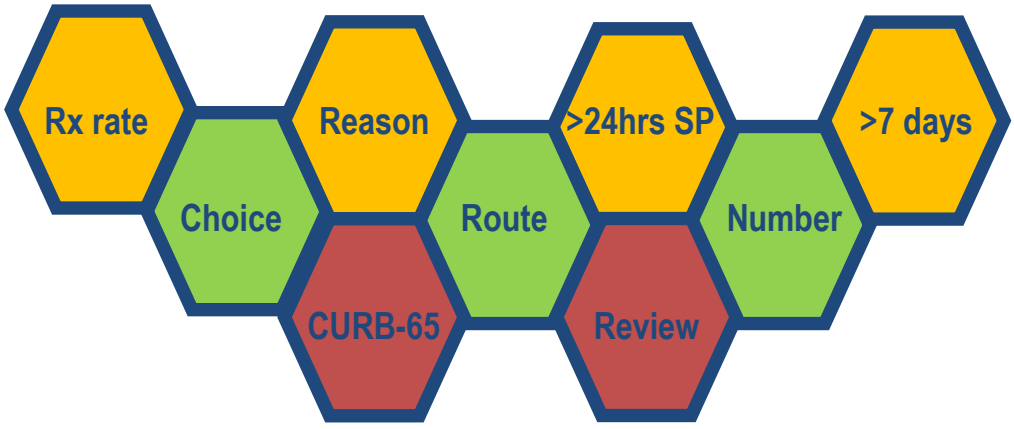
QUALITY MEASURES

Point Prevalence Surveys of Antimicrobial Prescribing in Acute Hospitals in Wales 2013-2018



Authors: Maggie Heginbothom, Jamie Sullivan, and Robin Howe	Date: 04/04/2019	Status: Final
Quality Measures 2013-2018 PPS	Page: 1 of 27	HARP Programme

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INTRODUCTION

This report compares Quality Measures data from the 2013 to 2018 all-Wales Point Prevalence Survey (PPS) of antimicrobial usage in secondary care in Wales. The data collected in the survey includes all systemic and topical antibacterials, antivirals, and antifungals, antiseptic agents, and TB agents, collectively described as antimicrobials. However, this Quality Measures report focuses mainly on systemic antibacterial usage.

This Quality Measures report includes data for the acute hospitals in Wales; psychiatric wards and non-acute hospitals are excluded from these analyses. Due to its specialist nature and the small number of in-patients, data for Velindre hospital are also excluded from this report. Data for all hospitals/wards that participated in the survey will be published in the Appendix.

This report allows for comparison between acute hospitals and shows trends across time; however, it should be noted that patient mix and specialities vary between hospitals and comparisons should be made with caution.

METHODOLOGY

The annual point prevalence survey takes place in November each year. Hospital pharmacy teams collect data using a paper-based method, surveying all patients resident on all wards at 8.00 am on the day of the survey, and document the details of those currently prescribed antimicrobials. The forms are referred to Public Health Wales, who collate, transcribe, process and analyse the data (using Microsoft Excel, and the statistical software packages R and STATA, and the business intelligence and analytics software Tableau).

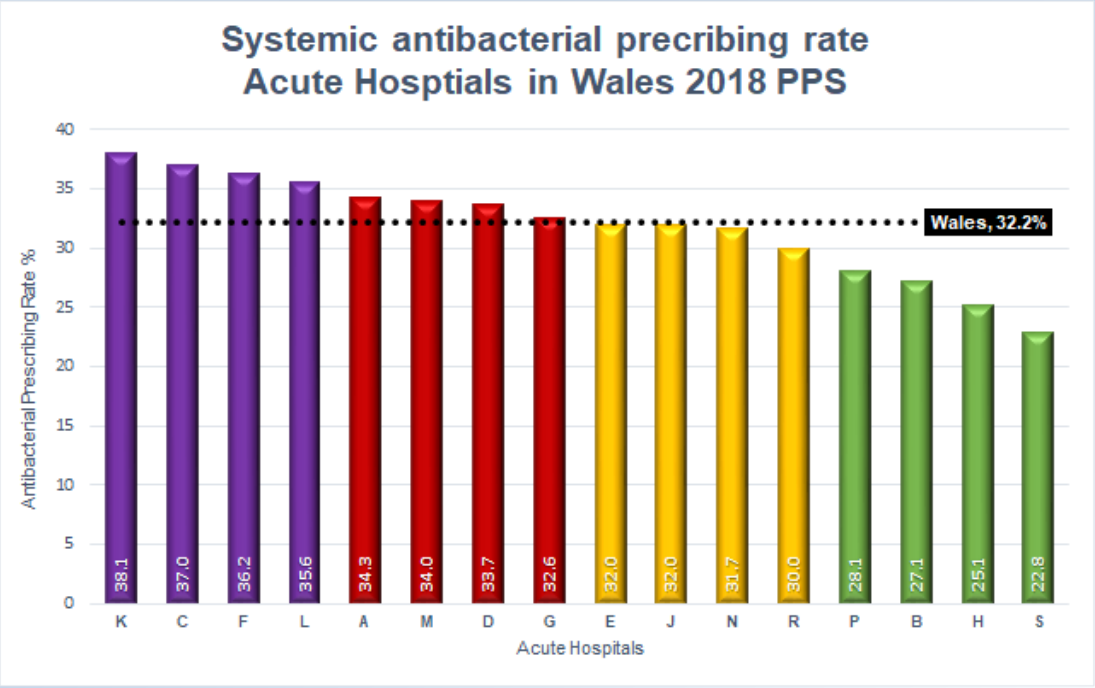
KEY POINTS

Variation in sampling

- There is significant variation in sampling across time for many of the hospitals; e.g. for Princess of Wales hospital the number of patients surveyed varied from 408 patients surveyed in 2013 to 322 in 2017.
- Variation in sampling may account in part for the variation in antibacterial prescribing rates.

Systemic Antibacterial Prescribing Rate [95% Confidence Interval]

- An all-Wales systemic antibacterial prescribing rate of **32.2%** [31.0, 33.3] for the acute hospitals in Wales in 2018.
- **NO SIGNIFICANT CHANGE** in the all-Wales prescribing rate across time (32.2% in 2013, 31.9% in 2014, 29.7% in 2015, 32.1% in 2016, 31.3% in 2017, and 32.2% in 2018).
- **HIGH PRESCRIBING RATES** for Ysbyty Gwynedd (K) 38.1%, Royal Glamorgan hospital (C) 37.0%, University Hospital of Wales (F) 36.2%, and Ysbyty Glan Clwyd (L) 35.5% recorded in the 2018 PPS.
- **SIGNIFICANTLY LOWER** prescribing rates for Singleton hospital (S) across time (median 24.8%).
- **SIGNIFICANT REDUCTION** in the prescribing rates for Wrexham Maelor hospital (H) across time.



Key: A - Bronglais; B - Princess of Wales; C - Royal Glamorgan; D - Royal Gwent; E - Morriston; F - University hospital of Wales; G - Withybush; H - Wrexham Maelor; J - Glangwili; K - Ysbyty Gwynedd; L - Ysbyty Glan Clwyd; M - Neville Hall; N - Prince Charles; P - University Hospital Llandough; R - Prince Philip; S - Singleton

Figure 1: Systemic antibacterial prescribing rates by acute hospital - 2018 PPS

Route of administration

- **57.9%** [56.0, 59.6] of antibacterials prescribed were parenteral (intravenous route).
- **A SIGNIFICANT INCREASE** in the rate of intravenous antibacterial usage for Bronglais hospital from 53.1% in 2017 to 72.2% in 2018.
- **SIGNIFICANTLY HIGHER** parenteral antibacterial usage in Morriston hospital across time (median 64.2%)

Number of different antibacterial agents

- No significant change in the number of different antibacterial agents prescribed across the time: A median of 26 for the acute hospitals in 2018.

Duration of treatment

- **16.0%** [14.3, 17.7] of patients prescribed systemic antibacterials for the treatment of infections received the antibacterials for more than 7 days
- **SIGNIFICANTLY HIGHER** extended duration of treatment (>7 days) for infections in University Hospital Llandough across time (median 22.9%)

Surgical prophylaxis

- **23.4%** [16.4, 32.2] of patients prescribed surgical prophylaxis were prescribed surgical prophylaxis for >24 hours.

Reason for treatment documented

- **89.0%** [87.9, 90.1] of antimicrobial prescriptions across Wales had a reason documented.
- **SIGNIFICANTLY LOWER** rate of documentation in UHW across time (median 78.7%).

Stop/review date documented

- **51.6%** [49.8, 53.4] of all antimicrobial prescriptions had a stop/review date documented (excluding surgical prophylaxis).
- **SIGNIFICANTLY LOWER** rate of documentation in Withybush (median 33.3%), Glangwili (33.8%) and Prince Philip (34.9%) across time.
- Generally, documentation of a stop/review date is poor.

Appropriate drug choice

- **92.1%** [91.1, 93.0] of antimicrobial prescriptions were adjudged the appropriate drug of choice.
- **SIGNIFICANTLY LOWER** rate of use of the appropriate drug choice in Withybush (median 84.5%) and Glangwili (86.4%).

CURB-65 score documented

- **31.8%** [25.8, 38.6] of patients with a diagnosis of community acquired pneumonia (CAP) had a CURB-65 score documented
- There remains much room for improvement.

VARIATION IN SAMPLING

Figure 2 is a box-plot showing the distribution of patients surveyed in the annual PPS by acute hospital from 2013-2018. Each point on the box plot represents an acute hospital. The upper and lower lines represent data within 1.5 times the inter-quartile range (IQR). Points outside of the IQR are outliers, and show marked variation in the number of patients surveyed compared with other years. For example, for Royal Gwent (D) 682 patients were surveyed in 2016, compared with 616 in 2013.

Note: The numbers shown in brackets below the hospital code in **Figure 2** are the 'average daily available beds' for the hospitals in 2018. The red markers (●) and figures in the graph show the number of patients surveyed per hospital in the 2018 PPS. Variation in sampling (the number of patients surveyed) may account in part for the variation in antibacterial prescribing rates, and in the variation in other quality measures. Variation in sampling is generally due to ward closures, or patients, and or their notes being off the ward at the time of the survey.

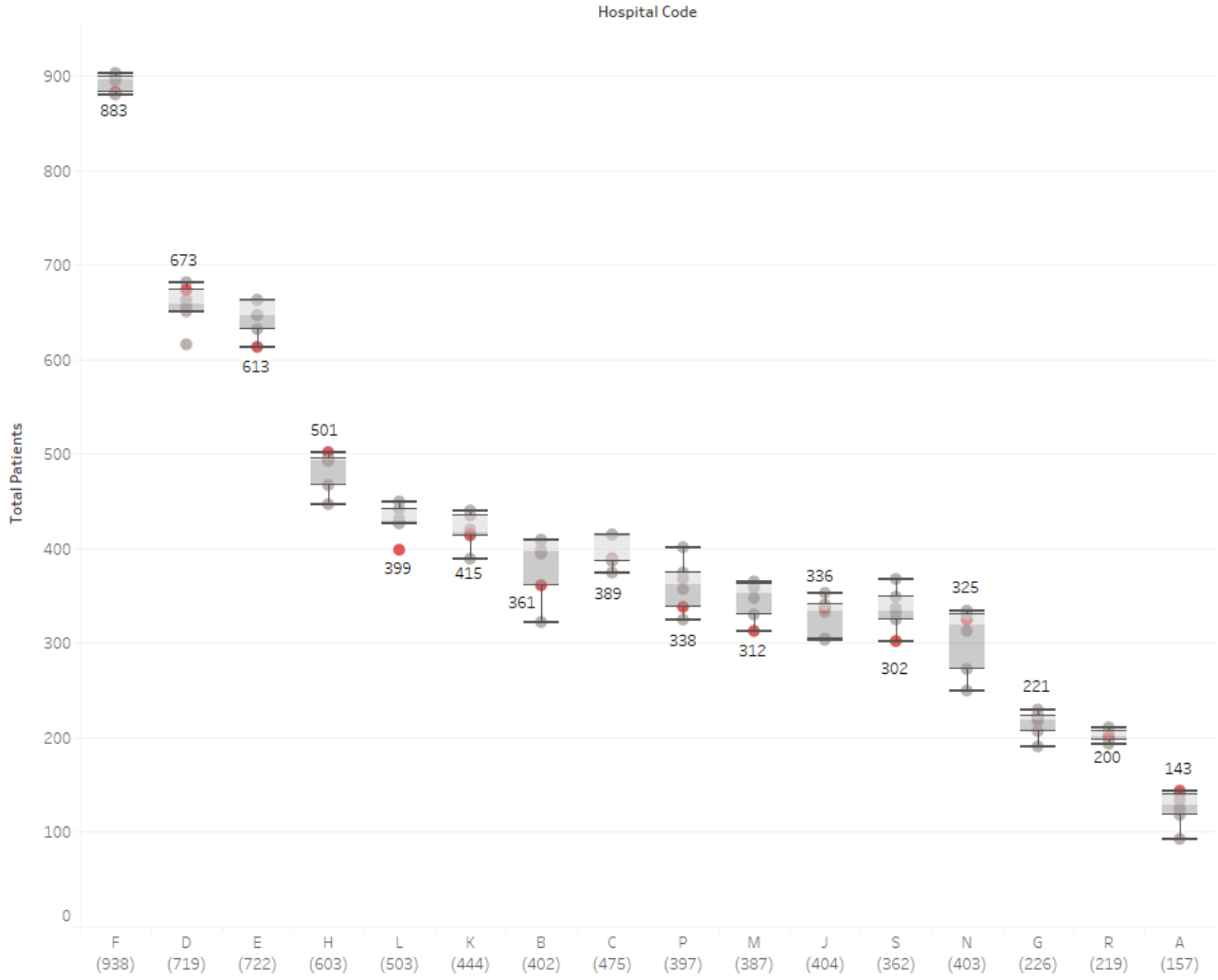


Figure 2: Variation in the total number of patients surveyed by acute hospital (2013-2018)

https://statswales.gov.wales/Catalogue/Health-and-Social-Care/NHS-Hospital-Activity/NHS-Beds/nhsbeds-by-organisation-site

QUALITY MEASURES

Antibacterial prescribing rates

During the 2018 PPS, **6411** patients were surveyed, of which **2063** were prescribed systemic antibacterials: An all-Wales acute hospital prescribing rate of **32.2%** [31.0, 33.3].

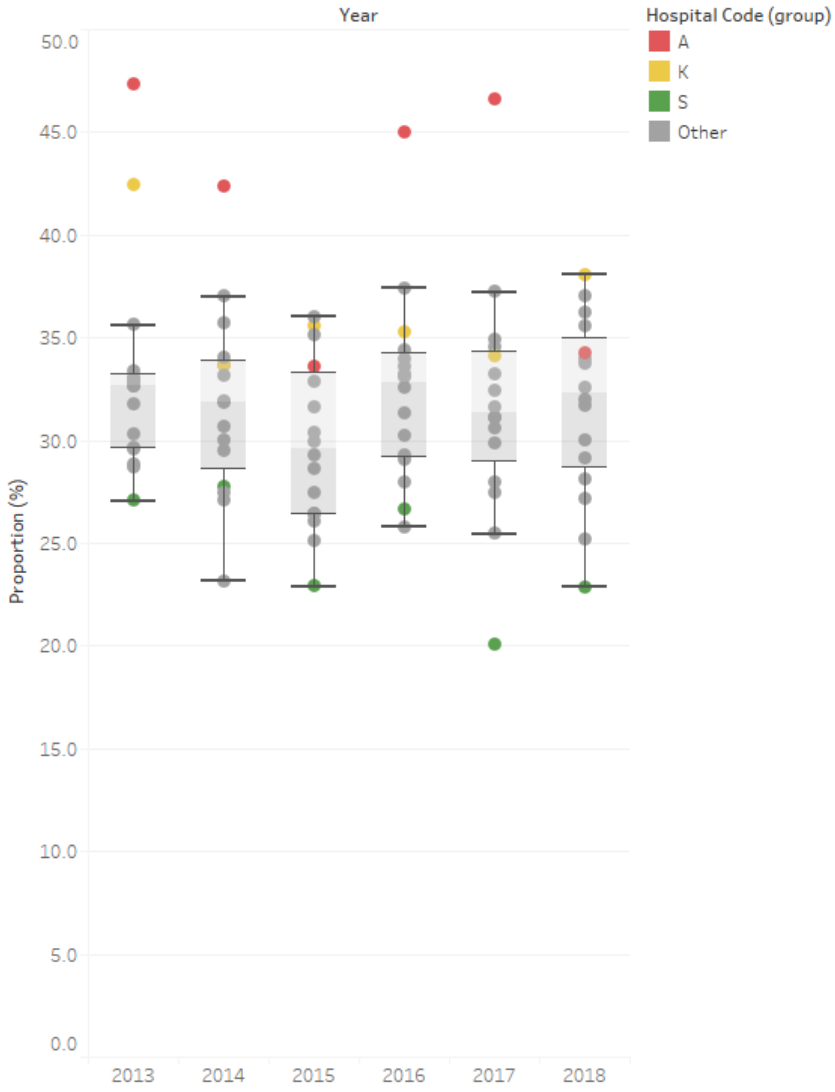


Figure 3: Antibacterial prescribing rates by year for acute hospitals (2013-2018)

Figure 3 is a box plot of acute hospital antibacterial prescribing by year. Across the period, Bronglais (●) and Ysbyty Gwynedd (●) have been two of the highest prescribing hospitals, whilst Singleton (●) remains one of the lowest. For Bronglais, there was a marked reduction in the prescribing rate from 46.6% in 2017 to 34.3% in 2018.

Table 1: Antibacterial prescribing rates for acute hospitals

Hospital Code	2013	2014	2015	2016	2017	2018
A	47.3	42.4	33.6	45.0	46.6	34.3
B	28.7	27.1	26.4	33.1	25.5	27.1
C	32.6	31.9	36.0	33.6	37.2	37.0
D	29.5	30.7	26.4	30.2	33.2	33.7
E	29.6	37.0	29.3	33.2	29.9	32.0
F	32.7	33.2	29.9	32.6	31.6	36.2
G	28.8	29.5	30.4	31.3	31.1	32.6
H	33.4	34.0	31.6	29.3	27.4	25.1
J	32.9	30.0	35.1	33.9	31.1	29.2
K	42.4	33.6	35.6	35.2	34.1	38.1
L	30.3	35.7	32.9	34.4	34.9	35.6
M	35.6	31.8	25.1	29.0	34.5	34.0
N	31.7	23.2	27.5	37.4	32.4	31.7
P	33.0	27.4	28.6	25.8	28.0	28.1
R	33.0	33.7	26.1	28.0	30.6	30.0
S	27.1	27.7	22.9	26.6	20.1	22.8

Year

Proportion (%)

20.1 47.3

Key:

A – Bronglais
B – Princess of Wales
C – Royal Glamorgan
D – Royal Gwent
E – Morriston
F – University Hospital of Wales
G – Withybush
H – Ysbyty Wrexham Maelor
J – Glangwili
K – Ysbyty Gwynedd
L – Ysbyty Glan Clwyd
M – Nevill Hall
N – Prince Charles
P – University Hospital Llandough
R – Prince Philip
S – Singleton

Table 1 shows the trends in prescribing rates for the acute hospitals over time; the table uses a colour gradation based on quintiles. Those in the lowest quintile are coloured white and those in the highest are coloured dark blue. In the 2018 PPS, rates varied from 22.8% in Singleton hospital (S) to 38.1% in Ysbyty Gwynedd (K). The prescribing rate for Wrexham Maelor (H) has decreased significantly over time; see 95% confidence intervals in **Table 2**.

Figure 4 is a box plot of the prescribing rate by acute hospital, and all-Wales. For Bronglais hospital (A), the median prescribing rate was 43.7%, significantly higher than the other acute hospitals. The median prescribing rates for Princess of Wales (B), University Hospital Llandough (P) and Singleton hospital (S) remain significantly lower than the all-Wales (Z) median prescribing rate of 32.0%.

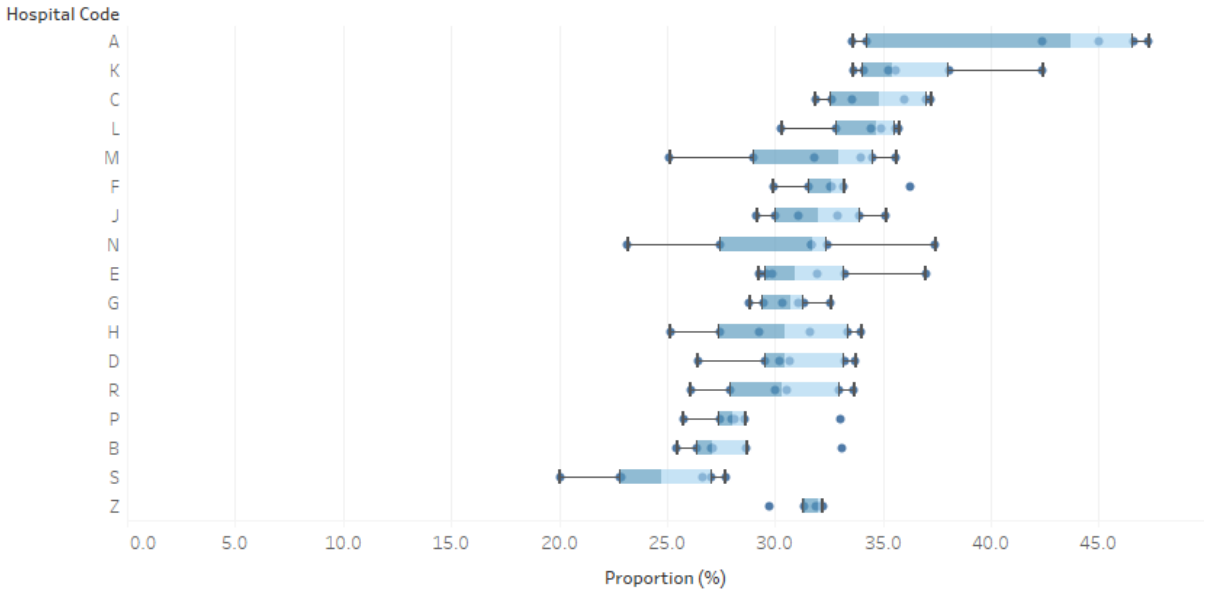


Figure 4: Antibacterial prescribing rates by acute hospital (2013-2018)

Table 2 shows the antibacterial prescribing rates for the acute hospitals 2013-2018 with 95% Confidence Intervals (95% CI). Wrexham Maelor (H) is the only acute hospital to make a statistically significant reduction in their prescribing rates over time; their prescribing rate reduced from 34.0% (30.0, 38.3) in 2014 to 25.1% (21.5, 29.1) in 2018.

Table 2: Antibacterial prescribing rates for the acute hospitals (with 95% CI)

Hospital Code	Hospital	Year	No. Patients	No. on antibacterials	Antibacterial rate (%)	95% CI
A	Bronglais	2013	93	44	47.3	(37.5, 57.4)
A	Bronglais	2014	118	50	42.4	(33.8, 51.4)
A	Bronglais	2015	125	42	33.6	(25.9, 42.3)
A	Bronglais	2016	140	63	45.0	(37, 53.3)
A	Bronglais	2017	133	62	46.6	(38.4, 55.1)
A	Bronglais	2018	143	49	34.3	(27, 42.4)
B	Princess of Wales	2013	408	117	28.7	(24.5, 33.2)
B	Princess of Wales	2014	395	107	27.1	(22.9, 31.7)
B	Princess of Wales	2015	409	108	26.4	(22.4, 30.9)
B	Princess of Wales	2016	399	132	33.1	(28.6, 37.8)
B	Princess of Wales	2017	322	82	25.5	(21, 30.5)
B	Princess of Wales	2018	361	98	27.1	(22.8, 32)
C	Royal Glamorgan	2013	374	122	32.6	(28.1, 37.5)
C	Royal Glamorgan	2014	414	132	31.9	(27.6, 36.5)
C	Royal Glamorgan	2015	386	139	36.0	(31.4, 40.9)
C	Royal Glamorgan	2016	414	139	33.6	(29.2, 38.3)
C	Royal Glamorgan	2017	387	144	37.2	(32.5, 42.1)
C	Royal Glamorgan	2018	389	144	37.0	(32.4, 41.9)
D	Royal Gwent	2013	616	182	29.5	(26.1, 33.3)
D	Royal Gwent	2014	662	203	30.7	(27.3, 34.3)
D	Royal Gwent	2015	651	172	26.4	(23.2, 29.9)
D	Royal Gwent	2016	682	206	30.2	(26.9, 33.8)
D	Royal Gwent	2017	656	218	33.2	(29.7, 36.9)
D	Royal Gwent	2018	673	227	33.7	(30.3, 37.4)
E	Morriston	2013	662	196	29.6	(26.3, 33.2)
E	Morriston	2014	646	239	37.0	(33.4, 40.8)
E	Morriston	2015	632	185	29.3	(25.9, 32.9)
E	Morriston	2016	647	215	33.2	(29.7, 36.9)
E	Morriston	2017	663	198	29.9	(26.5, 33.5)
E	Morriston	2018	613	196	32.0	(28.4, 35.8)
F	UHW	2013	903	295	32.7	(29.7, 35.8)
F	UHW	2014	895	297	33.2	(30.2, 36.3)
F	UHW	2015	899	269	29.9	(27, 33)
F	UHW	2016	897	292	32.6	(29.6, 35.7)
F	UHW	2017	880	278	31.6	(28.6, 34.7)
F	UHW	2018	883	320	36.2	(33.1, 39.5)
G	Withybush	2013	229	66	28.8	(23.3, 35)
G	Withybush	2014	207	61	29.5	(23.7, 36)
G	Withybush	2015	191	58	30.4	(24.3, 37.2)
G	Withybush	2016	217	68	31.3	(25.5, 37.8)
G	Withybush	2017	222	69	31.1	(25.4, 37.4)
G	Withybush	2018	221	72	32.6	(26.7, 39)

Table 2: Antibacterial prescribing rates for the acute hospitals (with 95% CI)

Hospital Code	Hospital	Year	No. Patients	No. on antibacterials	Antibacterial rate (%)	95% CI
H	Wrexham	2013	467	156	33.4	(29.3, 37.8)
H	Wrexham	2014	494	168	34.0	(30, 38.3)
H	Wrexham	2015	446	141	31.6	(27.5, 36.1)
H	Wrexham	2016	495	145	29.3	(25.5, 33.4)
H	Wrexham	2017	492	135	27.4	(23.7, 31.5)
H	Wrexham	2018	501	126	25.1	(21.5, 29.1)
J	Glangwili	2013	304	100	32.9	(27.9, 38.4)
J	Glangwili	2014	303	91	30.0	(25.1, 35.4)
J	Glangwili	2015	353	124	35.1	(30.3, 40.2)
J	Glangwili	2016	333	113	33.9	(29.1, 39.2)
J	Glangwili	2017	341	106	31.1	(26.4, 36.2)
J	Glangwili	2018	335	98	29.3	(24.6, 34.3)
K	Ysbyty Gwynedd	2013	389	165	42.4	(37.6, 47.4)
K	Ysbyty Gwynedd	2014	434	146	33.6	(29.4, 38.2)
K	Ysbyty Gwynedd	2015	413	147	35.6	(31.1, 40.3)
K	Ysbyty Gwynedd	2016	420	148	35.2	(30.8, 39.9)
K	Ysbyty Gwynedd	2017	440	150	34.1	(29.8, 38.6)
K	Ysbyty Gwynedd	2018	415	158	38.1	(33.5, 42.8)
L	Ysbyty Glan Clwyd	2013	449	136	30.3	(26.2, 34.7)
L	Ysbyty Glan Clwyd	2014	431	154	35.7	(31.4, 40.4)
L	Ysbyty Glan Clwyd	2015	426	140	32.9	(28.6, 37.5)
L	Ysbyty Glan Clwyd	2016	427	147	34.4	(30.1, 39.1)
L	Ysbyty Glan Clwyd	2017	441	154	34.9	(30.6, 39.5)
L	Ysbyty Glan Clwyd	2018	399	142	35.6	(31, 40.4)
M	Nevill Hall	2013	365	130	35.6	(30.9, 40.7)
M	Nevill Hall	2014	358	114	31.8	(27.2, 36.8)
M	Nevill Hall	2015	362	91	25.1	(20.9, 29.9)
M	Nevill Hall	2016	348	101	29.0	(24.5, 34)
M	Nevill Hall	2017	330	114	34.5	(29.6, 39.8)
M	Nevill Hall	2018	312	106	34.0	(28.9, 39.4)
N	Prince Charles	2013	249	79	31.7	(26.3, 37.7)
N	Prince Charles	2014	272	63	23.2	(18.5, 28.5)
N	Prince Charles	2015	313	86	27.5	(22.8, 32.7)
N	Prince Charles	2016	334	125	37.4	(32.4, 42.7)
N	Prince Charles	2017	330	107	32.4	(27.6, 37.7)
N	Prince Charles	2018	325	103	31.7	(26.9, 36.9)
P	UHL	2013	324	107	33.0	(28.1, 38.3)
P	UHL	2014	401	110	27.4	(23.3, 32)
P	UHL	2015	374	107	28.6	(24.3, 33.4)
P	UHL	2016	357	92	25.8	(21.5, 30.5)
P	UHL	2017	368	103	28.0	(23.6, 32.8)
P	UHL	2018	338	95	28.1	(23.6, 33.1)
R	Prince Philip	2013	197	65	33.0	(26.8, 39.8)
R	Prince Philip	2014	202	68	33.7	(27.5, 40.4)
R	Prince Philip	2015	207	54	26.1	(20.6, 32.5)
R	Prince Philip	2016	211	59	28.0	(22.3, 34.4)
R	Prince Philip	2017	193	59	30.6	(24.5, 37.4)
R	Prince Philip	2018	200	60	30.0	(24.1, 36.7)
S	Singleton	2013	336	91	27.1	(22.6, 32.1)
S	Singleton	2014	368	102	27.7	(23.4, 32.5)
S	Singleton	2015	332	76	22.9	(18.7, 27.7)
S	Singleton	2016	349	93	26.6	(22.3, 31.5)
S	Singleton	2017	324	65	20.1	(16.1, 24.8)
S	Singleton	2018	302	69	22.8	(18.5, 27.9)

Route of administration

In the 2018 PPS, **1661** of the **2871** systemic antibacterials prescribed were for parenteral usage **57.9%** [56.0, 59.6]. Parenteral usage rates varied from 44.8% in Royal Glamorgan to 72.2% in Bronglais hospital.

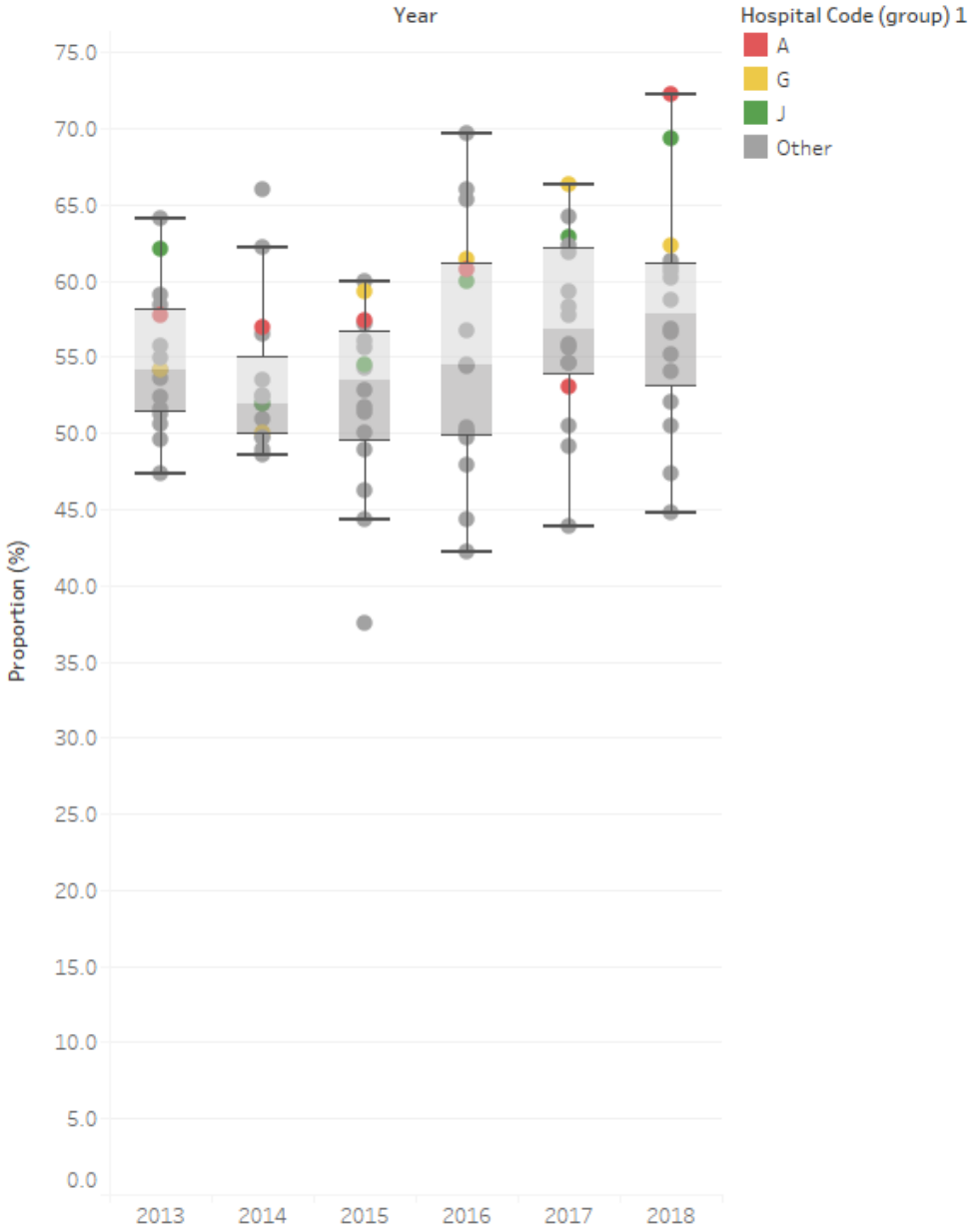


Figure 5: Parenteral route of administration by year for acute hospitals (2013-2018)

Figure 5 is a box plot of the rate of parenteral antibacterial use by year, showing the variation between hospitals across time. There has been a marked increase in parenteral drug use in Bronglais (●) and Glangwili (●) in 2018, and for Withybush (●) parenteral usage was higher than the all-Wales average at 62.2%.

Table 3: Parenteral antibacterial rates for acute hospitals

Hospital Code	Year 2013	2014	2015	2016	2017	2018
A	57.7	56.9	57.4	60.7	53.1	72.2
B	50.6	49.7	51.7	50.0	50.4	47.3
C	58.4	53.4	48.9	54.4	59.3	44.8
D	59.1	62.2	57.2	69.7	62.3	60.1
E	64.1	66.0	55.6	66.0	64.2	58.8
F	54.9	52.3	56.1	49.6	54.6	60.9
G	54.1	50.0	59.3	61.5	66.3	62.2
H	53.6	49.8	51.4	47.9	49.1	54.0
J	62.0	52.0	54.5	60.0	62.9	69.3
K	49.6	52.4	52.8	54.5	55.9	56.6
L	54.2	51.0	46.2	50.0	57.7	60.6
M	55.7	56.4	50.0	56.8	58.3	61.3
N	51.5	51.9	60.0	44.3	55.6	56.8
P	47.3	48.5	37.5	50.4	54.6	55.1
R	51.2	48.9	44.3	65.3	43.8	52.0
S	52.3	51.9	54.2	42.2	61.9	50.5

Proportion (%)
37.5 72.2

Key:

A – Bronglais
B – Princess of Wales
C – Royal Glamorgan
D – Royal Gwent
E – Morriston
F – University Hospital of Wales
G – Withybush
H – Ysbyty Wrexham Maelor
J – Glangwili
K – Ysbyty Gwynedd
L – Ysbyty Glan Clwyd
M – Nevill Hall
N – Prince Charles
P – University Hospital Llandough
R – Prince Philip
S – Singleton

Table 3 shows the trends in parenteral antibacterial usage over time by acute hospital: There is marked variation in parenteral antibacterial usage across time for a number of hospitals. Three of the acute hospitals in Hywel Dda UHB recorded the highest parenteral usage (Bronglais, Glangwili and Withybush).

Figure 6 is a box plot of the parenteral antibacterial usage by acute hospital and all-Wales, and shows the variation in the rate across the survey period 2013-2018. For Morriston hospital (E), the median usage rate was 64.2%, significantly higher than the all-Wales median of 55.3%, and significantly higher than the rates for most of the other acute hospitals. Although in 2018, Morriston reduced their parenteral drug usage to 58.8%.

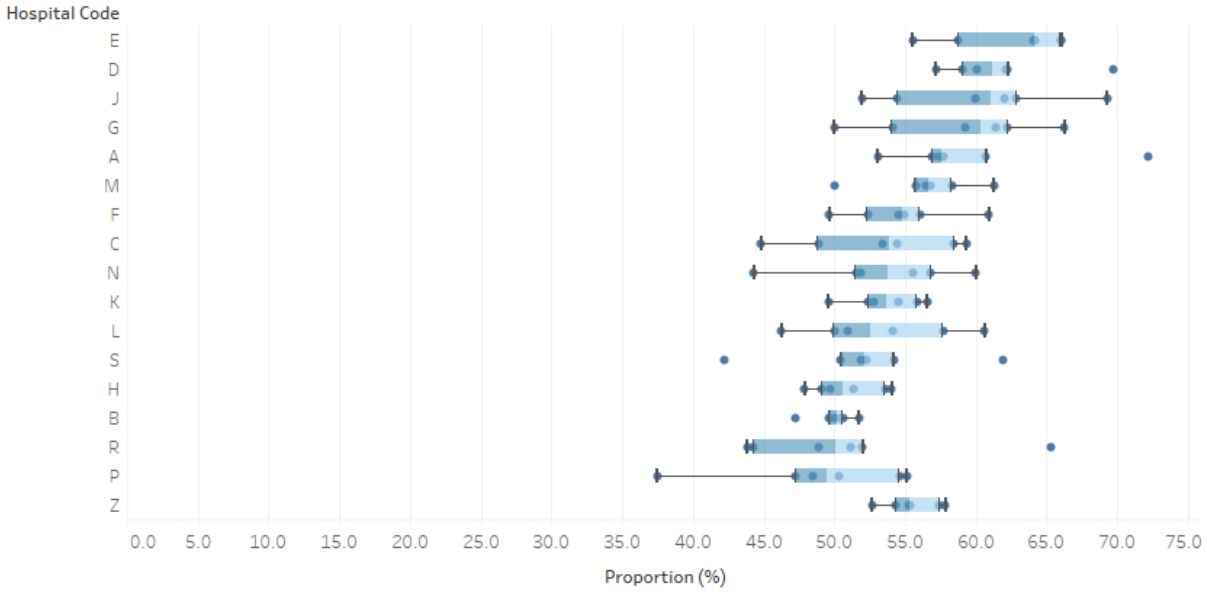
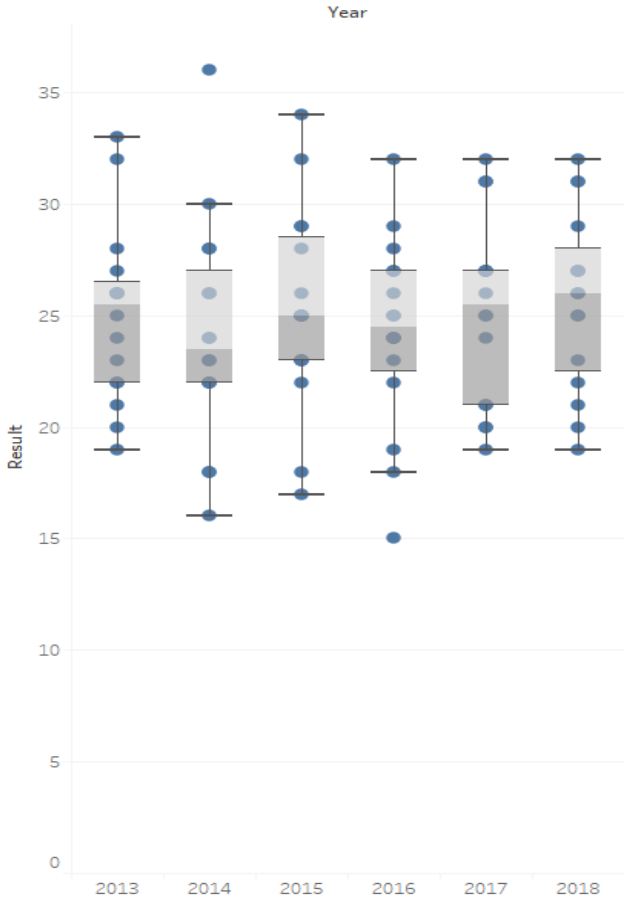


Figure 6: Parenteral route of administration by acute hospital (2013-2018)

Number of different antibacterials



In the 2018 PPS, the median number of different antibacterials prescribed across the acute hospitals increased marginally to 26 agents.

The greatest variety of antibacterial agents were prescribed in the tertiary referral centres of Royal Gwent (D), UHW (F) and Royal Glamorgan (C).

Figure 7 is a boxplot of showing the range in number of agents prescribed in the acute hospitals by year.

Table 3 shows the trends over time. In 2018, the number of different agents ranged from 32 in UHW (F) to 19 in Withybush (G). There was a notable increase in the number of agents recorded in Royal Glamorgan (C) and Prince Charles (N), probably in line with formulary changes.

Figure 7 & Table 4: Number of different antibacterials prescribed for acute hospitals

	Year					
Hospital Code	2013	2014	2015	2016	2017	2018
A	22	16	18	19	19	21
B	26	24	29	27	24	26
C	23	24	23	26	27	31
D	32	28	29	28	32	31
E	26	26	32	27	27	27
F	33	36	34	32	31	32
G	19	18	17	18	25	19
H	28	26	26	25	26	29
J	22	22	25	25	25	23
K	26	23	25	22	20	25
L	25	28	25	24	31	26
M	24	22	25	23	27	27
N	20	18	23	24	21	25
P	27	30	28	29	27	27
R	21	23	23	15	20	20
S	26	22	22	24	21	22

Result

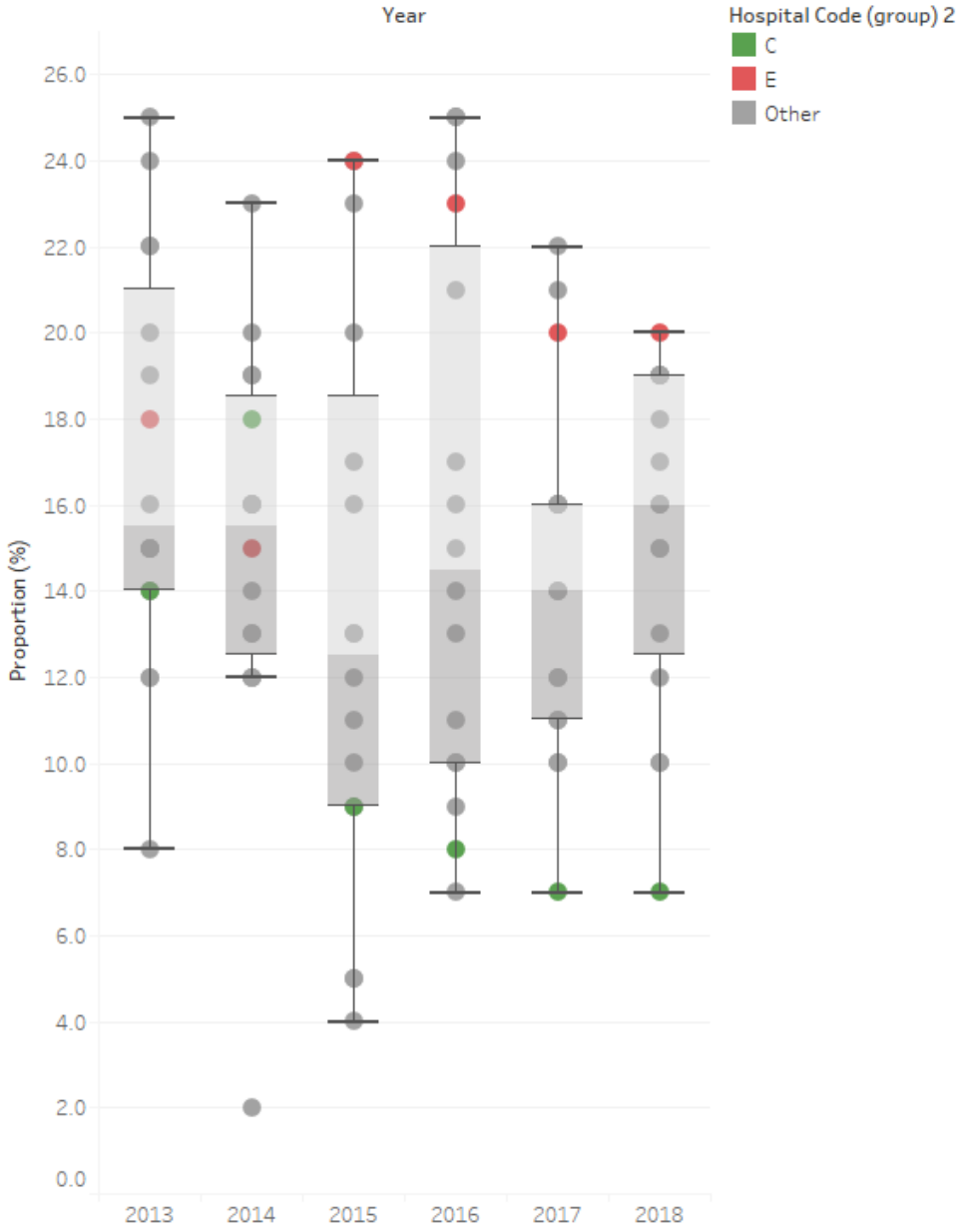
15 36

Key:

A – Bronglais
B – Princess of Wales
C – Royal Glamorgan
D – Royal Gwent
E – Morriston
F – University Hospital of Wales
G – Withybush
H – Ysbyty Wrexham Maelor
J – Glangwili
K – Ysbyty Gwynedd
L – Ysbyty Glan Clwyd
M – Nevill Hall
N – Prince Charles
P – University Hospital Llandough
R – Prince Philip
S – Singleton

Duration of treatment

In the 2018 PPS, **1785** patients were prescribed systemic antibacterials for the treatment of infection, of these **285** patients were prescribed one or more systemic antibacterials for >7 days **16.0%** [14.3, 17.7].



Figures 8: Proportion of patients prescribed antibacterials for > 7 days by year

Figure 8 is a boxplot showing the proportion of patients prescribed systemic antibacterials for the treatment of infection >7 days. From 2014 onwards, there has been a notable increase in the proportion of patients prescribed antibacterials for >7 days Morriston (●), whereas in Royal Glamorgan (●) there has been a notable decrease in the same period.

Table 5: Proportion of patients prescribed antibacterials for > 7 days by year

Hospital Code	Year 2013	2014	2015	2016	2017	2018
A	22.2	2.1	5.7	25.9	12.3	19.5
B	20.2	16.8	17.8	16.9	16.2	19.3
C	14.3	18.6	9.3	8.7	7.8	7.3
D	25.5	14.5	13.7	13.2	21.4	15.6
E	18.1	15.4	24.5	23.6	20.7	21.0
F	15.7	19.1	23.2	24.5	16.9	19.7
G	16.7	13.6	11.5	25.0	11.3	16.9
H	14.5	13.7	9.9	11.1	10.7	16.0
J	12.6	16.3	16.2	17.1	12.4	15.9
K	19.7	16.4	12.0	11.0	14.6	12.8
L	15.1	12.4	13.3	9.2	11.8	13.1
M	15.4	19.8	5.0	15.5	16.5	10.1
N	8.7	12.5	4.1	10.8	10.8	17.4
P	24.4	23.3	24.2	21.4	22.5	18.9
R	12.5	20.3	20.8	14.3	17.0	19.2
S	22.2	12.1	10.8	7.0	14.5	10.3

Proportion (%)

2.1 25.9

Key:

A – Bronglais
B – Princess of Wales
C – Royal Glamorgan
D – Royal Gwent
E – Morriston
F – University Hospital of Wales
G – Withybush
H – Ysbyty Wrexham Maelor
J – Glangwili
K – Ysbyty Gwynedd
L – Ysbyty Glan Clwyd
M – Nevill Hall
N – Prince Charles
P – University Hospital Llandough
R – Prince Philip
S – Singleton

Table 5 shows trends in the proportion of patients prescribed antibacterials for the treatment of infection >7 days by year. In the 2018 PPS, the proportion ranged from 7.3% in Royal Glamorgan (C) to 21.0% in Morriston (E). Generally, the proportion of patients prescribed antibacterials for the treatment of infection >7 days is higher in the tertiary referral hospitals – Morriston (E), UHW (F), and UHL (P).

Figure 9 is a box plot of patients prescribed antibacterials for >7 days by acute hospital and all-Wales, and shows the variation in the rate across the survey period 2013-2018. For UHL (P) the median was 22.9%, significantly higher than all-Wales median of 15.9%, and significantly higher than the rates for many of the other acute hospitals.

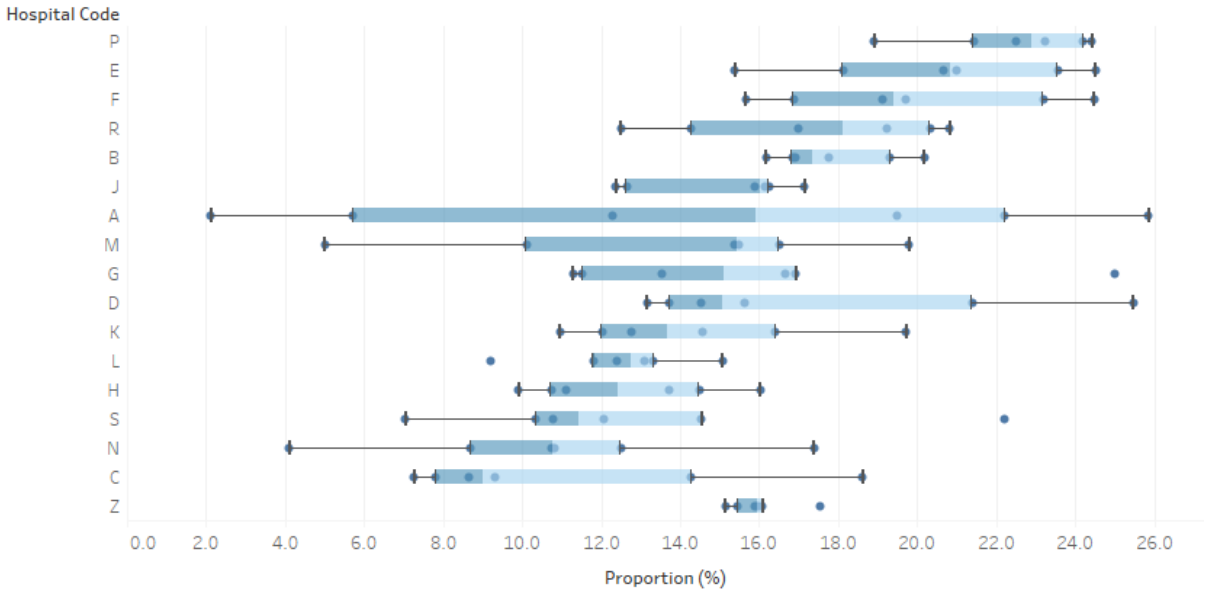


Figure 9: Patients prescribed antibacterials for > 7 days by acute hospital (2013-2018)

Duration of surgical prophylaxis

In the 2018 PPS, **107** patients were prescribed surgical prophylaxis (SP), of these **25** were prescribed for duration >24 hours, **23.4**% [16.4, 32.2].

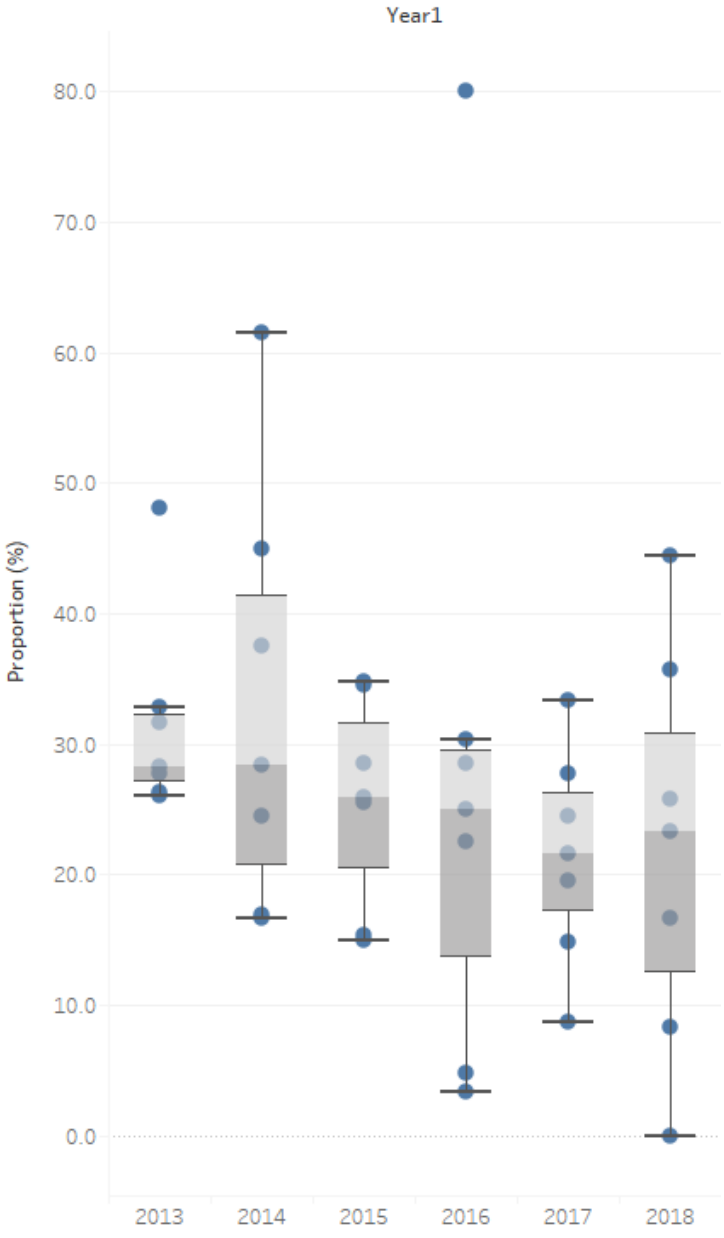


Figure 10: Proportion of surgical prophylaxis given > 24 hours - HB level by year

Figure 10 is a box plot of the proportion SP >24 hours at Health Board level by year. The numbers of antibacterials prescribed for surgical prophylaxis at hospital level is small, and so the data is aggregated to Health Board level. At Health Board level, the numbers remain small, and may account for some of the variation in the rates.

Table 6 shows trends in the proportion of surgical prophylaxis prescribed >24 hours at Health Board level over time. The number in brackets after the Health Board code shows the total number of antibacterials prescribed for surgical prophylaxis in the 2018 PPS. In the 2018 PPS, SP >24 hours ranged from 0.0% in Cwm Taff University Health Board (CTUHB) to 44.4% in Hywel Dda (HDUHB).

Table 6: Proportion of surgical prophylaxis given > 24 hours – Health Board level by year

	Year1					
Health Board	2013	2014	2015	2016	2017	2018
ABMUHB (14)	26.1	24.4	25.5	25.0	24.4	35.7
ABUHB (24)	26.3	16.7	15.0	4.8	33.3	8.3
BCUHB (12)	28.2	61.5	34.8	28.6	14.8	16.7
CAVUHB (31)	32.8	16.9	15.4	30.3	8.7	25.8
CTUHB (8)	27.8	45.0	28.6	80.0	21.6	0.0
HDUHB (18)	48.1	37.5	34.5	3.3	27.8	44.4
Wales (108)	31.6	28.4	25.9	22.5	19.5	23.4

Proportion (%)
0.0 80.0

Note: Surgical prophylaxis numbers are small and prone to misinterpretation at hospital level; therefore, the data is presented at Health board level in this report.

Note: The data includes prescribing for all types of surgery and this may account for some of the variation in the > 24 hours rate, as the types of surgery performed on the day of the PPS may differ from year to year, and some types of surgery are more likely to require extended prophylaxis than others.

Figure 11 is a box plot of antibacterials prescribed as surgical prophylaxis for >24 hours by Health Board and all-Wales, and shows the enormous variation in the rate across the survey period 2013-2018. For All-Wales (Z), the median was 24.6%; the all-Wales rates have decreased from 31.6% in 2013 to 19.5% in 2017, with a small increase in 2018 to 23.4%.

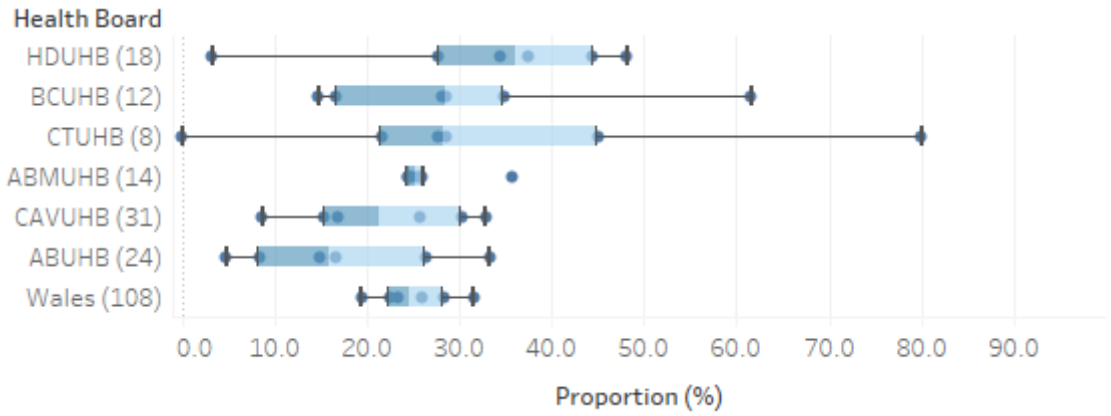


Figure 11: Proportion of surgical prophylaxis given > 24 hours by Health Board

Reason for treatment documented (notes/chart)

During the 2018 PPS, **3239** antimicrobials (topical or systemic) were prescribed, of which **2884** had the reason for prescribing documented in the notes or chart **89.0%** [87.9, 90.1].

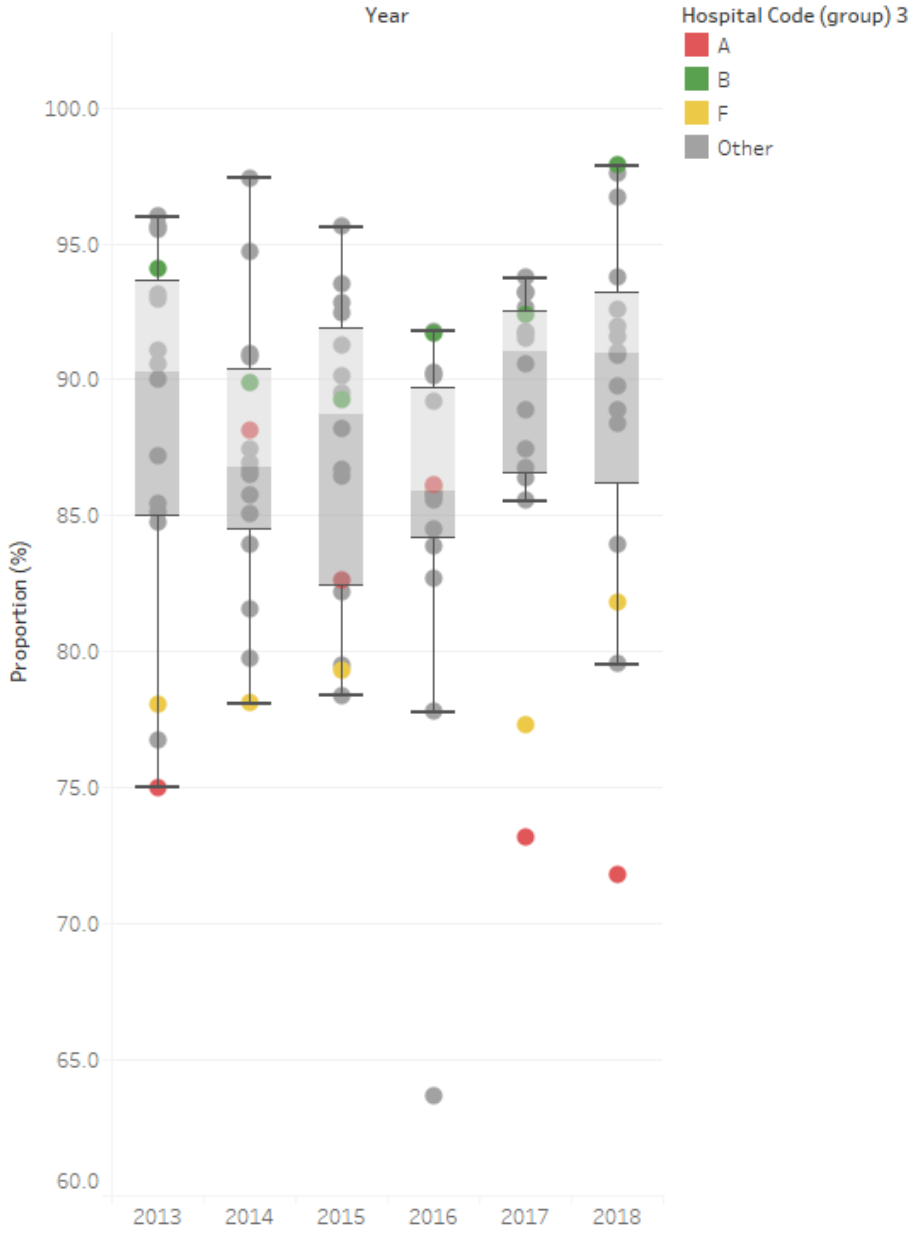


Figure 12: Reason documented in notes/chart by year (2013-2018)

Figure 12 is a box plot of the proportion of antimicrobials where the reason for the prescription was documented in the patient notes or drug chart by year. Across the period documentation has been poor in UHW (●), more recently it has decreased in Bronglais (●), whilst in Princess of Wales (●) there has been a marked improvement.

Table 7: Reason documented in notes/chart by year (2013-2018)

Hospital Code	2013	2014	2015	2016	2017	2018
A	75.0	88.1	82.6	86.1	73.2	71.8
B	94.1	89.9	89.2	91.7	92.4	97.9
C	91.1	85.0	92.4	85.7	93.2	98.5
D	92.9	90.8	89.5	89.2	91.7	88.4
E	90.6	91.0	86.7	90.1	92.6	89.7
F	78.1	78.1	79.3	86.0	77.3	81.8
G	90.0	86.5	95.6	83.8	86.7	91.9
H	84.7	86.7	88.2	84.5	91.5	91.6
J	93.2	87.4	78.4	85.8	90.6	93.8
K	95.7	79.8	82.2	85.6	93.2	90.9
L	85.4	81.6	79.5	86.0	87.4	88.9
M	87.2	86.9	93.5	90.2	93.8	91.0
N	85.1	85.7	90.2	91.8	88.9	98.0
P	76.7	83.9	92.8	63.6	86.3	84.0
R	96.0	94.7	86.5	77.8	85.5	79.5
S	95.5	97.4	91.3	82.7	91.8	92.6

Year

Proportion (%)

63.6 98.5

Key:

A – Bronglais
B – Princess of Wales
C – Royal Glamorgan
D – Royal Gwent
E – Morriston
F – University Hospital of Wales
G – Withybush
H – Ysbyty Wrexham Maelor
J – Glangwili
K – Ysbyty Gwynedd
L – Ysbyty Glan Clwyd
M – Nevill Hall
N – Prince Charles
P – University Hospital Llandough
R – Prince Philip
S – Singleton

Note: In the 2018 PPS, the 'reason recorded' data field was not completed for 18 antimicrobials; therefore, they were excluded from this analysis.

Table 7 shows trends in the proportion of antimicrobials where the reason for the prescription was documented over time. In 2018, the rate ranged from 98.5% in Royal Glamorgan (C) to 71.8% in Bronglais hospital (A).

Figure 13 is box plot of the proportion of antimicrobials where the reason for the prescription was documented by hospital. For UHW (F), the median was 78.7%, lower than all-Wales median of 86.9%, and significantly lower than the median for some other the acute hospitals.

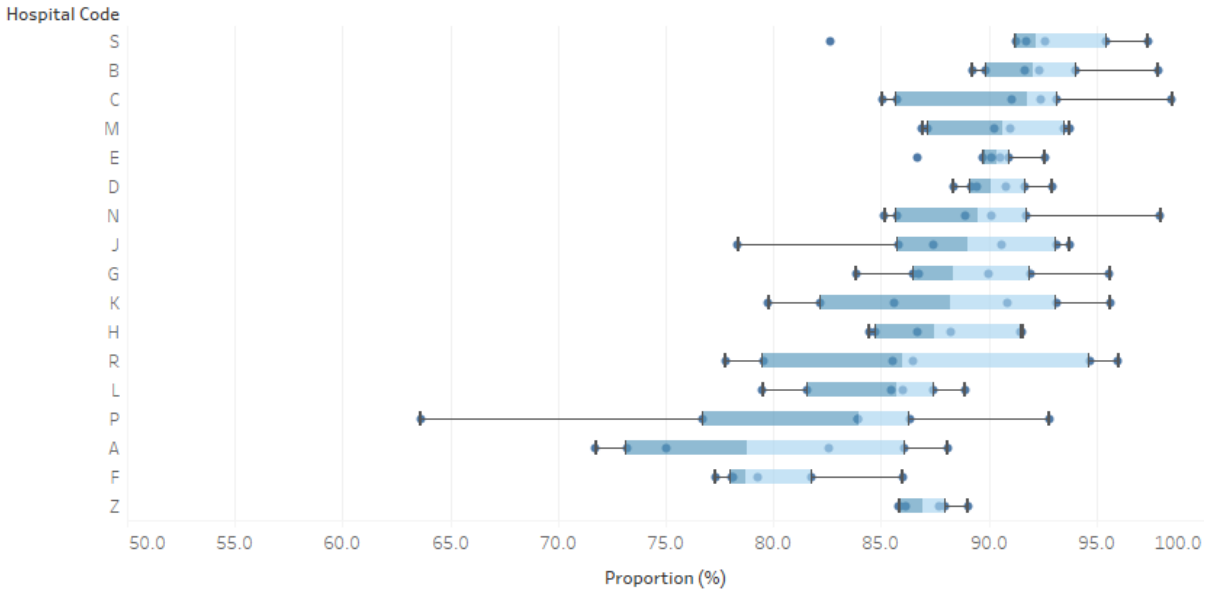
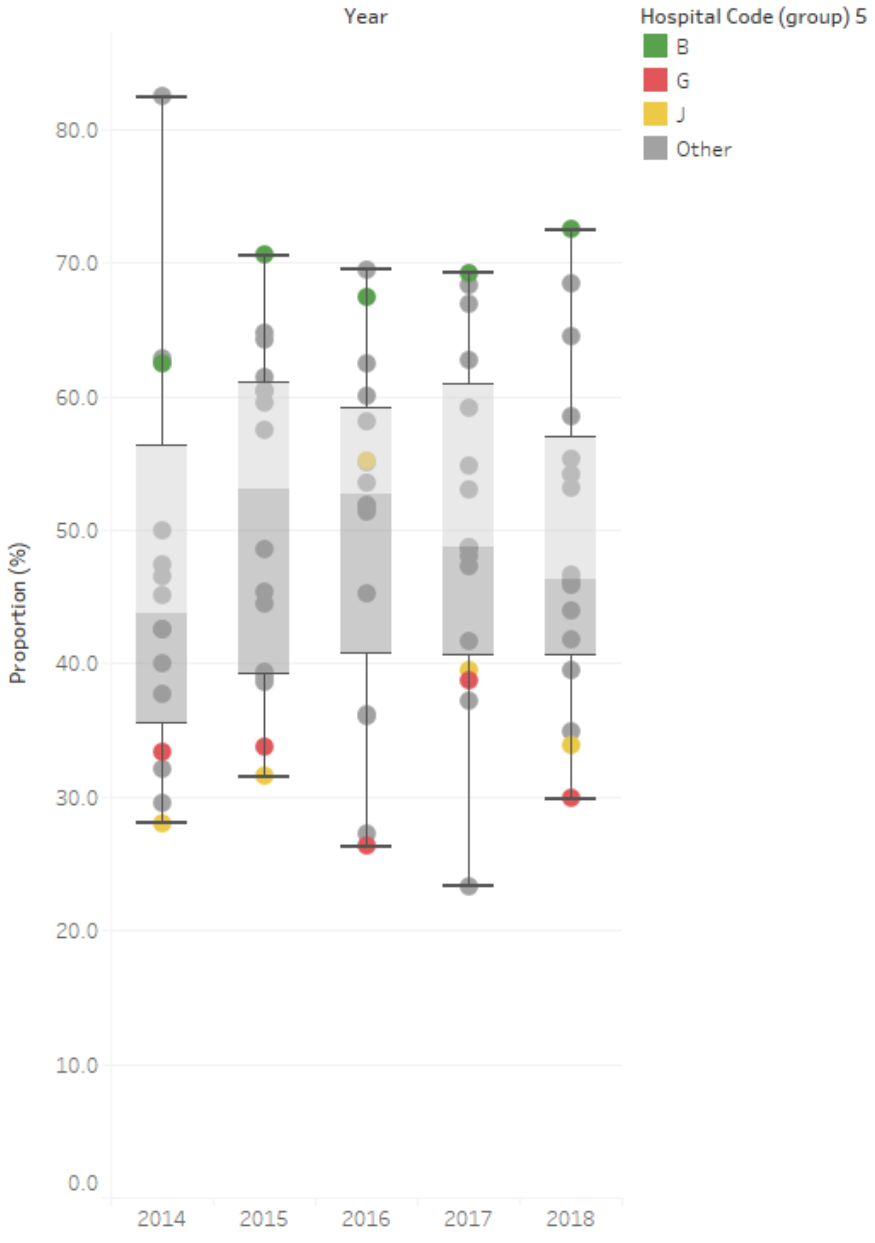


Figure 13: Reason documented in notes/chart by hospital (2013-2018)

Stop/review date for treatment documented (notes/chart)

During the 2018 PPS, **3047** antimicrobials were prescribed for the treatment of infection or medical prophylaxis, of these **1573** had a stop/review date recorded in the patient notes or drug chart **51.6%** [49.8, 53.4]. Surgical prophylaxis is excluded from this quality measure, as it is generally administered on a single day, and therefore does not require stop/review date. This quality measure was introduced in 2014.



Figures 14: Stop/review date documented in notes/chart by year (2014-2018)

Figure 14 is a box plot of the proportion of antimicrobials with a documented stop/review date by year. Across the period documentation has been poor in both Glangwili (●), and Withybush (●), whilst Princess of Wales (●) shows improvement over time.

Table 8: Stop/review date documented in notes/chart by year (2014-2018)

Hospital Code	Year 2014	2015	2016	2017	2018
A	42.5	39.4	58.1	23.3	39.4
B	62.5	70.6	67.4	69.2	72.5
C	29.6	38.5	51.8	41.6	45.8
D	42.5	45.4	36.2	47.3	41.8
E	62.8	64.2	62.4	62.6	55.3
F	40.0	48.6	36.0	48.7	58.5
G	33.3	33.7	26.3	38.7	29.9
H	46.5	60.4	60.0	66.8	68.4
J	28.1	31.6	55.2	39.5	33.8
K	47.4	64.8	53.5	59.2	53.2
L	62.6	57.5	69.5	68.3	64.5
M	37.7	59.6	55.1	48.7	54.2
N	50.0	44.4	45.2	37.1	46.1
P	45.0	60.3	51.4	54.7	44.0
R	32.1	38.9	27.3	53.0	34.9
S	82.4	61.5	51.7	48.0	46.6

Proportion (%)
23.3 82.4

Key:

A – Bronglais
B – Princess of Wales
C – Royal Glamorgan
D – Royal Gwent
E – Morriston
F – University Hospital of Wales
G – Withybush
H – Ysbyty Wrexham Maelor
J – Glangwili
K – Ysbyty Gwynedd
L – Ysbyty Glan Clwyd
M – Nevill Hall
N – Prince Charles
P – University Hospital Llandough
R – Prince Philip
S – Singleton

Note: In the 2018 PPS, 208 antimicrobials was recorded as 'not applicable' in the 'stop/review' data field, a high proportion of which were prescribed as medical prophylaxis. Review of medical prophylaxis is encouraged, and this data has been included in the analysis.

Table 8 shows trends in documentation of a stop/review date over time. In the 2018 PPS, the proportion of documentation ranged from 72.5% in Princess of Wales (B) to 29.9% in Withybush (G) hospitals. Wrexham Maelor (H) has significantly increased documentation over time, whereas Singleton (S) has significantly decreased documentation over time.

Figure 15 is box plot of the proportion of antimicrobials where a stop/review date was documented by hospital. Generally, documentation of a stop/review date is very poor, with an all-Wales median of only 51.6%. The median stop/review rates for Withybush (G), Glangwili (J) and Prince Philip (R) remain significantly lower than the all-Wales (Z) median prescribing rate of 51.6%.

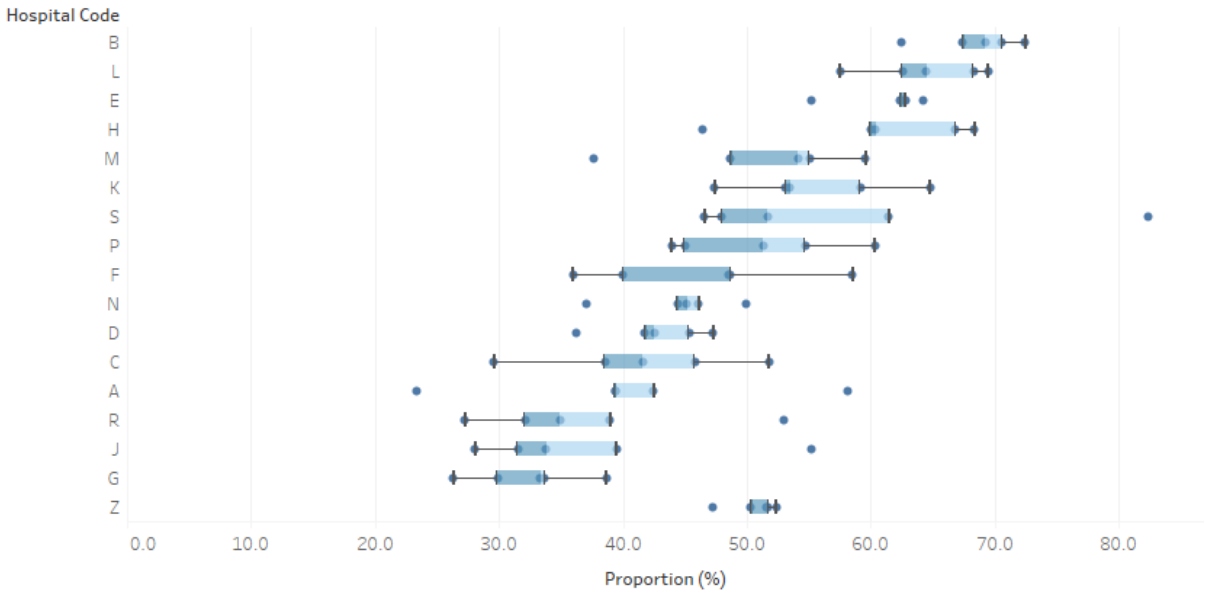
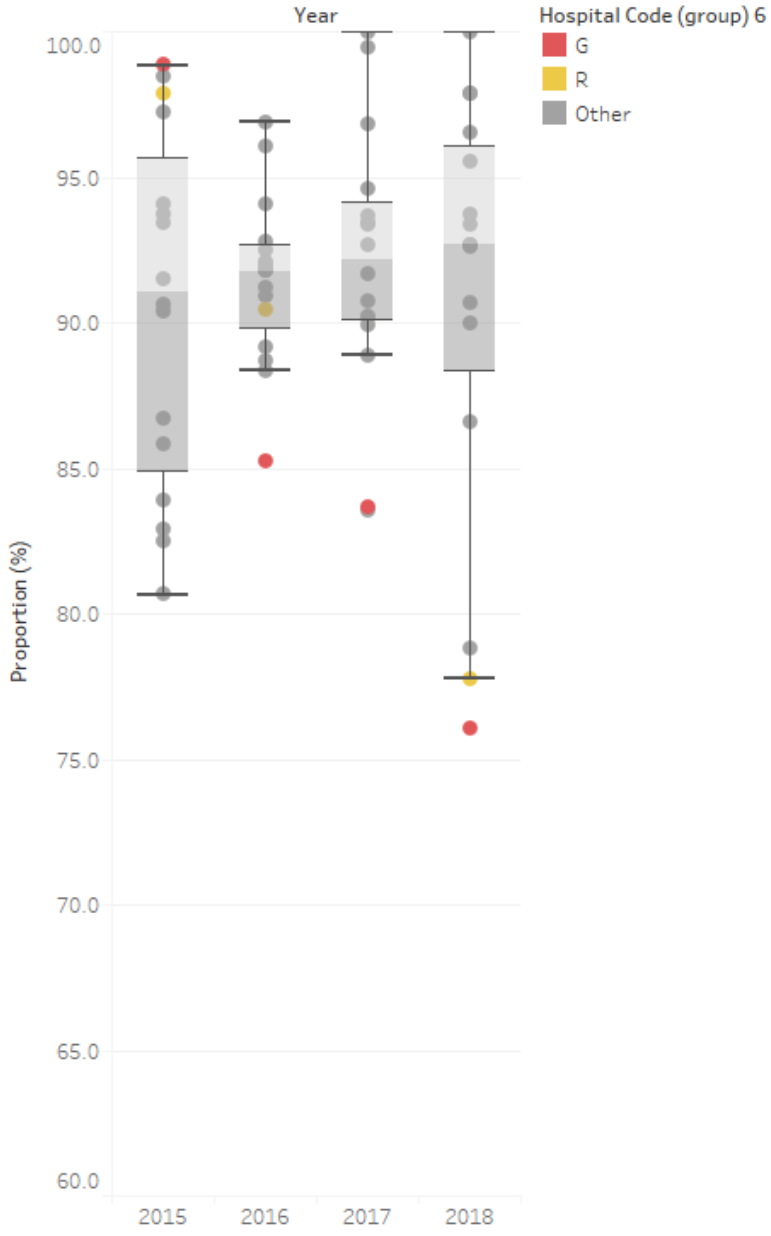


Figure 15: Stop/review date documented in notes/chart by hospital (2014-2018)

Appropriate Drug Choice

During the 2018 PPS, **3120** antimicrobials were recorded, **3115** had a response to the question 'appropriate drug choice yes or no'. Of these **2868** were adjudged as an appropriate choice **92.1%** [91.1, 93.0]. This quality measure was introduced in 2015.



Figures 16: Appropriate drug choice by year (2015-2018)

Figure 16 is a box plot of the proportion of antimicrobials recorded as the appropriate drug choice by year. Across the period choice of appropriate drug appears to have decreased in Withybush (●), and Prince Philip (●); this may be due to changes in the auditors, or increased scrutiny of the data, or a decrease in the choice of appropriate drug.

Table 9: Appropriate drug choice by year (2015-2018)

Hospital Code	Year 2015	2016	2017	2018
A	90.6	91.2	90.7	78.8
B	93.7	88.7	94.6	97.9
C	82.5	94.1	93.4	97.9
D	86.7	92.1	91.7	86.6
E	91.5	91.8	92.7	95.5
F	93.4	96.9	93.4	93.7
G	98.8	85.3	83.7	76.0
H	97.2	91.8	96.8	96.5
J	80.6	89.2	83.6	90.7
K	90.4	88.4	88.9	93.4
L	85.8	92.5	93.7	90.0
M	98.4	96.1	89.9	92.7
N	82.9	92.0	90.2	100.0
P	83.9	92.8	99.4	92.7
R	97.9	90.4	90.1	77.8
S	94.1	90.9	100.0	92.6

Proportion (%)
76.0 100.0

Key:

A – Bronglais
B – Princess of Wales
C – Royal Glamorgan
D – Royal Gwent
E – Morriston
F – University Hospital of Wales
G – Withybush
H – Ysbyty Wrexham Maelor
J – Glangwili
K – Ysbyty Gwynedd
L – Ysbyty Glan Clwyd
M – Nevill Hall
N – Prince Charles
P – University Hospital Llandough
R – Prince Philip
S – Singleton

Table 9 shows trends in the proportion of antimicrobials recorded as the appropriate drug choice by year. In the 2018 PPS, the proportion antimicrobials recorded as the appropriate ranged from 100% in Prince Charles (N) hospital to 76.0% in Withybush (G). There was a significant decrease in antimicrobials recorded as appropriate usage in three of the acute hospitals in Hywel Dda: Bronglais (A), Withybush (G) and Prince Philip (R).

Figure 17 is box plot of the proportion antimicrobials recorded as the appropriate drug choice by hospital. For Withybush (G) and Glangwili (J), the median rate was significantly lower than all-Wales median of 92.1%.

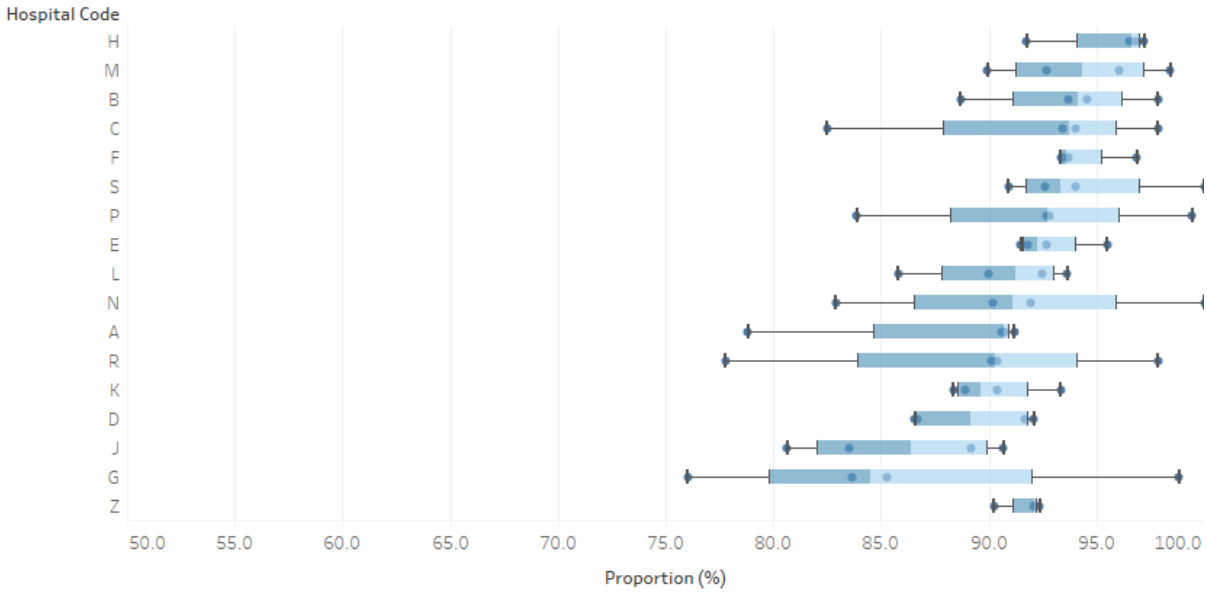


Figure 17: Appropriate drug choice by hospital (2015-2018)

CURB-65 score documented

During the 2018 PPS, **232** patients were recorded with a diagnosis of community-acquired pneumonia (CAP). Of which **201** had a response to a question regarding documentation of a CURB-65 score; **64** had a CURB-65 score documented **31.8%** [25.8, 38.6].

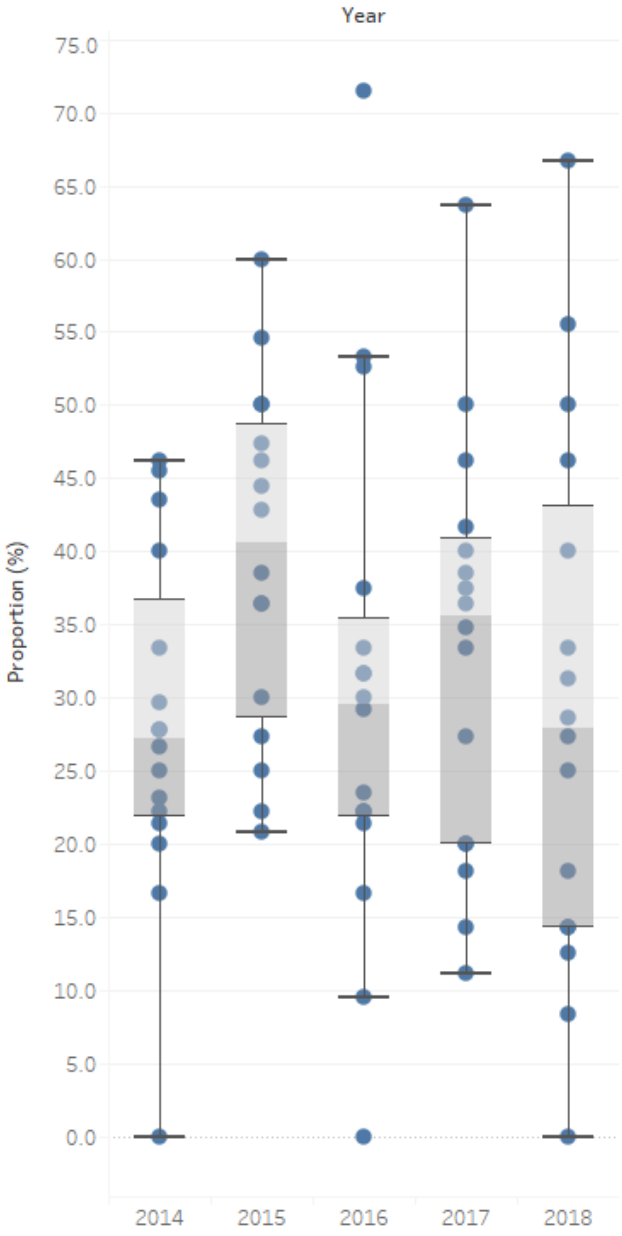


Figure 18: CURB-65 score documented for CAP by year

Figure 18 is a box plot of the proportion of patients with CAP for whom a CURB-65 score was recorded in their notes. Generally, documentation of CURB-65 scores is very poor, with an all-Wales median in 2018 of only 31.8%.

Table 10: CURB-65 score documented for CAP by year

Hospital Code	Year 2014	2015	2016	2017	2018
A (7)	0.0	60.0	22.2	20.0	14.3
B (10)	20.0	36.4	52.6	63.6	50.0
C (9)	43.5	22.2	53.3	41.7	55.6
D (35)	27.8	36.4	29.2	34.8	40.0
E (11)	29.6	38.5	31.6	46.2	27.3
F (16)	46.2	30.0	31.6	27.3	12.5
G (12)	22.2	44.4	0.0	18.2	8.3
H (9)	23.1	27.3	23.5	36.4	0.0
J (7)	33.3	50.0	30.0	37.5	28.6
K (16)	16.7	20.8	16.7	38.5	31.3
L (11)	27.8	47.4	9.5	14.3	18.2
M (15)	40.0	54.5	71.4	33.3	66.7
N (7)	26.7	25.0	21.4	40.0	14.3
P (8)	25.0	46.2	22.2	20.0	25.0
R (13)	45.5	50.0	37.5	50.0	46.2
S (15)	21.4	42.9	33.3	11.1	33.3

Proportion (%)

0.0 71.4

Key:

A – Bronglais
B – Princess of Wales
C – Royal Glamorgan
D – Royal Gwent
E – Morriston
F – University Hospital of Wales
G – Withybush
H – Ysbyty Wrexham Maelor
J – Glangwili
K – Ysbyty Gwynedd
L – Ysbyty Glan Clwyd
M – Nevill Hall
N – Prince Charles
P – University Hospital Llandough
R – Prince Philip
S – Singleton

Table 10 shows the trends in documenting a CURB-65 score across time. The number in brackets after the hospital code is the number of patients recorded with CAP in the 2018 PPS, e.g. in Bronglais (A) there were only 7 patients with CAP on the day of the PPS. There is marked variation in the recording rates for CURB-65 scores across time; this may be due to small numbers. The proportion of patients with a CURB-65 score recorded ranged from 66.7% in Nevill Hall hospital (M) to 0.0% in Wrexham Maelor (H), with a notable decrease across time in UHW (F).

Figure 19 is box plot the proportion of patients with CAP for whom a CURB-65 score was recorded by hospital, showing marked variation in documentation rates for many hospitals.

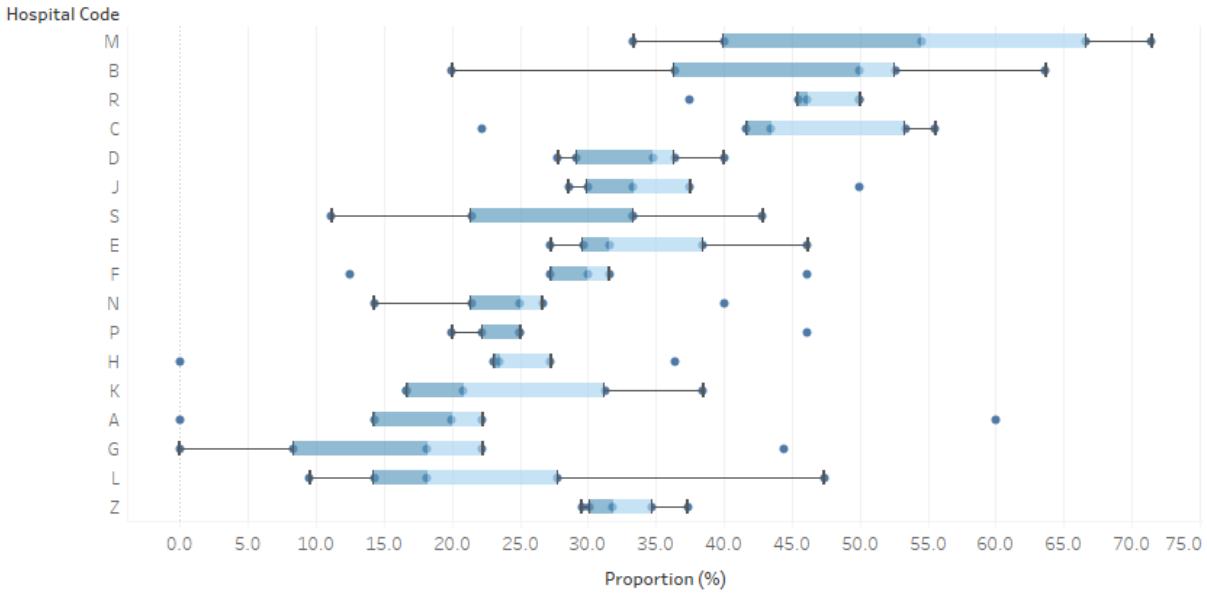


Figure 19: CURB-65 score documented for CAP by hospital

APPENDIX

Rationale for Quality Measures

➢ *Antibacterial prescribing rates*

Rationale for measure

Inappropriate use of antibacterial agents (e.g. use in patients without a bacterial infection or excessive durations of therapy or prophylaxis) are drivers for the development and spread of antibiotic resistance and *C. difficile* infection. It is widely acknowledged that up to 30% of antibiotic use is inappropriate in terms of being used for patients, who do not have a bacterial infection/need prophylaxis, or incorrect agent chosen, or incorrect dose, or incorrect duration.

Direction of measure

Given the fact that antibiotics are probably over-used in most areas, a lower proportion of patients receiving an antibiotic is probably "good". However, antibiotics are invaluable agents for the treatment and prophylaxis of infections and therefore use should not be reduced below the level for effective management of infections.

Factors affecting measure

The number of patients requiring antibiotics will be heavily influenced by patient case mix.

➢ *Route of administration*

Rationale for measure

Parenteral antibacterial therapy is usually indicated for acute severe infections and where oral absorption may be a problem. However oral therapy is appropriate for many infections, reduces the need for intravenous access devices (a potential portal for Healthcare-Associated Infection), and is usually significantly less expensive. Many Health Boards have parenteral/oral switch policies that suggest a switch after 48 hours of treatment and when infection is resolving.

Direction of measure

A higher percentage of oral therapy is probably "good".

Factors affecting measure

Parenteral therapy is indicated in certain clinical situations. Therefore, rates of parenteral use will be affected by case-mix.

➢ *Number of different antibacterial agents*

Rationale for measure

There are many antibacterials available and some have similar or identical indications. Local antimicrobial formularies/guidance usually recommends a limited number of agents. This limit increases familiarity with the agents recommended in terms of dosing and indications, and thereby reduces the risk of errors.

Direction of measure

A smaller number of different agents used is probably "good". However, the forthcoming introduction of the WHO recommendations for the increased use of the narrow spectrum (ACCESS) group of antibacterials may lead to an increase in the number of different agents used. http://www.who.int/mediacentre/news/releases/2017/essential-medicines-list/en/

Factors affecting measure

The complexity and variety of infections treated in a hospital may determine the number of different agents required.

➢ *Duration of treatment*

Rationale for measure

Excessive duration of antibiotic therapy has been identified as an element of inappropriate use. The "Start Smart - Then Focus" guidance from the DH suggests that a planned duration or stop/review date is included in every antibiotic prescription.

Direction of measure

A high proportion of patients receiving treatment for >7 days at the time of the PPS may indicate excessive durations of treatment. However, adequate durations of antibiotics are required to successfully treat infections and thus too small a proportion of patients receiving antibiotics for >7 days may indicate under-treatment.

Factors affecting measure

The data is shown as duration for the treatment of infections alone (indications CAI, HAI and LAI only). For different infections, the appropriate duration of therapy varies widely from a single dose (e.g. gonorrhoea) to many weeks/months (e.g. osteomyelitis). Therefore, case mix will affect the results for Hospitals.

➢ *Duration of surgical prophylaxis*

Rationale for measure

Antibiotic prophylaxis for surgical procedures is invaluable in the prevention of post-operative infections. However, there has been a tendency in the past to continue prophylaxis for longer than necessary. Guidance from the Scottish Inter-collegiate Guidance Network (SIGN 104) recommends "... a single dose of antibiotic with a long enough half-life to achieve

activity throughout the operation...” for most operations, although there are a few exceptions (e.g. hip arthroplasty) where evidence suggests a full 24 hours of prophylaxis. There is little evidence to support routine prophylaxis for > 24 hours for any surgical procedures.

Direction of measure

A lower proportion of antibacterial prophylaxis for > 24hours is “good”.

Factors affecting measure

Although there is little evidence to support prophylaxis for > 24 hours, there are certain types of surgery (e.g. arthroplasty, cardiac surgery) for which longer durations may sometimes be indicated. Therefore, case mix may affect the proportions for Health Boards and Hospitals.

➢ *Reason for treatment documented*

Rationale for measure

Documenting the reason for an antimicrobial has been identified as good practice that facilitates review and optimisation of therapy. It is therefore an element of the “Start Smart - Then Focus” guidance from DH.

Direction of measure

A higher percentage of documenting the reason for the antimicrobial in the notes is “good”.

Factors affecting measure

There are few, if any, valid reasons for not documenting the reason for an antimicrobial.

➢ *Stop/review date for treatment documented*

Rationale for measure

Excessive duration of antimicrobial therapy has been identified as an element of inappropriate use. The “Start Smart - Then Focus” guidance from the DH suggests that a planned duration or stop/review date is included in every antimicrobial prescription.

Direction of measure

A higher percentage of documenting the stop/review date in the notes is “good”.

Factors affecting measure

There are few, if any, valid reasons for not documenting the stop/review date for an antimicrobial.

➢ *Appropriate Antimicrobial Choice*

Rationale for measure

The “Start Smart - Then Focus” guidance from the DH suggests using local guidance to initiate prompt effective antibiotic treatment, and avoiding inappropriate use of broad-spectrum antibiotics.

Direction of measure

A higher percentage of appropriate antimicrobial choice is “good”.

Factors affecting measure

The measure of appropriate antimicrobial choice reflects compliance with local guidance or on microbiology advice, or culture and sensitivity results.

➢ *CURB-65 documented*

Rationale for measure

Guidance from NICE/BTS recommends when a diagnosis of community-acquired pneumonia (CAP) is made in an adult at presentation to hospital a CURB-65 score is used for risk stratification to determine the appropriate empiric regimen.

Direction of measure

A higher percentage of documenting the CURB-65 score is “good”.

Factors affecting measure

There are few, if any, valid reasons for not documenting the CURB-65 score.

Point Prevalence Survey Reports

Previous point prevalence survey reports available via:

Internet: http://www.wales.nhs.uk/sites3/page.cfm?orgid=457&pid=28906

Intranet: http://howis.wales.nhs.uk/sites3/page.cfm?orgid=457&pid=20791