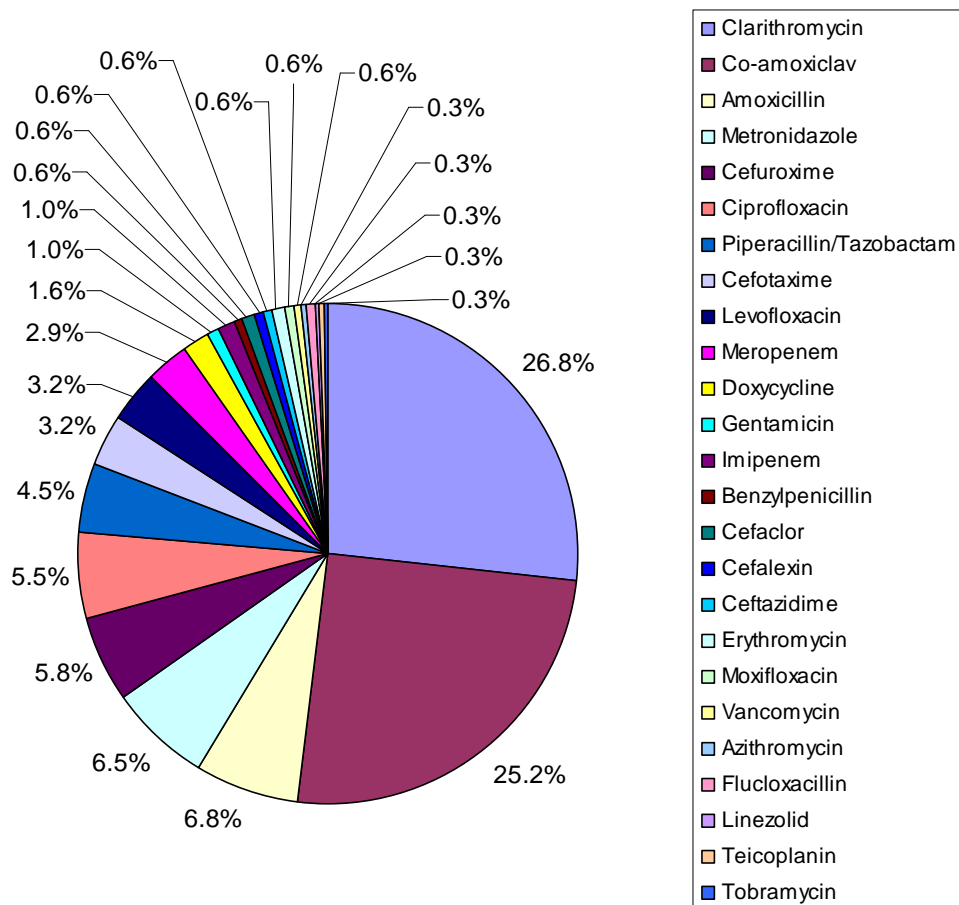


Figure 24: Antibacterials prescribed for pneumonia (%)

Clarithromycin (**27%**) and co-amoxiclav (**25%**) were the most commonly prescribed antibacterials, comprising **52%** of prescriptions for pneumonia (310 antibacterials in total). The pattern of prescribing showed some variation between hospitals with **60 different regimens** including monotherapies & combination therapies being prescribed; the most common were:

- Co-amoxiclav plus clarithromycin (38 prescriptions)
- Co-amoxiclav monotherapy (25 prescriptions)

Pyelonephritis

Antibacterials that were prescribed for the treatment of pyelonephritis are shown in **Figure 25**.

- 27 of the 4888 patients surveyed were prescribed antimicrobial/s for the treatment of pyelonephritis (**0.6%**)
- Of the 27 patients diagnosed with pyelonephritis:
 - 21 (**77.8%**) were classed as **Indication A**
 - 6 (**22.2%**) were classed as **Indication B**
- 10 different antibacterials were prescribed within this group.

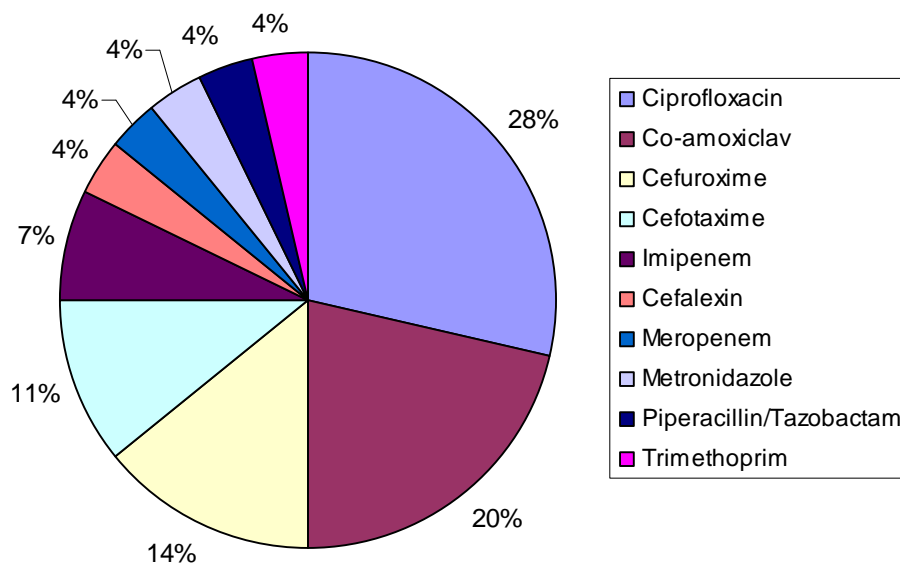


Figure 25: Antibacterials prescribed for pyelonephritis (%)

Ciprofloxacin (**28%**) and co-amoxiclav (**20%**) were the most commonly prescribed antibacterials, comprising **48%** of prescriptions for pneumonia (28 antibacterials in total). The pattern of prescribing showed some variation between hospitals with **10 different regimens** which were all monotherapies with exception of one; the most common regimens were:

- Ciprofloxacin monotherapy (8 prescriptions)
- Co-amoxiclav monotherapy (6 prescriptions)

SIRS

Antibacterials that were prescribed for the treatment of systemic inflammatory response with no clear anatomical site (SIRS) are shown in **Figure 26**.

- 39 of the 4888 patients surveyed were prescribed antimicrobial/s for the treatment of SIRS (**0.8%**)
- Of the 39 patients diagnosed with SIRS:
 - 22 (**56.4%**) were classed as **Indication A**
 - 11 (**28.2%**) were classed as **Indication B**
 - 6 (**15.4%**) were classed as **Indication D**
- 15 different antibacterials were prescribed within this group

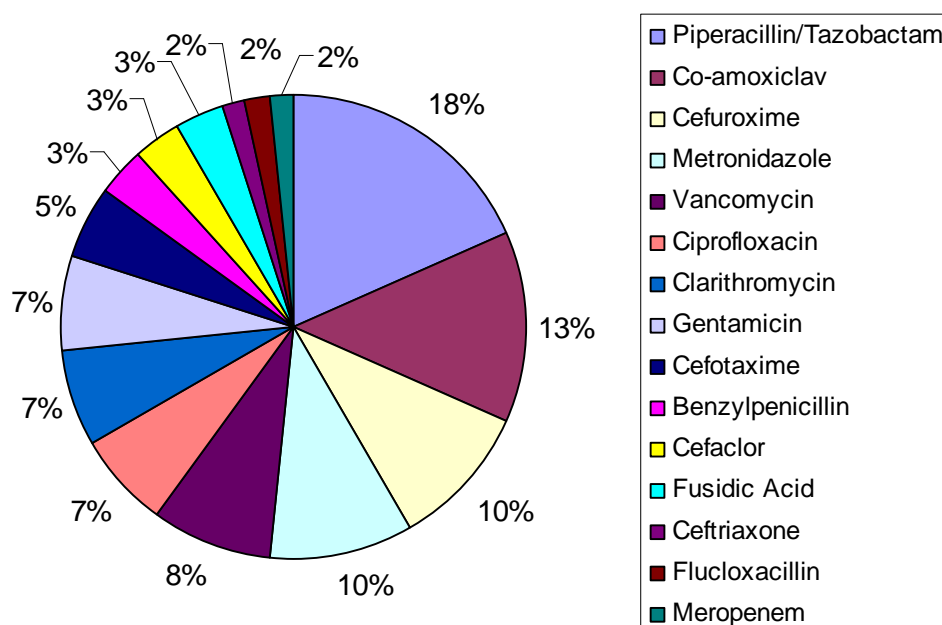


Figure 26: Antibacterials prescribed for SIRS (%)

Piperacillin/tazobactam (**18%**), co-amoxiclav (**13%**), cefuroxime (**10%**) and metronidazole (**10%**) were the most commonly prescribed antibacterials, comprising **51%** of prescriptions for SIRS (60 antibacterials in total). The pattern of prescribing showed some variation between hospitals with **26 different regimens** including monotherapies & combination therapies being prescribed; the most common were:

- Piperacillin/tazobactam monotherapy (5 prescriptions)
- Cefuroxime monotherapy (4 prescriptions)

UND

Antibacterials that were prescribed for the treatment of a completely un-defined site with no systemic inflammation (UND) are shown in **Figure 27**.

- 14 of the 4888 patients surveyed were prescribed antimicrobial/s for the treatment of pyelonephritis (**0.3%**)
- Of the 14 patients diagnosed with SIRS:
 - 8 (**57.1%**) were classed as **Indication A**
 - 3 (**21.4%**) were classed as **Indication B**
 - 3 (**21.4%**) were classed as **Indication D**
- 14 different antibacterials were prescribed within this group

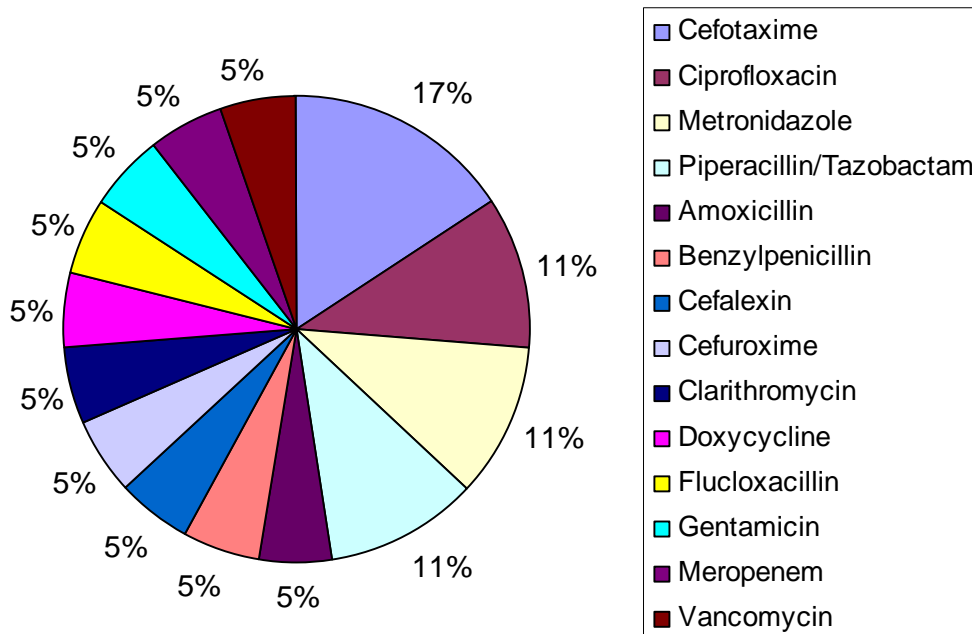


Figure 27: Antibacterials prescribed for SIRS (%)

The numbers in this group were too small to analyse.

APPENDIX 1

Table 1: Ward Information

Survey	Hospital	Ward	Specialty	Comments	No. patients	No. ABx	% ABx
07/11/2008	BWMH	No name given	Med&Surg		15	2	13.3
07/11/2008	LWH	Claerwen	G. Med		19	3	15.8
07/11/2008	YST	Adalina Patti	G. Med		27	3	11.1
07/11/2008	NHH	COE Team	G. Med	COE team	42	7	16.7
07/11/2008	NHH	3/1	Surgery	Orthopaedics	23	9	39.1
07/11/2008	NHH	3/2	Surgery	Gynaecology	24	5	20.8
07/11/2008	NHH	3/3	Surgery		18	5	27.8
07/11/2008	NHH	1/2	Surgery		29	12	41.4
07/11/2008	NHH	CCU	G. Med	Cardiology	5	1	20.0
07/11/2008	NHH	Cardiology	G. Med		6	2	33.3
07/11/2008	NHH	Gastro	G. Med	Team Based	21	7	33.3
07/11/2008	NHH	ITU	ICU		6	5	83.3
07/11/2008	NHH	Haematology	G. Med	No patients on ABx	1	0	0
07/11/2008	NHH	Respiratory	G. Med	Respiratory	23	8	34.8
07/11/2008	NHH	COE	G. Med	COE	11	7	63.6
07/11/2008	NHH	3/4	Surgery		32	13	40.6
07/11/2008	NHH	Rheum	G. Med	No patients on ABx	1	0	0.0
07/11/2008	NHH	2/3	Paeds		10	1	10.0
07/11/2008	NHH	4/1	G. Med		16	6	37.5
07/11/2008	NHH	NNU	Paeds	NNU	10	2	20.0
07/11/2008	NHH	EAU	Med&Surg		19	8	42.1
08/12/2008	LLH	Anwen	Surgery		18	2	11.1
08/12/2008	LLH	Bethan	Surgery		9	4	44.4
08/12/2008	LLH	Charles R	Surgery	Trauma & Orthopaedic	27	11	40.7
08/12/2008	LLH	CFU	G. Med	CF Unit	7	6	85.7
08/12/2008	LLH	Delyth	Surgery		20	9	45.0
08/12/2008	LLH	Gwen	G. Med		8	5	62.5
08/12/2008	LLH	ICU	ICU		8	5	62.5
08/12/2008	LLH	MAU	G. Med	MAU	21	11	52.4
08/12/2008	LLH	E1	G. Med		14	2	14.3
08/12/2008	LLH	E2	G. Med		31	7	22.6
08/12/2008	LLH	E5	G. Med		26	9	34.6
08/12/2008	LLH	E6	G. Med		31	9	29.0
08/12/2008	LLH	E7	G. Med		30	6	20.0
08/12/2008	LLH	E8	G. Med		30	2	6.7
08/12/2008	LLH	W1	G. Med		28	15	53.6
08/12/2008	LLH	W2	Surgery		26	11	42.3
08/12/2008	LLH	W3	Surgery	2 on HDU	22	6	27.3
08/12/2008	LLH	W4	G. Med		30	20	66.7
08/12/2008	LLH	W5	Surgery		29	9	31.0
08/12/2008	LLH	W6	G. Med		33	17	51.5
11/11/2008	MOR	Gower	G. Med	No patients on ABx	25	0	0
11/11/2008	MOR	W	Surgery	Trauma & Orthopaedic	23	7	30.4
11/11/2008	MOR	A	Surgery	Trauma & Orthopaedic	18	4	22.2
11/11/2008	MOR	J	Surgery	Trauma & Orthopaedic	28	2	7.1
11/11/2008	MOR	B	Surgery	Trauma & Orthopaedic	25	6	24.0
11/11/2008	MOR	M	Surgery	Trauma & Orthopaedic	13	2	15.4
18/11/2008	PCH	P31	G. Med	Paeds mainly medical	18	8	44.4
18/11/2008	PCH	1	Surgery		25	7	28.0
18/11/2008	PCH	2	Surgery		24	7	29.2
18/11/2008	PCH	2	Surgery	SAU	3	1	33.3
18/11/2008	PCH	3	Surgery	Orthopaedics	30	11	36.7
18/11/2008	PCH	4	Surgery	Orthopaedics	30	10	33.3
18/11/2008	PCH	5	G. Med	Gastro	30	5	16.7
18/11/2008	PCH	6	Surgery		29	11	37.9
18/11/2008	PCH	9	G. Med	Endocrinology/Diabetes	30	13	43.3
18/11/2008	PCH	10	G. Med	Respiratory	29	14	48.3
18/11/2008	PCH	19	G. Med		24	7	29.2
18/11/2008	PCH	20	Surgery	Gynaecology	15	3	20.0
18/11/2008	PCH	35	G. Med	Cardiology	19	3	15.8
18/11/2008	PCH	MAU	G. Med		21	7	33.3
18/11/2008	PCH	CCU & HD	ICU	Cardiology	12	4	33.3
18/11/2008	PCH	ITU	ICU		3	1	33.3

Survey	Hospital	Specialty	Specialty	Comments	No. patients	No. ABx	% ABx
18/11/2008	ABD	Aman	G. Med		31	3	9.7
21/11/2008	RGL	1	Surgery	Gastroenterology	28	8	28.6
21/11/2008	RGL	19	G. Med	COE/ Respiratory	30	19	63.3
21/11/2008	RGL	20	G. Med	Respiratory	20	8	40.0
06/11/2008	RGW	B3 (E&W)	G. Med		23	8	34.8
06/11/2008	RGW	B4	Surgery	Antenatal & postnatal ward	11	3	27.3
06/11/2008	RGW	B5	Surgery	No patients on ABx	7	0	0
06/11/2008	RGW	B6	G. Med	Stroke & COE	32	4	12.5
06/11/2008	RGW	B6 North	G. Med	Haem & Medical Outliers	8	2	25.0
06/11/2008	RGW	B7 (E&W)	Surgery	Gynaecology	28	8	28.6
06/11/2008	RGW	C4 E	G. Med	Gastroenterology	28	8	28.6
06/11/2008	RGW	C4 W	G. Med	Gastroenterology	25	3	12.0
06/11/2008	RGW	C5 E	Surgery	Trauma & Orthopaedic	29	5	17.2
06/11/2008	RGW	CCU	G. Med	No patients on ABx	5	0	0
06/11/2008	RGW	C5 W	Surgery	Trauma & Orthopaedic	27	10	37.0
06/11/2008	RGW	C6 (E&W)	G. Med	Respiratory	59	21	35.6
06/11/2008	RGW	C7 E	Surgery	Elective surgery	36	7	19.4
06/11/2008	RGW	C7 W	Surgery	GI surgery	30	9	30.0
06/11/2008	RGW	D1 W	G. Med	MAU	21	4	19.0
06/11/2008	RGW	D2 W	Surgery	Urology/ENT/Maxfax/Surgery	31	13	41.9
06/11/2008	RGW	D3 E	G. Med	Cardiology	30	5	16.7
06/11/2008	RGW	D3 W	G. Med	No patients on ABx	12	0	0
06/11/2008	RGW	D4 E	G. Med	Endocrinology	30	8	26.7
06/11/2008	RGW	D4 W	G. Med	Endocrinology	30	11	36.7
06/11/2008	RGW	D5 E	G. Med	COE	20	6	30.0
06/11/2008	RGW	D5 E	Surgery	Surgical admissions ward	10	3	30.0
06/11/2008	RGW	D5 W	Surgery	General surgery	30	6	20.0
06/11/2008	RGW	D6 E	Paeds	Paediatrics (3-12 yrs)	15	7	46.7
06/11/2008	RGW	D6 W	Paeds	Paediatrics (0-3 yrs)	12	2	16.7
06/11/2008	RGW	D7 E	Surgery	Orthopaedic elective surgery	17	7	41.2
06/11/2008	RGW	D7 W	Paeds	Paeds (11-19 yrs)	11	2	18.2
06/11/2008	RGW	Ophthalmology	Surgery	Sleep over Urology/ENT/Ortho	8	2	25.0
06/11/2008	RGW	SCBU/NICU	ICU	SCBU	10	3	30.0
06/11/2008	RGW	ICU	ICU		6	2	33.3
06/11/2008	RGW	HDU	ICU		5	1	20.0
18/11/2008	CMH	Bedwas	G. Med	Admissions/Cardiology	9	1	11.1
18/11/2008	CMH	Nantgarw	G. Med		18	5	27.8
18/11/2008	CMH	Nelson	Surgery		16	4	25.0
18/11/2008	CMH	Senghenydd	G. Med		33	12	36.4
18/11/2008	NPT	MAU	G. Med	General Medicine	16	5	31.3
18/11/2008	NPT	B2	Surgery	Orthopaedics	24	8	33.3
18/11/2008	NPT	C	G. Med	Respiratory	32	14	43.8
18/11/2008	NPT	D	G. Med	Cardiology	32	8	25.0
18/11/2008	NPT	E	G. Med	Gastro, Endocrine & Liver	16	4	25.0
18/11/2008	NPT	HDU/CCU	ICU	CCU/HDU	7	2	28.6
18/11/2008	NPT	PDW	G. Med	Pre-discharge ward	15	1	6.7
18/11/2008	NPT	Glannant B	G. Med	Rehab & Palliative Care	37	3	8.1
13/11/2008	PPH	ICU	ICU		4	1	25.0
13/11/2008	PPH	6	Surgery	4 Medical outliers	30	9	30.0
13/11/2008	PPH	8	Surgery	Orthopaedics	25	7	28.0
13/11/2008	PPH	Ty-Bryn Gwyn	G. Med	No patients on ABx	6	0	0
13/11/2008	PPH	4	G. Med		31	8	25.8
13/11/2008	PPH	9	G. Med	COE - rehab	26	4	15.4
13/11/2008	PPH	3	G. Med		26	10	38.5
13/11/2008	PPH	7	G. Med	Stroke/Gastro	28	7	25.0
13/11/2008	PPH	CDU	G. Med		10	4	40.0
13/11/2008	PPH	SSU	G. Med		23	11	47.8
13/11/2008	PPH	CCU	G. Med		4	1	25.0
18/11/2008	POW	6	G. Med	Gastro/ Diabetic/Medicine	27	9	33.3
18/11/2008	POW	8	Surgery	GI surgery & urology	28	12	42.9
18/11/2008	POW	19	G. Med	COE - rehab	25	5	20.0
20/11/2008	SIN	CCU	G. Med	Coronary Care	7	3	42.9
20/11/2008	SIN	HDU	ICU		4	4	100
20/11/2008	SIN	ITU	ICU		3	3	100
20/11/2008	SIN	4A	Surgery	GI Surgery - Colorectal	36	7	19.4
20/11/2008	SIN	4B	Surgery	GI Surgery - Upper GI, Breast	26	14	53.8
20/11/2008	SIN	6	G. Med	General Medicine	32	5	15.6
20/11/2008	SIN	7	G. Med	COE	32	3	9.4

Survey	Hospital	Specialty	Specialty	Comments	No. patients	No. ABx	% ABx
20/11/2008	SIN	8	G. Med	General & Resp Medicine	29	8	27.6
20/11/2008	SIN	9	G. Med	General Medicine	25	5	20.0
20/11/2008	SIN	10	G. Med	Gastro/ Dermatology/Medicine	28	4	14.3
20/11/2008	VEL	Princess Mgt	G. Med	Chemotherapy	19	4	21.1
20/11/2008	VEL	First Floor	G. Med	Oncology	18	7	38.9
20/11/2008	VEL	ASU	G. Med	Oncology	9	2	22.2
12/11/2008	WWGH	CDU/SSU	G. Med	Clinical Decision Unit/SSU	20	12	60.0
12/11/2008	WWGH	CCU	G. Med	CCU Step-down	12	4	33.3
12/11/2008	WWGH	Towy	G. Med	Cardiology	20	8	40.0
12/11/2008	WWGH	Padarn	G. Med	Respiratory	21	8	38.1
12/11/2008	WWGH	Steffan	G. Med	GI/Oncology	19	8	42.1
12/11/2008	WWGH	Dewi	G. Med		20	5	25.0
12/11/2008	WWGH	Gwenllian	G. Med		20	5	25.0
12/11/2008	WWGH	Cleddau	Surgery		17	6	35.3
12/11/2008	WWGH	Preseli	Surgery		14	8	57.1
12/11/2008	WWGH	Merlin	Surgery	ENT	12	3	25.0
12/11/2008	WWGH	Derwen	Surgery	Urology, Surgical & Medical	13	8	61.5
12/11/2008	WWGH	Ceri	Surgery	Orthopaedics	17	5	29.4
12/11/2008	WWGH	Teifi	Surgery	Orthopaedics	22	7	31.8
12/11/2008	WWGH	HDU	ICU		4	3	75.0
12/11/2008	WWGH	ICU	ICU		4	1	25.0
26/11/2008	WBH	10	G. Med	Oncology/Haem/Pall Care	20	6	30.0
26/11/2008	WBH	CDU	G. Med	Acute Clinical Decision Unit	14	5	35.7
26/11/2008	WBH	1	Surgery	Surgery	29	9	31.0
26/11/2008	WBH	3	Surgery	General Surgery/Gastro	28	7	25.0
26/11/2008	WBH	4	Surgery	Surgery	29	7	24.1
26/11/2008	WBH	7	G. Med	General Medicine	30	8	26.7
26/11/2008	WBH	11	G. Med	Rehabilitation/ASU	27	1	3.7
26/11/2008	WBH	12	G. Med	General Medicine	27	6	22.2
18/11/2008	WMH	MAU	G. Med	Medical admissions	19	9	47.4
18/11/2008	WMH	Erddig	G. Med	Med Gastro	18	5	27.8
18/11/2008	WMH	SAU	Surgery	Surgical admissions	9	2	22.2
18/11/2008	WMH	Lister	Surgery	Upper GI Surgery	27	7	25.9
18/11/2008	WMH	Onnen	G. Med	Rehab	27	1	3.7
18/11/2008	WMH	Morris	G. Med	COE	27	9	33.3
18/11/2008	WMH	Evington	G. Med	Respiratory Medicine	27	14	51.9
18/11/2008	YGB	Glyder/CCU	G. Med	Cardiology	24	5	20.8
18/11/2008	YGB	Aran	Surgery	ENT/Orthopaedics	26	6	23.1
18/11/2008	YGB	Tryfan	G. Med	Medical Admissions Ward	23	8	34.8
18/11/2008	YGB	Gogarth	G. Med	Gastroenterology & Liver	29	6	20.7
18/11/2008	YGB	Moelwyn	G. Med	Respiratory	30	17	56.7
18/11/2008	YGB	ITU	ICU/HDU	Intensive Care	9	7	77.8
18/11/2008	YGB	Glaslyn	G. Med	Endocrinology/COE	30	11	36.7
18/11/2008	YGB	Prysor	G. Med	Stroke / COE	15	6	40.0
18/11/2008	YGB	Conwy	Surgery	Surgery	26	5	19.2
18/11/2008	YGB	Alaw	G. Med	Haematology / Oncology	16	7	43.8
18/11/2008	YGB	Dulas	Surgery	Vascular	29	18	62.1
18/11/2008	YGB	Ffrancon	Surgery	Gynaecology	15	3	20.0
18/11/2008	YGB	Beuno	Surgery	Trauma & Orthopaedic	20	2	10.0
18/11/2008	YGB	Enlli	Surgery	Orthopaedics	18	7	38.9
18/11/2008	YGB	Tegid	Surgery	Surgery	19	3	15.8
18/11/2008	YGB	Hebog	G. Med	Renal	27	9	33.3
18/11/2008	YGB	Ogwen	Surgery	Urology	29	13	44.8
03/06/2008	UHW	ICU	ICU		16	11	68.8
03/06/2008	UHW	ITU-Cardiac	Surgery		11	9	81.8
03/06/2008	UHW	Renal	G. Med	Renal	35	22	62.9
03/06/2008	UHW	UGG	Surgery	Gynaecology	5	2	40.0
03/06/2008	UHW	Heulwen	Paeds	Paediatrics	8	3	37.5
03/06/2008	UHW	Sky	Paeds	Paediatrics	8	6	75.0
03/06/2008	UHW	Ocean	Paeds	Paediatrics	16	6	37.5
03/06/2008	UHW	PUS	Paeds	Paediatrics	21	3	14.3
03/06/2008	UHW	Land	Paeds	Paediatrics	13	3	23.1
04/06/2008	UHW	SCBU	ICU	SCBU	13	8	36.4
03/06/2008	UHW	B1	Surgery		22	5	13.2
03/06/2008	UHW	B2 (N&S)	Surgery		38	11	28.9
03/06/2008	UHW	B4 Haem	G. Med	Haematology	38	21	77.8
03/06/2008	UHW	B4 Neuro	G. Med	Neurology	27	7	20.6
03/06/2008	UHW	B6 South	Surgery		34	7	36.8

Survey	Hospital	Specialty	Specialty	Comments	No. patients	No. ABx	% ABx
03/06/2008	UHW	B6 North	Surgery		19	11	61.1
03/06/2008	UHW	B7 (E&W)	G. Med		18	8	21.1
03/06/2008	UHW	A1 Link	G. Med		38	12	54.5
03/06/2008	UHW	A1 Main	G. Med		22	12	41.4
03/06/2008	UHW	A2	Surgery		29	21	55.3
03/06/2008	UHW	A3 Link	G. Med		38	7	26.9
03/06/2008	UHW	A4	Surgery		26	10	26.3
03/06/2008	UHW	A5	Med&Surg	Med/Urol/T&O/Renal/Neuro	38	13	34.2
03/06/2008	UHW	A6	Surgery		38	13	34.2
03/06/2008	UHW	A7	G. Med		38	13	39.4
03/06/2008	UHW	C1	Surgery	Obstetrics	33	5	14.7
03/06/2008	UHW	C2	Surgery		34	16	42.1
03/06/2008	UHW	C3	Surgery		38	4	21.1
03/06/2008	UHW	C4T	G. Med	Cardiology	19	8	88.9
03/06/2008	UHW	C4 Neuro	G. Med	Neurology	9	4	22.2
03/06/2008	UHW	C5	Surgery		18	9	24.3
03/06/2008	UHW	C6	G. Med		37	11	28.9
03/06/2008	UHW	C7	G. Med		38	13	34.2
05/06/2008	CRI	Stroke	G. Med		38	1	4.2
05/06/2008	CRI	Elizabeth	G. Med		24	4	10.0
05/06/2008	CRI	ORU	G. Med		40	9	30.0
05/06/2008	WW	MRU	G. Med		30	7	26.9
05/06/2008	RKW	4	G. Med		26	2	13.3
05/06/2008	RKW	5	G. Med		15	1	7.1
05/06/2008	RKW	6	G. Med		14	4	21.1
05/06/2008	RKW	7	G. Med		19	2	12.5
05/06/2008	RKW	8	G. Med		16	1	6.7

Key for Specialties & wards: **ABx** - Antimicrobial prescribed; **ASU** - Acute Stroke Unit; **CCU** - Cardiac or Coronary Care Unit; **COE** - Care of the Elderly; **G. Med** - General Medicine; **Gastro** - Gastroenterology; **GI** - Gastrointestinal; **ICU** - Intensive Care Unit; **MAU** - Medical Admissions Unit; **Med** - Medical; **Med&Surg** - Mixed medical & surgical; **Pall** - Palliative; **Neuro** - Neurology; **Resp** - Respiratory; **SSU** - Short Stay Unit; **T&O** - Trauma & Orthopaedic

Table 2: Patients gender

Hospital	Female	Male	Unknown	Total
Aberdare Hospital	1	2		3
Brecon War Memorial Hospital	1		1	2
Caerphilly Miners Hospital	12	10		22
Cardiff Royal Infirmary & West Wing	14	7		21
Llandough Hospital	104	62		166
Llandrindod Wells Hospital	3			3
Morrison Hospital	16	5		21
Neath Port Talbot Hospital	35	10		45
Nevill Hall Hospital	56	42		98
Prince Charles Hospital	48	63	1	112
Prince Philip Hospital	32	30		62
Princess of Wales Hospital	10	16		26
Royal Glamorgan Hospital	85	85		170
Royal Gwent Hospital	5	5		10
Rookwood Hospital	15	20		35
Singleton Hospital	31	25		56
University Hospital of Wales	158	157		315
Velindre Hospital	6	7		13
Withybush Hospital	25	24		49
Wrexham Maelor Hospital	22	25		47
West Wales General Hospital	40	51		91
Ysbyty Gwynedd	56	77		133
Ystradgynlais Hospital	3			3
All-Hospitals	778	723	2	1503

Table 3: Patients age group

Hospital	0-1	2-14	15-29	30-44	45-59	60-74	75+	U	Total
ABD						3			3
BWMH							2		2
CMH			3	2	6	1	10		22
CRI & WW						2	19		21
LLH			9	10	21	40	86		166
LWH							3		3
MOR				1	2	4	14		21
NPT				2	2	16	25		45
NHH	2	1	6	6	14	23	45	1	98
PCH	5	2	11	13	18	27	36		112
PPH			1	4	7	16	34		62
POW			1			8	17		26
RGL	5	8	12	14	22	47	62		170
RGW			2	1		4	3		10
RKW				4	3	15	13		35
SIN			1	3	7	12	33		56
UHW	16	12	15	25	59	69	119		315
VEL				1	3	6	3		13
WBH			3	3	6	12	25		49
WMH			1	2	8	16	20		47
WWGH			1	6	6	26	52		91
YGB			4	13	20	38	58		133
YST							3		3
All-Hospitals	28	23	70	110	204	385	682	1	1503

Table 4: Indication for antimicrobial prescription

Hospital	A	B	C	D	Unknown	Total	Patients
ABD		3				3	3
BWMH	2	1				3	2
CMH	16	5	3	1		25	22
CRI & WW		22		1		23	21
LLH	124	73	28	23		248	166
LWH	1	3				4	3
MOR	8	21				29	21
NPT	29	29	6			64	45
NHH	84	31	20			135	98
PCH	106	22	37	5	1	171	112
PPH	48	27	20	2		97	62
POW	9	21	4	3		37	26
RGL	130	60	53	5		248	170
RGW		7		5		12	10
RKW	40	8	4			52	35
SIN	39	29	14	3		85	56
UHW	186	201	55	68	2	512	315
VEL	8	10		1		19	13
WBH	45	5	11	1		62	49
WMH	44	15	2	3	3	67	47
WWGH	85	38	10	2		135	91
YGB	99	67	19	7	6	198	133
YST		2		2		4	3
All-Hospitals	1103	700	286	132	12	2233	1503

Table 5: Reason for antimicrobial prescription recoded in patient notes

Indication Reason recorded	A		B		C		D		Unknown		Total	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
ABD			2	1							2	1
BWMH	2		1								3	
CMH	15	1	5		2	1		1			22	3
CRI & WW			21	1			1				22	1
LLH	119	5	68	5	25	3	20	3			232	16
LWH	1		3								4	
MOR	8		21								29	
NPT	27	2	29		1	5					57	7
NHH	76	8	21	10	11	9					108	27
PCH	85	21	21	1	34	3	3	2		1	143	28
PPH	42	6	25	2	4	16	2				73	24
POW	9		21		1	3	3				34	3
RGL	121	8	55	5	44	9	5				225	22
RGW			7				3	2			10	2
RKW	35	5	8			4					43	9
SIN	37	2	29		14		3				83	2
UHW	172	14	176	25	9	46	44	24		2	401	111
VEL	8		10				1				19	0
WBH	34	11	4	1	8	3		1			46	16
WMH	44	1	16	1	2		3				65	2
WWGH	78	7	31	7	9	1	2				120	15
YGB	63	35	49	18	12	7	4	3		6	128	69
YST			2	0			2				4	
All Hospitals	976	126	625	77	176	110	96	36		9	1873	358
Proportions	89%	11%	89%	11%	62%	38%	73%	27%	0%	100%	84%	16%

Table 6: Top 10 prescribing

Hospital	No of prescriptions of top ten antibacterials										Sum	Top 10 %
	AUG	MET	CXM	CIP	CLA	FLU	AMO	TRI	GEN	VAN		
CMH	8	3	3	2	2	1	1				20	80.0
CRI & WW	5	6		2	1	1	3	2		1	21	91.3
LLH	38	15	24	29	24	9	17	5	15	9	185	74.6
MOR	3		1	2		3		6			15	51.7
NPT	10	9	6	3	8	2	3	6	2		49	76.6
NHH*	19	17	19	11	10	11	11	4	2	1	105	75.0
PCH*	32	28	13	14	15	16	8	1	8	4	139	80.3
PPH	8	12	14	1	9	4	6	7	8	2	71	73.2
POW	2	5	1	7		1	1	4	4		25	67.6
RGL	3	7	5	3	7	1	2	5	1	1	398	67.3
RGW	50	38	20	12	15	16	13	10	7	7	188	75.8
RKW			1	3				2			6	50.0
SIN	9	21	15	9	8	1		7	2	2	74	87.1
UHW	58	53	32	56	24	32	11	18	12	32	328	64.1
VEL	6			3	1	1		2	2		15	78.9
WBH	9	3	9	4	8	1	6			1	41	66.1
WMH	10	11	1		8	1	8	5	1		45	67.2
WWGH	8	20	17	2	11	6	8	5	4	4	85	63.0
YGB	8	32	12	15	10	11	18	5	5	9	125	63.1
All Hospitals	286	280	193	178	161	118	116	94	73	73	1572	70.4

Key table 6: **AUG** - co-amoxiclav; **MET** - metronidazole; **CXM** - cefuroxime; **CLA** - clarithromycin; **FLU** - flucloxacillin; **AMO** - amoxicillin; **TRI** - trimethoprim; **GEN** - gentamicin; **VAN** - vancomycin; **NHH*** - combined Nevill Hall, Brecon, Llandrindod & Ystradgynlais; **PCH*** - Prince Charles & Aberdare.

Table 7: Proportion of Oral/Parenteral prescribing by specialty

Hospital	G. Medicine		Surgery			Med/Surgery		ITU		Paediatrics	
	O (%)	P (%)	O (%)	P (%)	O&P	O (%)	P (%)	O (%)	P (%)	O (%)	P (%)
CMH	60	40	25	75							
CRI & WW	100	0									
LLH	71.9	28.1	36.8	63.2				100			
MOR			69.0	31.0							
NPT	68	32	30	70				25	75		
NHH*	56.6	43.4	46.6	53.4		82.4	17.6		100	25	75
PCH*	56.8	43.2	38.4	61.6				45.5	54.5	63.6	36.4
PPH	51.5	48.5	3.8	76.9	19.2			0	100		
POW	70.6	29.4	27.8	72.2							
RGW	61.2	38.8	36	64			100	0	100	75	25
RKW	83.3	16.7									
RGL	67.6	32.4	60	40							
SIN	62.5	37.5	48.5	51.5				8.3	91.7		
UHW	62.6	37.4	42.1	57.9				12.5	87.5	15.8	84.2
VEL	73.7	26.3									
WBH	57.1	42.9	23.1	76.9							
WMH	47.2	52.8	53.8	46.2							
WWGH	46.4	53.6	28.3	71.7				11.1	88.9		
YGB	59.8	40.2	59.3	40.7				6.7	93.3		
All Hospitals	62.0	38.0	41.0	58.3	0.6	70	30	11.4	88.6	35.4	64.6

Key table 7: O - oral; P - parenteral; O&P – Oral & parenteral

Note: Some PPH surgical prophylaxis regimens include a single dose of a parenteral antibacterial followed by oral doses therefore noted as O&P.

Table 8: Number of antibacterials prescribed per patient by indication

Hospital	Indication/ Number	Number of scripts			Total Patients	Proportion of scripts		
		1	2	3+		1	2	3+
CMH	A	13	1		14	92.9	7.1	
	B	3	1		4	75	25	
	C	3			3	100		
	D	1			1	100		
CRI & WW	B	19	1		20	95	5	
	D	1			1	100		
LLH	A	37	32	6	75	49.3	42.7	8
	B	39	14	2	55	70.9	25.5	3.6
	C	16	6		22	72.7	27.3	
	D	6	2	3	11	54.5	18.2	27.3
MOR	A	6	1		7	85.7	14.3	
	B	7	7		14	50	50	
NPT	A	38	17	4	59	64.4	28.8	6.8
	B	22	6		28	78.6	21.4	
	C	12	4		16	75	25	
NHH*	A	2			2	100		
	B	8	9	1	18	44.4	50	5.6
	C	16	5	1	22	72.7	22.7	4.5
	D	4	1		5	80	20	
PCH*	A	34	26	7	67	50.7	38.8	10.4
	B	13	5		18	72.2	27.8	0
	C	14	7	3	24	58.3	29.2	12.5
	D	4			4	100		
	Unknown	1			1	100		
PPH	A	11	14	2	27	40.7	51.9	7.4
	B	14	6		20	70	30	
	C	7	5	1	13	53.8	38.5	7.7
	D			1	1			100

Hospital	Indication	Number of scripts			Total Patients	Proportion of scripts		
		1	2	3+		1	2	3+
POW	A	5	2		7	71.4	28.6	
	B	10	2	2	14	71.4	14.3	14.3
	C	4			4	100		
	D		1		1	0	100	
RGL	A	18	11		29	62.1	37.9	
	B	1	2	1	4	25	50	25
	C		2		2	0	100	
RGW	A	45	35	5	85	52.9	41.2	5.9
	B	30	11	1	42	71.4	26.2	2.4
	C	21	14	1	36	58.3	38.9	2.8
	D	5			5	100		
RKW	B	4	1		5	80	20	
	D	4	1		5	80	20	
SIN	A	12	12	1	25	48	48	4
	B	10	9		19	52.6	47.4	
	C	4	5		9	44.4	55.6	
	D	2	1		3	66.7	33.3	
UHW	A	62	43	4	109	56.9	39.4	3.7
	B	79	33	13	125	63.2	26.4	10.4
	C	12	18	3	33	36.4	54.5	9.1
	D	17	11	3	31	54.8	35.5	9.7
	Unknown	2			2	100		
VEL	A		4		4		100	
	B	6	2		8	75	25	
	D	1			1	100	0	
WBH	A	25	8		33	75.8	24.2	
	B	3	1		4	75	25	
	C	9	1		10	90	10	
	D		1		1		100	
WMH	A	17	13		30	56.7	43.3	
	B	7	4		11	63.6	36.4	
	C		1		1		100	
	D	1	1		2	50	50	
WMH	A&B (MIX)	1	1		2	50	50	
WWGH	A	27	22	3	52	51.9	42.3	5.8
	B	19	8	1	28	67.9	28.6	3.6
	C	6	1	1	8	75	12.5	12.5
	D	2			2	100		
YGB	A	40	21	4	65	61.5	32.3	6.2
	B	24	14	5	43	55.8	32.6	11.6
	C	13	2	1	16	81.3	12.5	6.25
	D	3	1		4	75.0	25.0	
	Unknown	4			4	100.0		
All Hospitals	A	425	258	37	720	59.0	35.8	5.1
	B	336	128	26	490	68.6	26.1	5.3
	C	127	66	10	203	62.6	32.5	4.9
	D	51	18	7	76	67.1	23.7	9.2
	Unknown	7	0	0	7	100.0		
Totals	All	946	470	80	1496	63.2%	31.4%	5.3%

Key table 7: A – community acquired infection; B – hospital acquired infection; C – surgical prophylaxis; D – medical prophylaxis; A&B (MIX) – auditor uncertain of indication; 1 – monotherapy; 2 – two antibacterials prescribed per patient; 3+ - three or more antibacterials prescribed per patient.

Note: Antifungals, antivirals and antibacterials prescribed as part of TB regimens are not included in this data set.

Table 9: Dosing regimens for treatment of CA-RTI

Hospital	Route	Oral				Parenteral	
	Dose per day	0.375g 3	0.625g 2	0.625g 3	0.6g 3	1.2g 2	1.2g 3
CMH	Co-amoxiclav			2			
LLH	Co-amoxiclav			19		1	1
NPT	Co-amoxiclav			4			3
NHH*	Co-amoxiclav				1		2
PCH*	Co-amoxiclav			9			5
PPH	Co-amoxiclav	1					2
POW	Co-amoxiclav			1			
RGL	Co-amoxiclav			7			11
RGW	Co-amoxiclav			2			
SIN	Co-amoxiclav			1			4
UHW	Co-amoxiclav		1	11		1	5
WBH	Co-amoxiclav			2			
WMH	Co-amoxiclav	1		2			2
WWGH	Co-amoxiclav			1			3
YGB	Co-amoxiclav			1	1		
All Hospitals	Co-amoxiclav	2	1	62	2	2	38
Hospital	Route	Oral				Parenteral	
	Dose per day	0.25g 3	0.5g 2	0.5g 3	1g 3	0.5g 3	1g 3
CMH	Amoxicillin					1	
LLH	Amoxicillin		1	11			
NPT	Amoxicillin			2			
NHH*	Amoxicillin			4		1	
PCH*	Amoxicillin			1			
PPH	Amoxicillin	1		1		1	
RGL	Amoxicillin				2		
RGW	Amoxicillin			6			1
UHW	Amoxicillin			2	1		
WBH	Amoxicillin			2	2		1
WMH	Amoxicillin			3			2
WWGH	Amoxicillin	1		2			1
YGB	Amoxicillin			10	2		
All Hospitals	Amoxicillin	2	1	44	7	3	5
Hospital	Route	Oral				Parenteral	
	Dose per day	0.25g 2	0.5g 2	0.5g 3	0.5g 4	0.25g 2	0.5g 2
CMH	Clarithromycin		2				
LLH	Clarithromycin		18				2
NPT	Clarithromycin		6				1
NHH*	Clarithromycin	1	5				2
PCH*	Clarithromycin	1	3	1			3
PPH	Clarithromycin		5			1	2
RGL	Clarithromycin		4				2
RGW	Clarithromycin		11	1			1
SIN	Clarithromycin		6				1
UHW	Clarithromycin		13				1
WBH	Clarithromycin		6				1
WMH	Clarithromycin		4				1
WWGH	Clarithromycin	1	8				1
YGB	Clarithromycin		5		1		1
All Hospitals	Clarithromycin	3	96	2	1	1	19

Key for Hospitals: **CMH** - Caerphilly Miners; **LLH** - Llandough; **NPT** - Neath Port Talbot; **NHH*** - Nevill Hall & Brecon, Llandod & Ystradgynlais; **PCH*** - Prince Charles & Aberdare; **PPH** - Prince Philip; **POW** - Princess of Wales; **RGL** - Royal Glamorgan; **RGW** - Royal Gwent; **SIN** - Singleton ; **UHW** - University Hospital of Wales; **WBH** - Withybush; **WMH** – Wrexham Maelor; **WWGH** - West Wales General; **YGB** - Ysbyty Gwynedd.

Table 10: Antibacterials prescribed for hospital acquired infection

Antibacterials	CNS	CVS	ENT	GI	GUOB	MIX	Not Defined	RESP	SSTBJ	UTI	Total
Metronidazole			3	72	1	1	5	15	14	2	113
Co-amoxiclav		1	2	3	3		4	38	15	12	78
Ciprofloxacin				4	1		5	14	16	32	72
Vancomycin	1	5		22	1		11	3	5		48
Flucloxacillin		3	1				2	1	37		44
Trimethoprim									1	42	43
Piperacillin/Tazo		2		4			6	16	3	1	32
Cefuroxime			2	8			3	5	5	2	25
Clarithromycin			1				1	20	3		25
Amoxicillin								15	1	5	21
Meropenem	1	1		5			3	3	4	3	20
Cefotaxime	1			5			3	5			14
Imipenem			1	1	1		3	4	2	1	13
Teicoplanin				2			3	1	7		13
Benzympenicillin		1					2		9		12
Gentamicin		4		3			1	3		1	12
Cefalexin				1	1	1		1	1	6	11
Ceftazidime				3				4	2		9
Clindamycin					1	1			6		8
Cefaclor				1			1	4		1	7
Doxycycline	1								6		7
Erythromycin			2					2	3		7
Nitrofurantoin										7	7
Fusidic Acid		1					1		4		6
Levofloxacin				1				5			6
Penicillin V							1		4		5
Amikacin							4				4
Rifampicin									4		4
Cefradine				1					2		3
Co-trimoxazole	1								1		2
Colistin								1			1
Daptomycin									1		1
Minocycline									1		1
Norfloxacin										1	1
Tetracycline							1				1
Tigecycline									1		1
Grand Total	5	18	12	136	9	3	60	160	158	116	677

Table 11: Antibacterials by indication B-B5

Antibacterials	B	B1	B2	B3	B4	B5	Total
Metronidazole	2	26	5	46	29	4	112
Co-amoxiclav	2	25	4		43	4	78
Ciprofloxacin		18	10		40	4	72
Vancomycin		14	8	12	9	5	48
Flucloxacillin	1	13	9		17	4	44
Trimethoprim	1	4	5	2	29	2	43
Piperacillin/Tazobactam		7	6		15	4	32
Cefuroxime		10			12	3	25
Clarithromycin	1	3	1	1	19		25
Amoxicillin		1	1		17	2	21
Meropenem		10	1		7	2	20
Cefotaxime	1	3	1		9		14
Imipenem		4	3		6		13
Teicoplanin		7	1		3	2	13
Benzylpenicillin		5	1		5	1	12
Gentamicin		1	4		6	1	12
Cefalexin		2	1		7	1	11
Ceftazidime	1	4	2		2		9
Clindamycin		1			6		7
Cefaclor		2	2		3		7
Doxycycline		1	1		2	3	7
Erythromycin		2			5		7
Nitrofurantoin					7		7
Fusidic Acid		3			2	1	6
Levofloxacin		1			4	1	6
Phenoxymethylpenicillin			1		4		5
Amikacin			2		2		4
Rifampicin		3				1	4
Cefradine		3					3
Co-trimoxazole		1				1	2
Colistin			1				1
Daptomycin					1		1
Minocycline		1					1
Norfloxacin					1		1
Tetracycline					1		1
Tigecycline		1					1
Grand Total	9	176	70	61	313	46	675

Table 12: Dosing regimens for treatment of HA-RTI

Hospital	Dose per day	0.625g 3	1.25g 3	0.6g 3	1.2g 2	1.2g 3
CMH	Co-amoxiclav	1				
CRI & WW	Co-amoxiclav	2				
LLH	Co-amoxiclav	3	1			2
NPT	Co-amoxiclav			1		
PCH	Co-amoxiclav	2				1
RGL	Co-amoxiclav					1
RGW	Co-amoxiclav	2			1	1
SIN	Co-amoxiclav	1				1
UHW	Co-amoxiclav	6				5
VEL	Co-amoxiclav	2				1
WMH	Co-amoxiclav	1				2
WWGH	Co-amoxiclav	1				
All Hospitals	Co-amoxiclav	21	1	1	1	14

Table 13: Surgical prophylaxis by diagnosis code and duration of treatment C1, C2 & C3

Hospital	Diagnosis Code	Indication	Total Number Prescriptions	Number C3	Proportion C3 > 1 day
CMH	Proph GI	C2	1		
	Proph GyOb	C1	2		
CMH Total			3	0	0%
LLH	Proph GyOb	C1	2		
		C2	1		
		C3	2		40%
	Proph SBJ	C1	5		
		C2	12		
		C3	3		15%
	Proph UT	C1	2		
		C3	1		33%
LLH Total		28	6	21%	
NPT	Proph SBJ	C3	6		100%
NPT Total			6	6	100%
NHH	Mix	C3	1		100%
	Proph GI	C2	3		
		C3	2		40%
		C1	1		
	Proph GyOb	C3	2		67%
		C2	9		
	Proph SBJ	C3	2		18%
NHH Total		20	7	35%	
PCH	Proph ENT	C3	1		100%
	Proph GI	C1	1		
		C3	2		67%
	Proph GyOb	C1	2		
	Proph SBJ	C2	7		
		C3	15		68%
	Proph UT	C1	9		
PCH Total			37	18	49%
PPH	Proph GI	C1	5		
		C2	1		
		C3	1		14%
	Proph SBJ	C1	6		
		C2	2		
		C3	2		20%
	Proph UT	C1	1		
		C3	2		67%
PPH Total		20	5	25%	
POW	Proph CVS	C3	1		100%
	Proph UT	C1	3		
POW Total			4	1	25%
RGL	Proph GI	C1	4		
RGL Total			4	0	0%
RGW	Proph ENT	C1	1		
		C2	2		
		C3	4		57%
	Proph GI	C1	1		
		C2	5		
		C3	9		60%
	Proph GyOb	C2	1		
		C3	6		86%

Hospital	Diagnosis Code	Indication	Total Number Prescriptions	Number C3	Proportion C3 > 1 day	
RGW	Proph SBJ	C1	1			
		C2	8			
		C3	8		47%	
	Proph UT	C1	1			
		C2	1			
		C3	4		67%	
RGW Total			52	31	60%	
SIN	Proph GI	C2	4			
		C3	8		67%	
	Proph GyOb	C3	2		100%	
SIN Total			14		71%	
UHW	Mix	C3	1		100%	
	Proph CNS	C1	2			
		C2	4			
		C3	13		68%	
	Proph ENT	C2	1			
		C3	1		50%	
	Proph GI	C3	11		100%	
	Proph GyOb	C3	2		100%	
	Proph RES	C3	1		100%	
	Proph SBJ	C3	5		100%	
		C1	8			
	Proph UT	C3	3		27%	
UHW Total			54		69%	
WBH	Proph GI	C3	2		100%	
	Proph GyOb	C2	1			
	Proph SBJ	C1	1			
		C2	6			
	Proph UT	C3	1		100%	
WBH Total			11		27%	
WMH	Proph CVS	C1	2			
WMH Total			2		0%	
WWGH	Proph CVS	C3	1		100%	
	Proph GI	C3	3		100%	
	Proph SBJ	C2	1			
	Proph UT	C1	3			
		C2	1			
C3		1		20%		
WWGH Total			10		50%	
YGB	Proph CVS	C2	1			
	Proph ENT	C3	1		100%	
	Proph GI	C2	2			
		C3	3		40%	
	Proph SBJ	C2	6			
		C3	4		40%	
	Proph UT	C1	1			
C2		1				
YGB Total			19		42%	
Total	All diagnosis		284		48%	

Table 14: Surgical prophylaxis by antibacterial, hospital & duration of treatment C1, C2 & C3

Antibacterial	Hospital	C1	C2	C3	Total Scripts	Proportion C3 < 1 day duration
Cefuroxime	LLH	4	11		15	0
	NPT			4	4	100
	NHH		10	4	14	28.6
	PCH	1	6		7	0
	PPH	3	2	2	7	28.6
	RGL	2			2	0
	RGW		5	3	8	37.5
	SIN		2	4	6	66.7
	UHW	2	2	13	17	76.5
	WBH		6	1	7	14.3
	WWGH		1	2	3	66.7
	YGB		6	4	10	40
Cefuroxime Total		12	51	37	100	37%
Co-amoxiclav	CMH	2	1		3	0
	LLH		2	3	5	60
	NHH	1			1	0
	PCH	4		1	5	20
	PPH			1	1	100
	RGW	2	3	10	15	66.7
	UHW		1	4	5	80
	WBH		1	1	2	50
	YGB			1	1	100
Co-amoxiclav Total		9	8	21	38	55.3 %
Gentamicin	LLH	4			4	0
	NPT			2	2	100
	PCH	5			5	0
	PPH	8			8	0
	POW	3			3	0
	RGW	2	1		3	0
	UHW	4			4	0
	WMH	1			1	0
	WWGH	3			3	0
	YGB	1			1	0
Gentamicin Total		31	1	2	34	5.9 %
Metronidazole	LLH	1			1	0
	NHH		2	2	4	50
	PCH	1		4	5	80
	PPH	1		1	2	50
	RGL	2			2	0
	RGW		5	7	12	58.3
	SIN		2	4	6	66.7
	UHW			6	6	100
	WBH			1	1	100
	WWGH			2	2	100
YGB		1	2	3	66.7	
Metronidazole Total		5	10	29	44	65.9 %
Grand Total		57	70	89	216	41.2 %