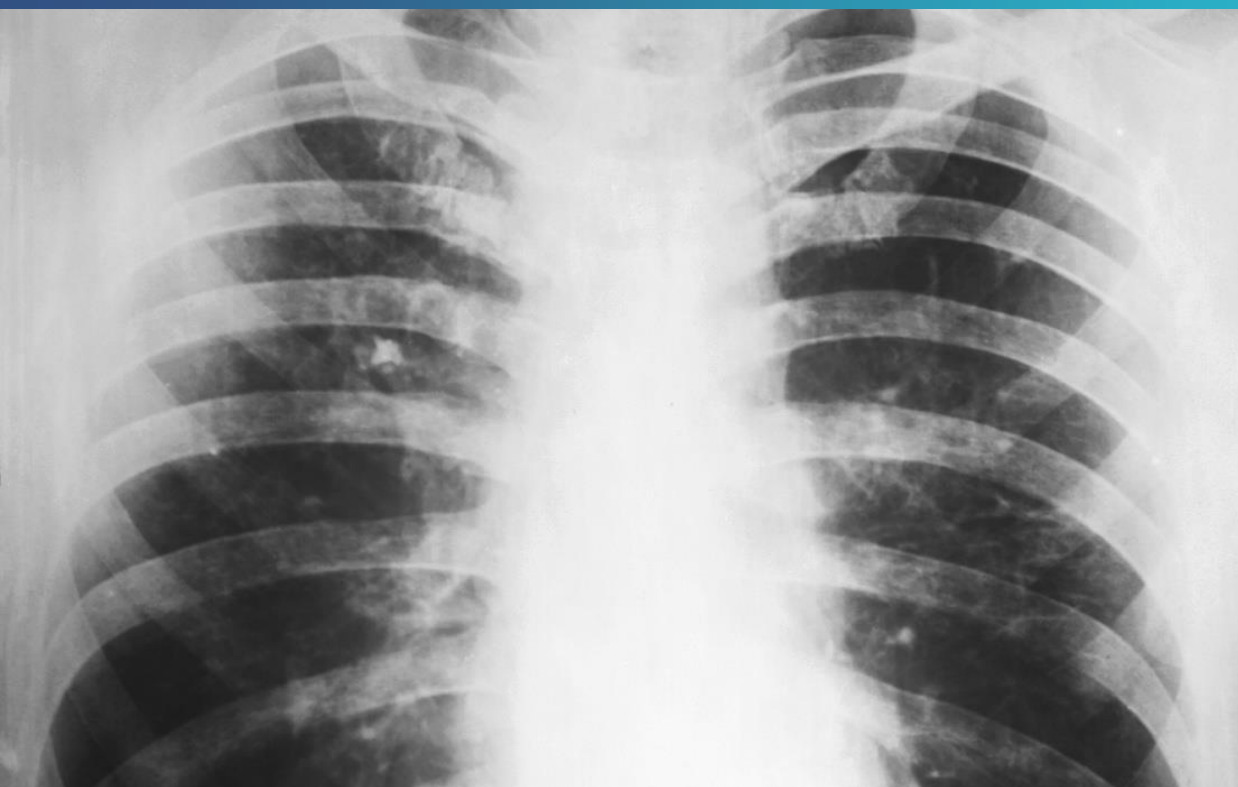




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Critical Care Surveillance: Ventilator Associated Pneumonia

Annual report:

**Betsi Cadwaladr University
Health Board**

2018

Version 1

Issued: 15/05/2019

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Data considerations

Data is captured at unit level in Ward Watcher across Wales. Once a month data is extracted and emailed to Public Health Wales. The information found in this report may differ slightly from that found in the quarter 4 report issued 31/1/19. This may be due to additional data being received for the annual report subsequently. For this reason the annual report should be referenced when mentioning annual VAP data.

Data within this report relates to Ysbyty Glan Clwyd, Ysbyty Wrexham Maelor and Ysbyty Gwynedd.

Ventilator-Associated Pneumonia (VAP) definitions

The below details are a summary guide only, and should not be used to determine infection status. For a more detailed breakdown of the criteria, please see the HELICS definitions for ICU-acquired pneumonia.

To be classified as a ventilator-associated pneumonia, an invasive respiratory device must have been present (even intermittently) in the 48 hours preceding the onset of infection; there must be two or more serial chest X-rays (CXR) or CT scans with a suggestive image of pneumonia (only one definitive CXR or CT scan is sufficient if there is no underlying cardiac or pulmonary disease). Additionally, there will be a combination of symptoms which include fever, leucopenia, leucocytosis, purulent sputum (or a change in sputum), cough, dyspnoea, tachypnoea, suggestive auscultation, ronchi, wheezing, and/or worsening gas exchange.

In addition to the clinical criteria, the following criteria determine which category the infection falls under:

PN1 – Protected sample + quantitative culture (10^4 CFU/ml BAL/ 10^3 PB, DPA).

PN2 – Non-protected sample (ETA) + quantitative culture (10^6 CFU/ml).

PN3 – Alternative microbiological criteria.

PN4 – Sputum bacteriology or non-quantitative ETA.

PN5 – No microbiological criterion met (only clinical criteria).

PNX – Meets all requirements for PN1-4, but no CXR or CT scans have been done. Does not meet ECDC HELICS definition (but will be included for a Welsh VAP rate).

Betsi Cadwaladr UHB: Compliance

This section shows compliance by year for Betsi Cadwaladr UHB. We would expect to receive one export per month (12 per year per hospital). During 2014 the methods of data capture changed which may account for the decreased compliance.

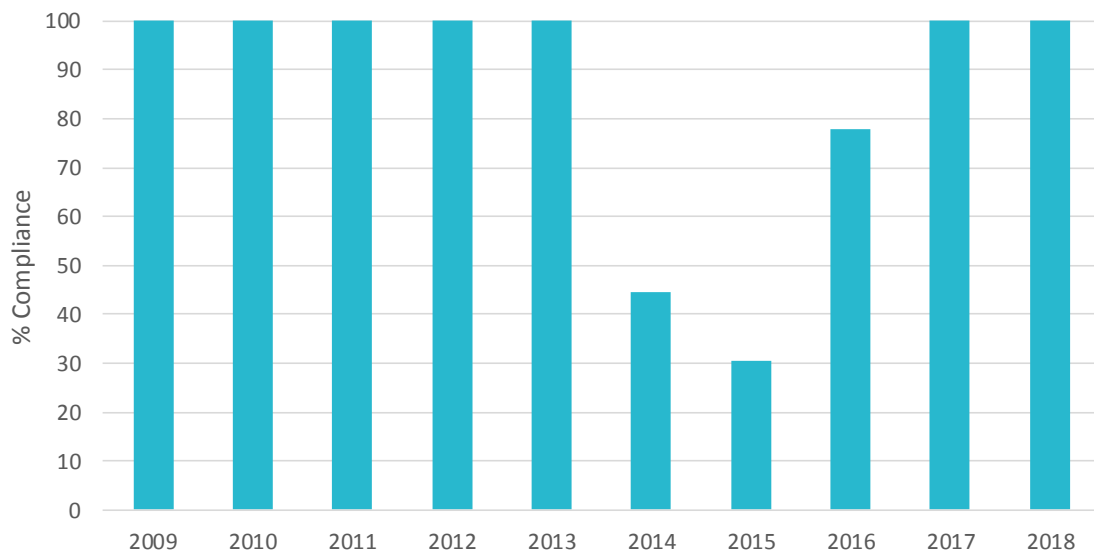


Figure 1: Compliance trend for Betsi Cadwaladr UHB (2009-2018)

During 2018 compliance for Betsi Cadwaladr UHB was 100%. During 2014 and 2015 compliance in the health board was poor meaning data is missing, and thus the rates for those years should be interpreted with caution.

Betsi Cadwaladr UHB: Annual VAP rates (HELICS definition)

The European Centre for Disease Prevention and Control (ECDC) classifies VAPs according to the HELICS criteria.¹ This section of the report details VAPs according to the HELICS criteria (PN1-PN5).

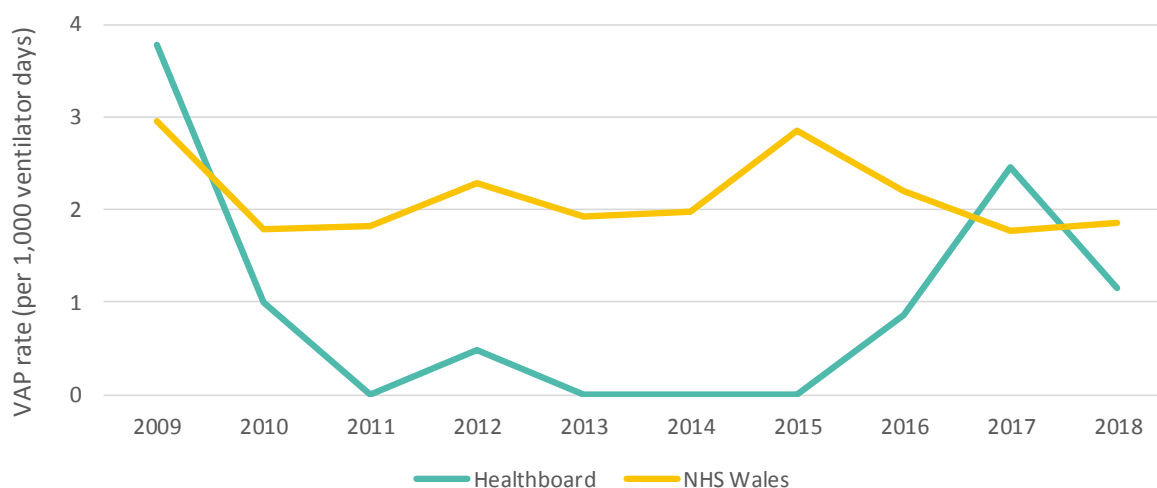


Figure 2: Betsi Cadwaladr HELICS VAP trend rate compared with all Wales (2009-2018)

Year	Healthboard			NHS Wales		
	Ventilator days	VAP*	VAP rate (per 1,000 ventilator days)	Ventilator days	VAP*	VAP rate (per 1,000 ventilator days)
2009-2018	31,687	37	1.17	192,016	403	2.10
2018	4,322	5	1.16	22,530	42	1.86
2017	4,482	11	2.45	24,209	43	1.78
2016	3,481	3	0.86	23,625	52	2.20
2015	1,439	0	0.00	10,496	30	2.86
2014	1,363	0	0.00	12,648	25	1.98
2013	2,850	0	0.00	22,264	43	1.93
2012	4,097	2	0.49	21,849	50	2.29
2011	3,229	0	0.00	18,705	34	1.82
2010	2,989	3	1.00	18,380	33	1.80
2009	3,435	13	3.78	17,310	51	2.95

There were 5 infections and 4,322 ventilator days in 2018, giving a VAP rate of 1.16 per 1,000 ventilator days. This is lower than the 2017 rate of 2.45 per 1,000 ventilator days.

The rate for Betsi Cadwaladr UHB was lower than the all Wales rate for 2018.

*Excluding infections recorded as PNx (PN0) on WardWatcher.

	4.20
	3.15
2009-2018 Welsh average	2.10
	1.05
	0.00

Betsi Cadwaladr UHB: Welsh VAP rates (including PNx)

In 2016 a new PN code was added to capture infections meeting all requirements for PN1-4, but where no CXR or CT scans have been done. This was following reported incidence of VAPs in Wales being lower than other European regions and a study which was conducted by Public Health Wales.²

This section details all VAPs recorded including PNx and compares the rates with and without the additional code.

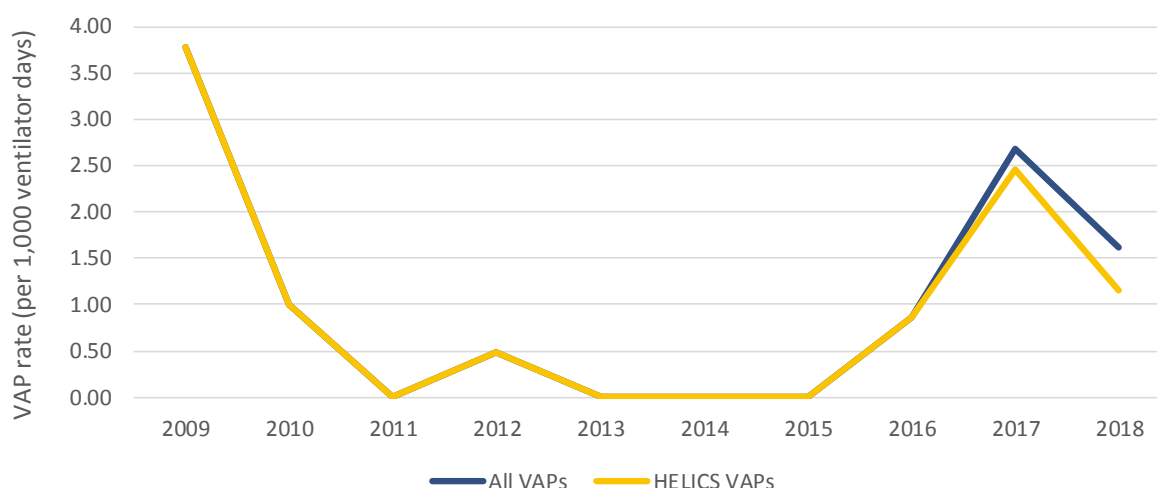


Figure 3: Betsi Cadwaladr VAP rate trend compared with HELICS VAP rate (2009-2018)

Year	All VAPs			HELICS VAPs	
	Ventilator days	VAP*	VAP rate (per 1,000 ventilator days)	VAP**	VAP rate (per 1,000 ventilator days)
2009-2018	31687	40	1.26	37	1.17
2018	4,322	7	1.62	5	1.16
2017	4,482	12	2.68	11	2.45
2016	3,481	3	0.86	3	0.86
2015	1,439	0	0.00	0	0.00
2014	1,363	0	0.00	0	0.00
2013	2,850	0	0.00	0	0.00
2012	4,097	2	0.49	2	0.49
2011	3,229	0	0.00	0	0.00
2010	2,989	3	1.00	3	1.00
2009	3,435	13	3.78	13	3.78

For 2018 there were an additional 2 VAPs recorded when the PNx type was included, giving a total of 7 VAPs across the health board (5 HELICS). This gives a VAP rate per 1,000 ventilator days of 1.62. This was lower than the 2017 rate (2.68).

*Including infections recorded as PNx (PN0) on WardWatcher.

**Excluding infections recorded as PNx (PN0) on WardWatcher.

2.52	2.34
1.89	1.75
1.26	1.17
0.63	0.58
0.00	0.00

Betsi Cadwaladr UHB: VAP types

The following figure shows the number of VAPs broken down the by type of VAP recorded by the surveillance. The VAP types include those as noted by HELICS (PN1-PN5), and includes the Welsh PNX type from 2016 onwards.

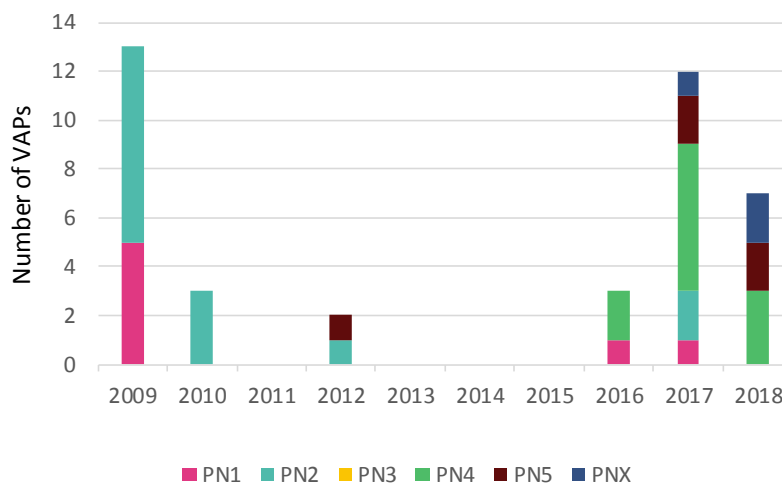


Figure 4: VAPs recorded by type for Betsi Cadwaladr UHB (2009-2018)

Table 1: VAP types for Betsi Cadwaladr UHB (2018)

	2018	
	Healthboard	NHS Wales
PN1	0	26
PN2	0	0
PN3	0	0
PN4	3	13
PN5	2	3
Total (HELICS)	5	42
PNX	2	24
Total (inc. PNX)	7	66

During 2018, the most common VAP type reported in Betsi Cadwaladr UHB was PN4, followed by PN5 and PNX. The most common VAP type across Wales was PN1, followed by PNX.

Betsi Cadwaladr UHB: Associated organisms

Infections categorised as PN1, PN2, PN3, or PN4 have microbiology data provided. Up to 3 organisms can be captured per infection.

Where only 1 organism is recorded we can deduce that this was the causative organism.

In 2018 there were 7 infections reported for Betsi Cadwaladr UHB. 5 of these had just one organism recorded as associated with the infection and thus we can deduce that these were the causative organisms. Of these 5 infections, 2 were caused by *Escherichia Coli*, 2 were caused by *Pseudomonas aeruginosa* and 1 was caused by *Staphylococcus aureus*. The remaining 2 infections were recorded as PN5 and thus no microbiological criteria were met.

References

- 1) <https://ecdc.europa.eu/sites/portal/files/media/en/publications/Publications/healthcare-associated-infections-HAI-ICU-protocol.pdf>
- 2) <https://www.frontiersin.org/articles/10.3389/fmicb.2016.01271/full>