



Emergency Service Planning
Emergency Medical Services

Welsh Ambulance Services NHS Trust

Demand and Capacity Review

Final Report

ORH/WAST/1
16 January 2020

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EXECUTIVE SUMMARY

- i. The Welsh Ambulance Services NHS Trust (WAST) and the Emergency Ambulance Services Committee (EASC) commissioned Operational Research in Health Limited (ORH) to undertake a Demand and Capacity Review of WAST.
- ii. This Final Report describes the entire project process. The components of the review are to:
 - I. Forecast incident demand over the next 5 years.
 - II. Agree the required level of quality and time performance to be modelled for each type of patient.
 - III. Model the resources needed to achieve these levels of quality and time performance assuming that current operations continue.
 - IV. Identify WAST efficiencies and the impact these will have on the staffing required.
 - V. Identify unscheduled care system efficiencies and the impact these will have on the staffing required.
 - VI. Model the impact of planned service changes and their impact on patient flows.
 - VII. Model the resources required for call handling clinical staff and dispatch in the Clinical Contact Centres (CCCs).

Data Collection

- iii. An ambulance service is a complex system; in order to analyse and build a representative picture of WAST, a comprehensive data collection process was required.
- iv. The main sample period for data collection was the financial year 2018/19, with historical demographic information collected for a five-year period.
- v. The key data items for the review are listed in Figure **2-1** in Section 2.

Data Analysis

- vi. ORH compared the 2018/19 sample with 2015/16 data collected for a previous Demand and Capacity Review of WAST. The key findings were that:
 - Responded demand was 9% lower in 2018/19 than 2015/16, although the reported acuity mix was higher.
 - There was an increase in non-responded incidents in 2018/19 compared to 2015/16; both of these observations are potentially linked to a change in CAD system.

Figure I: Benchmarking Summary

	Parameter	WAST Values			Benchmarked Values		
		SE	C&W	North	Min.	Median	Max.
Operations	Red: Call Answer to Vehicle Assign*	03:26	03:23	03:08	02:23	03:11	05:02
	Non-Red Emergencies: Clock Start to Vehicle Assign*	49:10	40:34	29:16	02:45	17:01	49:10
	Time at Scene: Conveyed	32:55	34:51	32:40	24:48	32:55	39:50
	Time at Scene: Not Conveyed	51:40	54:31	48:50	37:15	55:34	67:54
	Conveyance Rate	72.2%	65.6%	70.8%	57.8%	70.8%	82.2%
	Arrival to Handover	27:56	31:04	35:13	11:41	22:26	35:13
	Handover to Clear	12:54	11:57	10:10	09:08	15:02	24:03
	Emergency Ambulance Utilisation	70.6%	50.8%	60.6%	26.4%	62.9%	73.2%

CCC	999 Average Call Duration	06:40	04:16	05:12	06:40
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	Parameter	Difference to Minimum		
		SE	C&W	North
Operations	Red: Call Answer to Vehicle Assign*	01:03	01:00	00:45
	Non-Red Emergencies: Clock Start to Vehicle Assign*	46:25	37:48	26:31
	Time at Scene: Conveyed	08:06	10:02	07:52
	Time at Scene: Not Conveyed	14:25	17:16	11:35
	Conveyance Rate	14.4%	7.8%	13.0%
	Arrival to Handover	16:15	19:22	23:32
	Handover to Clear	03:47	02:49	01:03
	Emergency Ambulance Utilisation	44.2%	24.4%	34.2%

CCC	999 Average Call Duration	02:24
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* Note: First vehicle assign is for the first assignment of the first vehicle that arrives on scene.

- Red 8-minute response performance improved from 68.4% in 2015/16 to 73.7% in 2018/19; however Amber 20-minute performance degraded from 75.0% to 43.9%.

vii. ORH subsequently undertook a detailed analysis of 2018/19 data, revealing that:

- Red 8-minute and Amber 20-minute response performance figures were not well correlated by HB; Amber 20-minute performance varied from 36.6% in Abertawe Bro Morgannwg to 48.7% in Powys.
- There was a mismatch between peak demand and peak resourcing; peak resourcing tended to occur around two hours after peak demand on weekdays.
- EA utilisation was highest at 20:00 to 21:00 on both weekdays and weekends, peaking at 84% in this time period in the South East area.
- Call answer performance on 999 lines was 86.0% in 6 seconds, with 67.6% of calls answered by the home CCC. New call handler rosters, introduced in October 2018, align well to the pattern of call demand.
- WAST achieved a 7.9% Hear and Treat rate, 4.8% from the CSD and 3.1% from NHS Direct Wales (NHSD). The majority of Hear and Treat originated from the triage of non-CTA-suitable calls due to operational pressures.
- There is a large degree of disparity in the number of vehicles and workload managed by each dispatch desk. The current dispatch area boundaries are not generally well aligned to patient-hospital flows.

Benchmarking

viii. Internal benchmarking involved detailed comparison of the 2015/16 and 2018/19 samples. All benchmarking is undertaken by ORH to ensure that fair comparisons can be drawn. The key findings from the internal benchmarking are that:

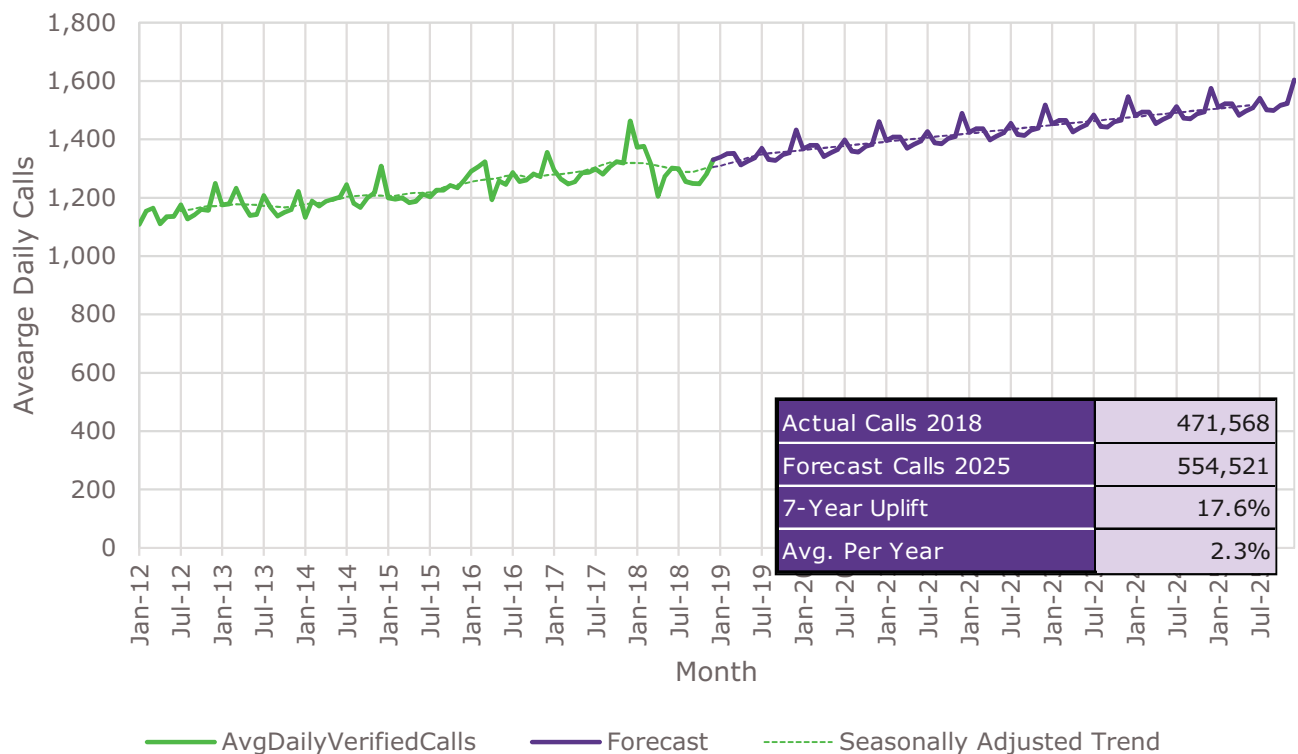
- The 'clock start' time has shifted later into the call due to a change in the CAD system, but the 'call answer to time on scene' has not changed materially.
- Conveyance rates have reduced, with an appreciable increase in time at scene.
- Average arrival to handover has reduced, but there is still a large variation by facility (from 43m26s at Royal Gwent Hospital to 11m30s at Prince Charles Hospital).
- The duration of 999 calls has increased significantly across all CCCs.

ix. ORH also presented external benchmarking gathered from other UK ambulance reviews in recent years (see Figure **I**). The following conclusions can be made:

- WAST's multiple attendance ratio for the highest acuity category is the highest in the UK, reflecting its clinical protocols, skill and vehicle mix.
- The relationship between time at scene and conveyance rate in WAST is in line with that observed elsewhere.

Figure II: Demand Projections**Age/Gender Demand Projection**

	ABM	Bevan	Betsi	CV	CT	HD	Powys	All HBs
2018 Incidents	76,964	83,391	121,040	67,057	43,727	56,972	19,953	469,104
2025 Forecast	96,291	94,897	143,249	77,647	49,813	69,351	24,813	556,062
Increase over 7 years	25.1%	13.8%	18.3%	15.8%	13.9%	21.7%	24.4%	18.5%
Increase per year	3.3%	1.9%	2.4%	2.1%	1.9%	2.8%	3.2%	2.5%

Holt-Winters Forecasting (Avg Daily Calls)**Projection Methods Summary**

Historical analysis	Average trend from 2012 to 2018	2.1% growth per annum
Holt-Winters	Statistical seasonally-adjusted time-series projection method More emphasis on more recent data	2.3% growth per annum
Age : gender	Historical population by HB Analysis of age:gender call rates, projected to 2024/25 Future population by HB (total and age profile change)	2.5% growth per annum

- Average arrival at hospital to handover in WAST is among the highest of those benchmarked.
- The 999 call duration is the highest of those benchmarked.
- For WAST-controllable parameters, WAST generally benchmarks favourably against other ambulance services.

- x. ORH compared WAST's CTA-suitable codesets with those of other UK ambulance services and found the potential to expand the CSD codeset and increase the Hear and Treat rate to 10.2%.
- xi. ORH analysed WAST's abstraction and relief information, and WAST suggested a more efficient relief rate of 42.7% for operations and 44.3% for CCCs, which would place them in the middle of benchmarked ambulance services.

Demand Projections

- xii. ORH used an age/gender-based demand projection method to create future demand scenarios. This involves analysing historical demand rates per 1,000 population, forecasting this forward and combining it with projected population figures.
- xiii. Observations can be made about the historical demand and population information:
 - In 2012 there were 346.7 ambulance calls per year per 1,000 people aged 65+; this increased to 385 in 2018 and is projected to reach 443 in 2025.
 - The population:age profile across Wales is typical of an ageing population; the population aged 65+ is predicted to increase by 13% from 2018 to 2025.
 - Total population is predicted to increase by 1.6% across Wales from 2018 to 2025; this rate is highest in Cardiff and Vale HB at 5.1%.
- xiv. Combining the population projections and trended future demand rates per 1,000 produced a 2.5% year-on-year increase in demand across Wales on average.
- xv. ORH also used a Holt-Winters statistical time series forecasting method to produce an alternative year-on-year average of 2.3% (see Figure **II**).
- xvi. Historically, average annual demand growth across WAST from 2012 to 2018 was 2.1%.
- xvii. The 2.3% demand increase was chosen as the core scenario by the Steering Group, with 2.1% and 2.5% being used for the sensitivity scenarios.

Model Setup

- xviii. ORH's bespoke ambulance simulation model, AmbSim, was set up based on analysed WAST workload and resourcing data for 2018/19.
- xix. AmbSim simulates the entire life cycle of emergency incidents, from the incident occurring through to potentially transporting the patient to an appropriate hospital.

Figure III: Agreed Response Performance Modelling Parameters

Response Parameter	Pan Wales	By HB	Period	Comments
Red 8-minute	70%	65%	Monthly	<ul style="list-style-type: none"> With expectation of continuous improvement. Parameters are minimum.
Red 90th	15 mins	-	Monthly	<ul style="list-style-type: none"> As per English Ambulance Response Programme (ARP). Report HB level performance once pan-Wales parameter is achieved. Improve distribution curve.
Amber 1 (first on scene)	18 mins	-	Monthly	<ul style="list-style-type: none"> As per English ARP. Hybrid standard (as per ARP): 18 minutes if not conveyed, 18 minutes for conveying resource if conveyance required. Model first on scene as per EASC Ambulance Quality Indicators (ASIs).
Amber 1 90th (first on scene)	40 mins	-	Monthly	<ul style="list-style-type: none"> As per English ARP. Report HB level performance once pan-Wales parameter is achieved. Improve distribution curve. Hybrid standard. Model first on scene as per EASC AQIs.

Figure IV: 2024 Staff Requirement Summary (FTE) – Operations

Position	Budgeted Establishment	Staff Requirement	Change
Paramedic ¹	857.6	976.0	118.5
Technician	372.3	746.8	374.5
Urgent Care Assistant	198.0	246.3	48.3
APP ²	47.0	67.7	20.7
Total	1,474.8	2,036.8	562.0

1) Includes EMT3

2) Excludes CCC position

- xx. A careful calibration process was undertaken to ensure that the model replicated actual operations and performance as closely as possible.
- xxi. Similar call handling and clinical triage simulation models were set up to model the future call handler and clinician requirements.

Operational Scenario Modelling

- xxii. AmbSim was used to model the scenarios required for the objectives of the review. The key conclusions can be summarised as follows:
 - There is a 'relief gap' of 262.5 FTE when comparing WAST's budgeted establishment and the requirement to run the planned rosters assuming the more efficient 42.67% relief rate.
 - If demand were to increase by 2.3% per annum, without any other changes to resources or operational parameters, the Amber 1 90th percentile in Wales in December 2024 would be 5h40m compared to the agreed performance parameter of 40m.
 - To meet the Steering Group-agreed performance parameters (see Figure **III**) with no operational efficiencies in December 2024 would require 2,150 FTE, representing an increase of 675 FTE from the budgeted position.
 - Re-rostering frontline staff in this position equated to an efficiency of 72 FTE.
 - Increasing the Hear and Treat rate to 10.2% from 8% created an efficiency of 45 FTE.
 - The modelling of APPs in optimal locations targeted at a specific codeset to reduce the chance of conveyance resulted in an 11 FTE efficiency. There are also benefits for the patient and the wider healthcare system.
 - 2,037 FTE are required in the Final December 2024 position to meet the agreed performance parameters (see Figure **IV**).

Clinical Contact Centre Modelling

- xxiii. ORH appraised the staffing capacity of the call handling, clinical triage assessment (CTA) and dispatch functions within the three CCCs.
- xxiv. There is a 'relief gap' of 10.3 FTE in the CCCs when comparing WAST's budgeted establishment and the requirement to run the planned rosters assuming the more efficient 44.3% relief rate.
- xxv. ORH assessed the new call handler rosters, introduced in 2018, against the requirement to deliver 95% of calls answered in 5 seconds and 85% of calls answered in their home CCC in 2024. Two efficiencies were agreed for inclusion: a reduction in duplicate calls and a return to 2018 call durations.
- xxvi. With efficiencies achieved targets can be met with the planned rosters, plus 21-hour adjustment, therefore requiring a total of 106.4 FTE. This staffing level would also provide sufficient capacity for undertaking welfare calls.
- xxvii. ORH optimised CTA staff numbers to maximise the current CSD and NHSD codesets (8% Hear and Treat) and maximise an expanded CSD codeset based on benchmarked data (10.2% Hear and Treat) in December 2024.

Figure V: 2024 Staff Requirement Summary (FTE) - CCCs

Position	Budgeted Establishment	Staff Requirement	Change
Call Handler	96.9	106.4	9.5
Call Supervisor	3.0	18.1	15.1
Allocator	76.0	87.6	11.6
Dispatcher	66.8	0.0	-66.8
APP ¹	-	4.8	4.8
Clinician ²	41.0	43.0	2.0
Senior Clinician	7.0	6.3	-0.7
Total	290.6	266.1	-24.5

1) CCC position only

2) Includes Pharmacists and Mental Health Clinicians

Note: Excludes Clinical Team Leaders, CCC Day Managers and CCC Duty Managers

- xxviii. A total of 29.9 FTE CSD staff and 26.7 FTE NHSD staff are required to maximise the current codesets, increasing to 43.0 FTE CSD staff for the expanded codeset.
- xxix. ORH developed a new dispatch desk configuration, based on the vehicle deployment and workload from the 'Final December 2024' position, which better equalised workload and minimised patient flows between desks.
- xxx. It is proposed that WAST operates 11 EA/RRV desks in the day and evening periods, supplemented with 2 HCP desks and 1 APP desk. At night, lower workload and vehicle numbers could allow for a reduction to 7 desks.
- xxxi. By 2024 the combination of a number of factors will achieve a level of workload on each desk that can be managed by a single allocator without the reliance on a dispatcher. These factors include a reduction in radio communications, the introduction of auto-allocation to Red calls, the reconfiguration of dispatch desks and a more simplified dispatch process (due to the shifting vehicle mix).
- xxxii. To staff these desks will require 87.6 FTE if EA/RRV desks are reduced at night, increasing to 93.0 FTE if they are covered 24/7. A total of 4.8 APPs are required to staff the APP desk.
- xxxiii. A summary of the CCC requirement in 2024 is provided in Figure V.
- xxxiv. This review does not consider other performance, quality support or supervisory roles within the CCCs. A separate project underway by WAST is exploring opportunities to reorganise the roles within the CCCs based on the recent CAD system upgrade, which also supports the single allocator model.

Key Recommendations

- Re-roster of operational staff by location, time of day and vehicle type to better match demand (roster for call taking staff in the CCCs match demand well and do not need to change). CTLs were assumed to be 0% operational.
- Increase the Hear and Treat rate from 8% to 10.2%.
- Introduce APPs at key locations and times of day.
- Reduce relief rates in both operations and the CCCs (to 42.67% and 44.3% respectively).
- Reduce call handing times back to 2018 levels.
- Reduce duplicate calls to 2016/17 levels (this is predicated on an increase in frontline resourcing to reduce long patient waits).
- Re-define dispatch desks to better respect workloads, vehicle flows and patient flows to hospitals.
- With all these improvements achieved, WAST requires 2,302.9 staff across operations and CCCs; this compares to 1,765.4 staff that are currently budgeted.

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1 Introduction

- 1.1 The Welsh Ambulance Services NHS Trust (WAST) and the Emergency Ambulance Services Committee (EASC) commissioned Operational Research in Health Limited (ORH) to undertake a Demand and Capacity Review of WAST with the following components:
 - I. Forecast incident demand over the next 5 years.
 - II. Agree the required level of quality and time performance to be modelled for each type of patient.
 - III. Model the resources needed to achieve these levels of quality and time performance assuming that current operations continue.
 - IV. Identify WAST efficiencies and the impact these will have on the staffing required.
 - V. Identify unscheduled care system efficiencies and the impact these will have on the staffing required.
 - VI. Model the impact of planned service changes and their impact on patient flows.
 - VII. Model the resources required for call handling clinical staff and dispatch in the Clinical Contact Centres (CCCs).
- 1.2 The review focused on CCC and response elements; the impact on support services was outside the review's scope.
- 1.3 A cross-stakeholder Steering Group was formed in order to discuss deliverables and make decisions informing the outcome of the review.
- 1.4 This Final Report describes the entire project process. Overviews of the data collection and analysis processes are provided in Sections 2 and 3, with operational benchmarking being reported in Section 4. Section 5 describes the demand projection methodology and results.
- 1.5 Simulation models were used for both the operational and CCC modelling streams; the setup of these models is outlined in Section 6. Operational and CCC modelling scenarios are presented in Sections 7 and 8 respectively.
- 1.6 A glossary of terms is included in Appendix **A1**.

Figure 2-1: Data Collection

Operations	CCC
Workload Data	<ul style="list-style-type: none"> All calls received by the CCCs with all information on the incident (location, etc) and WAST response (all timestamps)
Historical Data	<ul style="list-style-type: none"> Monthly demand and performance Five years of historical age/gender counts
Geographical Data	<ul style="list-style-type: none"> Station, standby, CFR scheme and hospital locations Digital boundaries (eg, Health Boards) AVL data, with GPS-derived vehicle location and speed data
Hospital Data	<ul style="list-style-type: none"> Clinical specialties Opening hours
Resource Data (Ops. and CCC)	<ul style="list-style-type: none"> Planned and actual shifts for the sample period Staff and vehicle establishments Vehicle off-road data Meal break, end-of-shift, standby and dispatch policies Abstraction data
Call Logging Data	<ul style="list-style-type: none"> All phone calls offered to or answered by the CCCs, including the type of call, staff grade and time to answer
Agent Activity Data	<ul style="list-style-type: none"> All staff activity including call volumes, logged-in time, ready time and not ready time
Clinical Triage Data	<ul style="list-style-type: none"> All calls triaged by the CSD, including initial disposition, time and duration of call, and outcome
Welfare Calls Data	<ul style="list-style-type: none"> The thresholds at which a held call would require a ring back Number of ring backs undertaken historically
Dispatch Function	<ul style="list-style-type: none"> Structure and staffing of dispatch desks Electronic desk boundaries

2 Data Collection and Validation

An ambulance service is a complex system; in order to analyse and build a representative picture of WAST, a comprehensive data collection process was required.

The main sample period for data collection was the financial year 2018/19, with historical demographic information collected for a five-year period.

The key data items for the review were as follows:

- **Workload data:** A database of all calls received by the CCCs, with information on all vehicle allocations and responses. This was used to analyse components of the job cycle, undertake operational benchmarking, and produce inputs for ORH's simulation model AmbSim.
- **Resourcing data:** Details for all the vehicle shifts deployed during the sample, including start and end times, vehicle type and location. This was used directly within AmbSim to ensure that the model had an accurate picture of deployments.
- **Historical data:** Call counts by age, gender, year and Health Board (HB) for the past five years. This was combined with past and future population data to create the demand projections.
- **CCC data:** Databases of all phone calls made by or offered to CCC staff, including all calls triaged by the Clinical Support Desk (CSD). This was combined with CCC resourcing information and records of agent activity to understand CCC operations and to set up ORH's call handling and clinical triage simulation models.

Data Collection

- 2.1 In order to produce insightful analysis and set up ORH's simulation models for the modelling components, a comprehensive data collection process was required. Data is collected to ensure that a wide range of analyses can be undertaken; sources include standard operating procedures as well as operational workload data and CCC call logging data (see Figure **2-1** for a data collection summary, and Appendix **A** for the full request).
- 2.2 The main sample period for the study was the financial year 2018/19, although some items required a longer sample period to ensure that trends could be analysed over time; these included the population and historical age/gender data.
- 2.3 ORH previously undertook a review of WAST in 2017, which used 2015/16 data. For this review, data was collected for 2017/18 onwards to ensure there was a continuous sample, enabling the comparison of parameters and trends. The demand projections used a sample from 2012 to 2018.

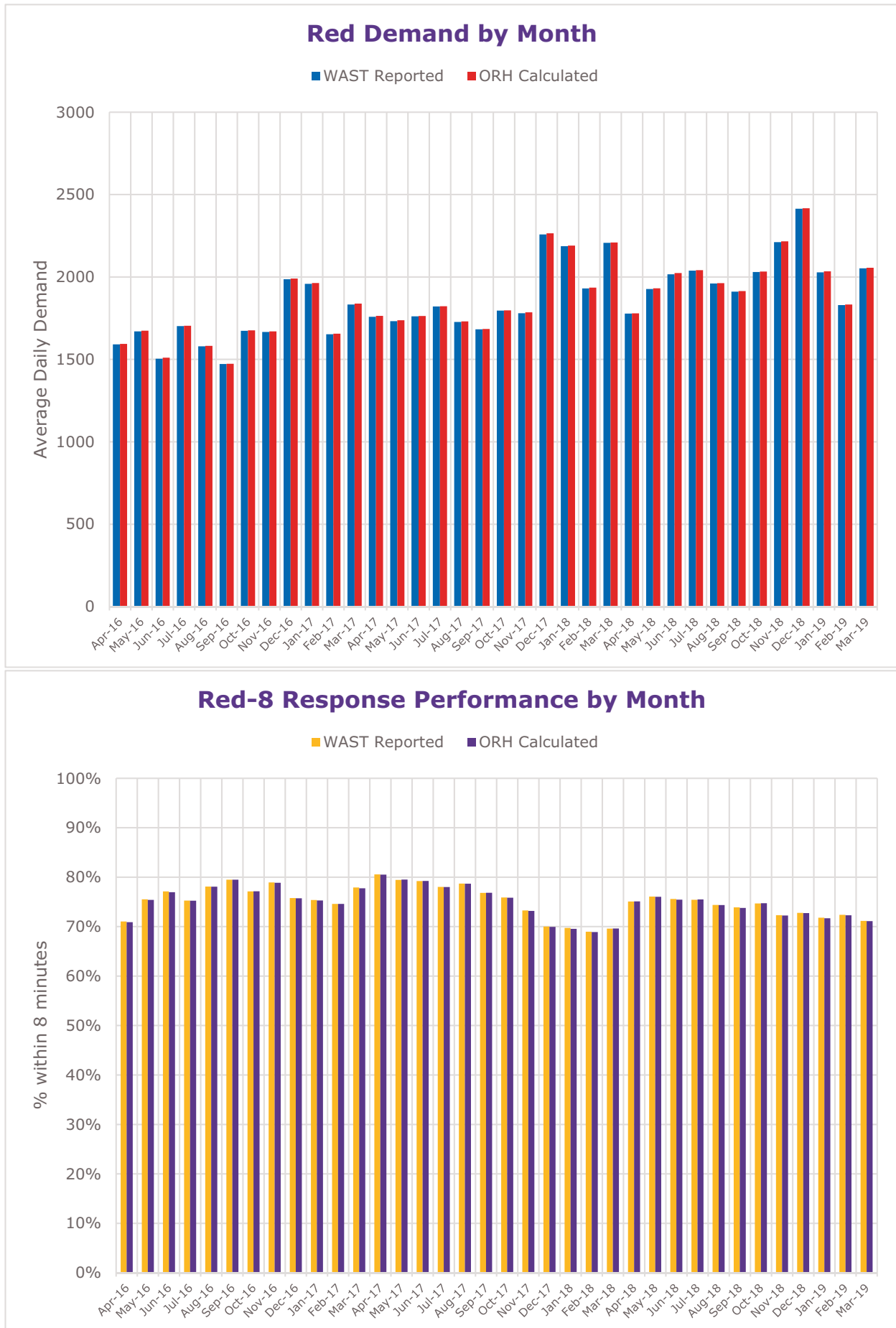
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Operational Data

- 2.4 The Computer Aided Dispatch (CAD) data sample included all calls which created an entry in the CAD, regardless of vehicle and response outcome. This comprised information about the incident (AMPDS code, category, location) and all WAST vehicles allocated, including timestamps for the various components of the job cycle.
- 2.5 Monthly demand and performance reports were also collected in order to check the validity of the CAD sample (see 'Demand and Performance Validation').
- 2.6 A five-year sample of call counts by age, gender and Health Board (HB) was collected in order to analyse historical demand rate trends for the demand projection methodology (see Section 5). This was supplemented by historical and future population information collected from the Office for National Statistics (ONS).
- 2.7 Actual resourcing data was required to accurately reflect the shifts deployed during the sample period by time, location and vehicle type; planned resourcing data was also collected to depict an average planned shift level for modelling purposes. Information on standard operating procedures for meal breaks and end-of-shift arrangements was also needed to build a representative picture of current practices.
- 2.8 Automatic Vehicle Location (AVL) data was collected; this is a GPS-based dataset which includes speed and location information for all WAST vehicles on a granular basis (typically recorded every 5-15 seconds). This data was required in order to calibrate a travel time network with speeds representative of WAST vehicles (see Section 6).
- 2.9 Other geographical data collected included the location of all ambulance stations, dispatch points, receiving hospitals, community first responder schemes and defibrillators.

CCC Data

- 2.10 A call logging data sample was collected from the telephony system; essentially this is a database of all calls offered to or made by CCCs, including information on the result of the call (such as call answer time or whether the call was abandoned).
- 2.11 Information on agent activity, including ready and not-ready time, was required in order to gain an understanding of the amount of time available to make and receive calls.
- 2.12 A database of all calls triaged by the CSD was collected to understand Clinical Triage Assessment (CTA) workload and also to enhance the discussions of potential future Hear and Treat rates.
- 2.13 Data on historical welfare calls was collected, along with information on the thresholds at which a welfare call would be triggered.

Figure 2-2: Demand and Performance Validation

- 2.14 Information on the structure, jurisdiction and staffing of dispatch desks was collected in order to assess the current dispatch procedures and understand whether these would require realignment in future modelling scenarios.
- 2.15 As with the operational data stream, resourcing data was also collected for the CCC stream for both actual and planned deployments. Information on CCC meal and rest break arrangements was also collected.

Demand and Performance Validation

- 2.16 ORH undertook a detailed demand and performance validation process, comparing WAST reported figures with values calculated from the CAD workload sample. The purpose of this was to ensure that the data collected was complete and accurate, and that ORH was correctly interpreting the methodology used to calculate demand and performance.
- 2.17 There was a very close match between ORH's calculated figures and WAST's reported figures, to within 0.5% for both Red demand and 8-minute Red response performance by month (see Appendix **B1** and Figure **2-2**).

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3 Data Analysis

ORH compared the 2018/19 sample with 2015/16 data collected for the previous Demand and Capacity Review of WAST. The key findings were that:

- Responded demand was 9% lower in 2018/19 than 2015/16, although the reported acuity mix was higher.
- There was an increase in non-responded incidents in 2018/19 compared to 2015/16, potentially linked to a change in CAD system.
- Red 8-minute response performance improved from 68.4% in 2015/16 to 73.7% in 2018/19; however Amber 20-minute performance degraded from 75.0% to 43.9%.

ORH subsequently undertook a detailed analysis of 2018/19 data, revealing that:

- Red 8-minute and Amber 20-minute response performance figures were not well correlated by HB; Amber 20-minute performance varied from 36.6% in Abertawe Bro Morgannwg to 48.7% in Powys.
- There was a mismatch between peak demand and peak resourcing; peak resourcing tended to occur around two hours after peak demand on weekdays.
- Emergency Ambulance (EA) utilisation was highest at 20:00 to 21:00 on both weekdays and weekends, peaking at 84% in this time period in the South East area.
- Call answer performance on 999 lines was 86.0% in 6 seconds, with 67.6% of calls answered by the home CCC. New call handler rosters, introduced in October 2018, align well to the pattern of call demand.
- WAST achieved a 7.9% Hear and Treat rate, 4.8% from the CSD and 3.1% from NHS Direct Wales (NHSD). The majority of Hear and Treat originated from the triage of non-CTA-suitable calls due to operational pressures.
- There is a large degree of disparity in the number of vehicles and workload managed by each dispatch desk. The current dispatch area boundaries are not generally well aligned to patient-hospital flows.

Sample Comparison

- 3.1 ORH undertook a Demand and Capacity Review for WAST in 2017, using 2015/16 data. Comparing this sample and the latest 2018/19 data enables the understanding of changes in WAST operations and wider trends.
- 3.2 The CAD system in WAST changed in November 2017, and this corresponds with a reduction in the level of attended calls but a similar number of

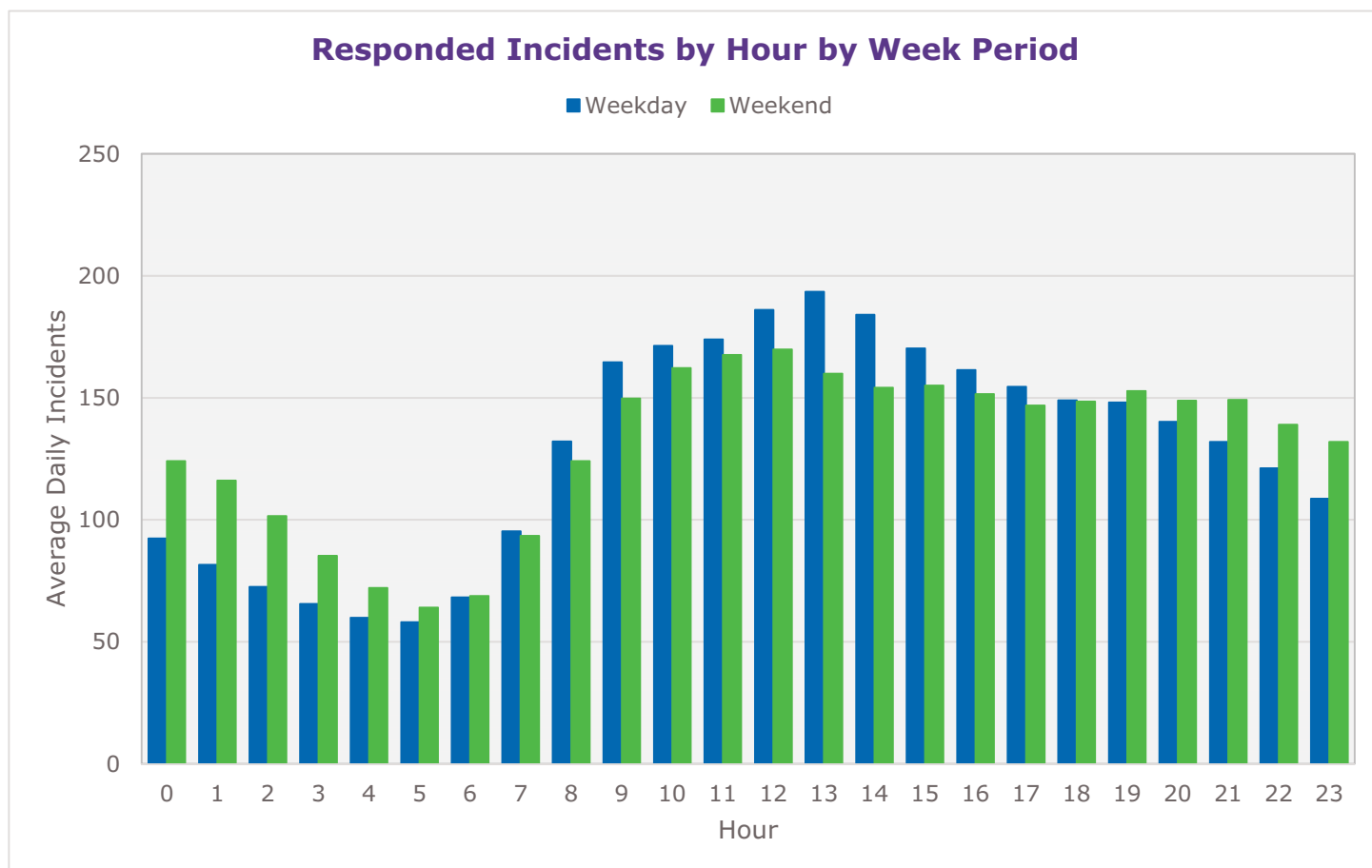
Figure 3-1: Demand Summary

2018/19 Financial Year

2018/19 Responded Demand per day

Health Board	RED	AMBER	GREEN	ROUTINE	TOTAL
Abertawe Bro Morgannwg University	12.9	114.1	21.5	7.3	155.8
Aneurin Bevan	12.1	125.7	28.0	4.4	170.1
Betsi Cadwaladr University	13.7	193.4	44.5	3.5	255.0
Cardiff & Vale University	11.1	94.9	19.7	3.5	129.3
Cwm Taf	6.3	69.2	16.1	3.5	95.1
Hywel Dda	7.7	95.4	22.6	5.8	131.5
Powys	2.6	34.6	9.0	0.1	46.3
Total	66.4	727.3	161.6	28.4	983.6

Demand Proportion	6.8%	73.9%	16.4%	2.9%	100.0%
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Note: 'Weekend' is defined from 18:00 Friday to 18:00 Sunday.

verified calls¹ (see Appendix **B2**). Further analysis of the breakdown of non-responded incidents in 2018/19 shows that 42.2% were 'cancelled pre-arrival' (see Appendix **B3**). This could indicate a level of latent demand which is not being serviced by vehicles due to expected long response times, however it is not possible to confirm this from the data.

- 3.3 If attended and cancelled pre-arrival calls are combined, the levels observed in 2018 were similar to those prior to the CAD change (see Appendix **B4**).
- 3.4 Responded demand was approximately 9% lower in 2018/19 than in 2015/16, though Red and Amber call volumes were higher, representing a higher reported acuity mix (see Appendix **B5**). A component of this change will be due to changes in Hear and Treat, and also the CAD system change as outlined above.
- 3.5 There were 22.8 fewer calls per day in Cardiff and Vale HB, representing a 15% reduction from 2015/16 levels. Cardiff and Vale HB had the highest proportion of Red demand at 8.6%, with Powys having the lowest at 5.7%.
- 3.6 The proportion of Red calls attended within 8 minutes had improved from 68.4% in 2015/16 to 73.7% in 2018/19 WAST-wide (see Appendix **B6**). Amber 20-minute performance had degraded however, from 75.0% to 43.9%.
- 3.7 Actual deployed resourcing hours were similar between the two samples at approximately 16,000 Emergency Ambulance (EA) hours per week (see Appendix **B7**).

2018/19 Analysis

Operations

- 3.8 WAST responded to 983.6 incidents per day on average, of which around 66 were categorised as Red (see Figure **3-1**).
- 3.9 The analysed hourly demand profile in WAST was typical for an ambulance service; on weekdays, demand is lowest from 03:00 to 05:00 and highest from 12:00 to 14:00. Demand then gradually reduces through the daytime and evening. The weekend daytime has a flatter profile than the weekday daytime, with demand being relatively stable from 10:00 until 21:00, and weekend demand is higher than weekday demand from 19:00 to 05:00.
- 3.10 Red 8-minute response performance differed by Health Board, from 81.3% in Cardiff and Vale HB to 65.6% in Hywel Dda HB (see Appendix **C1**). The level of 'indirect' or 'non-core' contribution also differed; this was highest at 11.3% in Powys HB where defibrillator and Community First Responder (CFR) contribution is relatively high.
- 3.11 Amber 20-minute response performance was highest in Powys HB at 48.7%, and lowest in Abertawe Bro Morgannwg HB at 36.6% (see Appendix **C2**). Red and Amber performance levels by HB were not well correlated; for example, Powys HB had the highest Amber performance but the third lowest

¹ 'Verified calls' are calls which create a unique entry in the CAD but may not necessarily receive a vehicle response.

Figure 3-2: Utilisation by Health Board**Utilisation by Health Board: 2018/19 Analysis**

Health Board	Utilisation		
	EA	RRV	UCS
Aneurin Bevan	73.0%	37.2%	68.2%
Cardiff & Vale	74.4%	34.5%	52.8%
Cwm Taf	60.4%	29.8%	55.2%
Betsi Cadwaladr	60.2%	35.0%	61.2%
Abertawe Bro Morgannwg	66.4%	40.0%	61.3%
Hywel Dda	45.6%	37.5%	54.3%
Powys	37.2%	19.3%	40.9%
Trust Wide	59.2%	35.0%	58.0%

Utilisation Ranking by Vehicle Type (1 = Highest)

Health Board	Utilisation		
	EA	RRV	UCS
Aneurin Bevan	2	3	1
Cardiff & Vale	1	5	6
Cwm Taf	4	6	4
Betsi Cadwaladr	5	4	3
Abertawe Bro Morgannwg	3	1	2
Hywel Dda	6	2	5
Powys	7	7	7

Red performance. Amber performance tends to be highest in the more rural areas of Wales, whilst the opposite is true for Red performance.

- 3.12 The proportion of shifts not actually deployed compared to the plan was highest in the South East CCC area at 12.9% (see Appendix **C3**). The dropped shift rate was highest for Advanced Paramedic Practitioner (APP) and Rapid Response Vehicle (RRV) shifts, which are both solo responder vehicle types. On an average week WAST deployed:
- 15,984 EA hours
 - 6,036 RRV hours
 - 2,908 Urgent Care Service (UCS) vehicle hours
- 3.13 Comparing the temporal pattern of demand to vehicle resourcing by CCC area showed a mismatch; the peak deployment of vehicles generally occurred between 14:00 and 16:00 on weekdays, whereas demand peaked at 12:00 to 13:00 (see Appendix **C4**).
- 3.14 These graphs are not intended to show the required level of resources per hour, but whether the profile of resources matches that of demand (the peaks, lows and overall shape).
- 3.15 Focusing on EA resourcing (the blue bars on the graph), there is little difference between the minimum deployment and maximum deployment. For example, in Central and West CCC on weekdays there is a minimum of 35 EAs and a maximum of 45 EAs (a ratio of 1.28:1), whereas demand varies from 20 calls per hour to over 60 (a ratio of 3:1). The rurality of regions does, however, come into account, as one-ambulance stations are required to ensure geographical coverage.
- 3.16 Utilisation² of vehicles also differed by Health Board, reflecting the differences in geography, demand patterns and resourcing across Wales. Averaged across the week, EA utilisation was highest in Cardiff and Vale HB at 74.4% and lowest in Powys HB at 37.2% (see Appendix **C5** and Figure **3-2**). UCS vehicles were similarly utilised to EAs on average, at 58.0% compared to 59.2%. The figures displayed are averages across the week.
- 3.17 Analysing EA utilisation by time of day showed a similar pattern across all three CCC areas; utilisation was highest between 20:00 to 21:00 on both weekdays and weekends (see Appendix **C6**). Specifically, EA utilisation by area was as follows:
- South East: 84%
 - North: 75% to 77%
 - Central and West: 68%
- 3.18 EA utilisation otherwise broadly followed the pattern of demand. However, weekend utilisation in the early morning was notably higher than on a

² Utilisation is measured as the sum of time mobile to time clear divided by the sum of actual deployed resource hours. Meal breaks are not included as 'busy time'.

Figure 3-3: CCC Call Volumes***Average Daily Calls***

Line Type	Offered	Answered	Abandoned
999	1319.0	1312.7	6.3
Emergency Services	165.1	153.0	12.0
HCP Urgent	235.8	214.1	21.7
Routine	64.1	55.0	9.1
Total	1,784.0	1,734.8	49.1

Average Daily Calls Offered

Line Type	Line Area			Total
	Central and West	North	South East	
999	422.3	329.2	567.4	1,319.0
Emergency Services	7.1	46.7	111.3	165.1
HCP Urgent	66.0	45.2	124.7	235.8
Routine	3.2	49.8	11.1	64.1
Total	498.6	470.9	814.5	1,784.0

weekday; for example, utilisation was 70% at 02:00 in North CCC on a weekend compared to 58% on a weekday.

- 3.19 These peaks generally followed after shift start and end times, or likely meal break windows, as vehicles become available. The re-roster modelling aimed to stagger shift start and end times in order to reduce concurrent meal breaks and shift ends where possible (see Section 7).
- 3.20 Vehicle Off-Road (VOR) information was provided by reason and vehicle type. This information is useful in ascertaining the amount of time rostered on-shift in which a vehicle is not available for response; it is also possible to include this downtime within AmbSim to ensure that the productivity of shifts is accurately represented.
- 3.21 A large majority of the VOR time, particularly for EAs, was due to time spent returning to base for a meal break (see Appendix **C7**). AmbSim models this behaviour directly, therefore this time was excluded. Total EA unavailable time was 11.9%, excluding the 'Return to Base for Meal break' reason leaves a residual 3.3%; for RRVs the total was 13.5% and 9.0% was modelled.

Call Handling

- 3.22 The call handling function is divided between the three CCCs: Central and West, North and South East, with varying numbers of staff at each.
- 3.23 WAST operates a virtual call handling model across the three CCCs, bringing the benefits of increased efficiency and resilience by utilising capacity WAST-wide.
- 3.24 On average, WAST offered 1,784 calls per day, of which 97.2% were answered (see Figure **3-3**). Three-quarters of call volumes originate on 999 lines, followed by HCP Urgent (13.2%), Emergency Services (9.3%) and Routine lines (3.6%).
- 3.25 In Central and West CCC the Emergency Services line is not being used correctly, with other services' control rooms instead contacting dispatchers on direct dial in (DDI) lines. WAST have identified an additional 76 calls per day which are received from Police, Fire and Coastguard in Central and West CCC.
- 3.26 Call answering performance on 999 lines was 86.0% in 6 seconds, with 67.6% of calls answered by the home CCC.
- 3.27 There is no perceivable benefit to call handling times of a call being answered in the home CCC (see Appendix **C8**).
- 3.28 Call durations increased across 2018/19 in all CCCs, most notably from November 2018 onwards, from an average of 5m11s per 999 call in early 2018 to 6m40s per call in the first half of 2019 (see Appendix **C9**).
- 3.29 In 2019 call durations were longest in South East CCC at 7m10s, and shortest in North CCC at 6m07s.
- 3.30 In late 2018 WAST introduced new call handler rosters based on the recommendations of the previous ORH review. Planned shifts comprise 2,879 staff hours per week across the three CCCs compared to an actual

Figure 3-4: CSD Workload 2018/19***Average Daily Calls***

CSD Outcome	Hear & Treat Reason	CSD Suitable		Total	% Verified Calls
		Yes	No		
Hear and Treat	Alternative Transport	5.0	14.4	19.4	1.5%
	Hear and Treat Discharge	4.5	11.2	15.7	1.2%
	Taxi Suitable	3.7	11.7	15.3	1.2%
	Hear and Treat Referral	2.9	6.9	9.8	0.8%
	Hear and Treat Total	16.1	44.2	60.3	4.8%
Upgrade		11.7	63.5	75.2	5.9%
CSD Aborted/Unable to Complete		13.8	24.3	38.1	3.0%
Response Appropriate (No Change)		8.2	27.0	35.2	2.8%
Downgrade		0.1	2.9	3.0	0.2%
Other		0.7	0.7	1.4	0.1%
CSD Total		50.7	162.5	213.2	16.8%
Not Dealt with by CSD		31.2	-	-	2.5%

deployment of 2,387 staff hours in Q3 and Q4 of 2018/19 (see Appendix **C10**).

- 3.31 Comparing the temporal pattern of demand to call handler resourcing shows a good match across the day (see Appendix **C11**).

Clinical Triage Assessment (CTA)

- 3.32 WAST's CSDs triaged on average 213.2 calls per day, of which 60.3 resulted in Hear and Treat, equivalent to 4.8% of total call volumes. The most common CSD outcome was that of an upgrade (see Figure **3-4**).
- 3.33 Including the 3.1% Hear and Treat delivered by NHS Direct Wales (NHSD), WAST achieved a total Hear and Treat rate of 7.9% in 2018/19.
- 3.34 Of the calls Hear and Treated by the CSD, only 26.7% came from the CTA-suitable codeset, with the majority originating from the triage of unsuitable calls due to operational pressures. Furthermore, secondary triage was not attempted on 38% of calls identified as CTA-suitable.
- 3.35 WAST's Hear and Treat success rate (the proportion of triaged calls that did not receive an ambulance response) was 28.3% for CSD (31.8% if CTA-suitable) and 56.0% for NHSD. The disparity in success rates is due to the lower acuity of calls triaged by NHSD.
- 3.36 The average triage duration for a CTA-suitable call was 26m31s if triaged by the CSD, and 23m 24s if triaged by NHSD.

Dispatch

- 3.37 WAST currently operates 11 EA/RRV desks 24/7 (four in Central and West, three in North and four in South East CCCs). In addition, one HCP desk (responsible for the dispatch of UCS vehicles) and one APP desk are located in each CCC.
- 3.38 There is a large degree of disparity in the number of planned vehicles managed by each desk (see Appendix **C12**).
- 3.39 During the day (07:00 to 19:00), the desk with most vehicles is Powys and Ceredigion HB with an average of 20.4 vehicles to manage, whilst the Swansea HB desk manages only 9.4 vehicles on average across the same period.
- 3.40 All three HCP desks manage fewer vehicles than the EA/RRV desks at under 10 vehicles across the day period, while the three APP desks all manage fewer than 2 vehicles on average based on the planned rosters.
- 3.41 Similar variation exists in the level of incident workload on each desk, with the busiest desk, Cardiff and Vale, dispatching to an average of 5.2 incidents per hour in the day, compared to the quietest desk, Swansea, at 3.0 incidents per hour.
- 3.42 At night (02:00 to 07:00) incident workload is significantly reduced, with most desks dispatching to fewer than two incidents per hour.

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- 3.43 The current dispatch area boundaries are not generally well aligned to the patient flows. For example, the Morriston and Singleton Hospitals in Swansea HB have catchments across two dispatch areas, as do the Ysbyty Gwynedd and Glan Clwyd Hospitals in North CCC (see Appendix **C13**).
- 3.44 Additionally, the Nevill Hall and Bronglais Hospitals have catchments across both multiple dispatch areas and multiple CCCs, which complicates the management of resources on these desks.

Figure 4-1: Benchmarking Summary

	Parameter	WAST Values			Benchmarked Values		
		SE	C&W	North	Min.	Median	Max.
Operations	Red: Call Answer to Vehicle Assign*	03:26	03:23	03:08	02:23	03:11	05:02
	Non-Red Emergencies: Clock Start to Vehicle Assign*	49:10	40:34	29:16	02:45	17:01	49:10
	Time at Scene: Conveyed	32:55	34:51	32:40	24:48	32:55	39:50
	Time at Scene: Not Conveyed	51:40	54:31	48:50	37:15	55:34	67:54
	Conveyance Rate	72.2%	65.6%	70.8%	57.8%	70.8%	82.2%
	Arrival to Handover	27:56	31:04	35:13	11:41	22:26	35:13
	Handover to Clear	12:54	11:57	10:10	09:08	15:02	24:03
	Emergency Ambulance Utilisation	70.6%	50.8%	60.6%	26.4%	62.9%	73.2%

CCC	999 Average Call Duration	06:40	04:16	05:12	06:40
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	Parameter	Difference to Minimum		
		SE	C&W	North
Operations	Red: Call Answer to Vehicle Assign*	01:03	01:00	00:45
	Non-Red Emergencies: Clock Start to Vehicle Assign*	46:25	37:48	26:31
	Time at Scene: Conveyed	08:06	10:02	07:52
	Time at Scene: Not Conveyed	14:25	17:16	11:35
	Conveyance Rate	14.4%	7.8%	13.0%
	Arrival to Handover	16:15	19:22	23:32
	Handover to Clear	03:47	02:49	01:03
	Emergency Ambulance Utilisation	44.2%	24.4%	34.2%

CCC	999 Average Call Duration	02:24
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* Note: First vehicle assign is for the first assignment of the first vehicle that arrives on scene.

4 Benchmarking

Internal benchmarking involved detailed comparison of the 2015/16 and 2018/19 samples. All benchmarking is undertaken by ORH to ensure that fair comparisons can be drawn. The key findings from the internal benchmarking are that:

- The 'clock start' time has shifted later into the call due to a change in the CAD system, but the 'call answer to time on scene' has not changed materially.
- Conveyance rates have reduced, with an appreciable increase in time at scene.
- Average arrival to handover has reduced, but there is still a large variation by facility (from 43m26s at Royal Gwent Hospital to 11m30s at Prince Charles Hospital) – see Figure 4-2.
- The duration of 999 calls has increased significantly across all CCCs.

ORH also presented external benchmarking gathered from other UK ambulance reviews in recent years (see Figure 4-1). The following conclusions can be made:

- WAST's multiple attendance ratio for the highest acuity category is the highest in the UK, reflecting its clinical protocols, skill and vehicle mix.
- The relationship between time at scene and conveyance rate in WAST is in line with that observed elsewhere.
- Average arrival at hospital to handover in WAST is among the highest of those benchmarked.
- The 999 call duration is the highest of those benchmarked.
- For WAST-controllable parameters, WAST generally benchmarks favourably against other ambulance services.

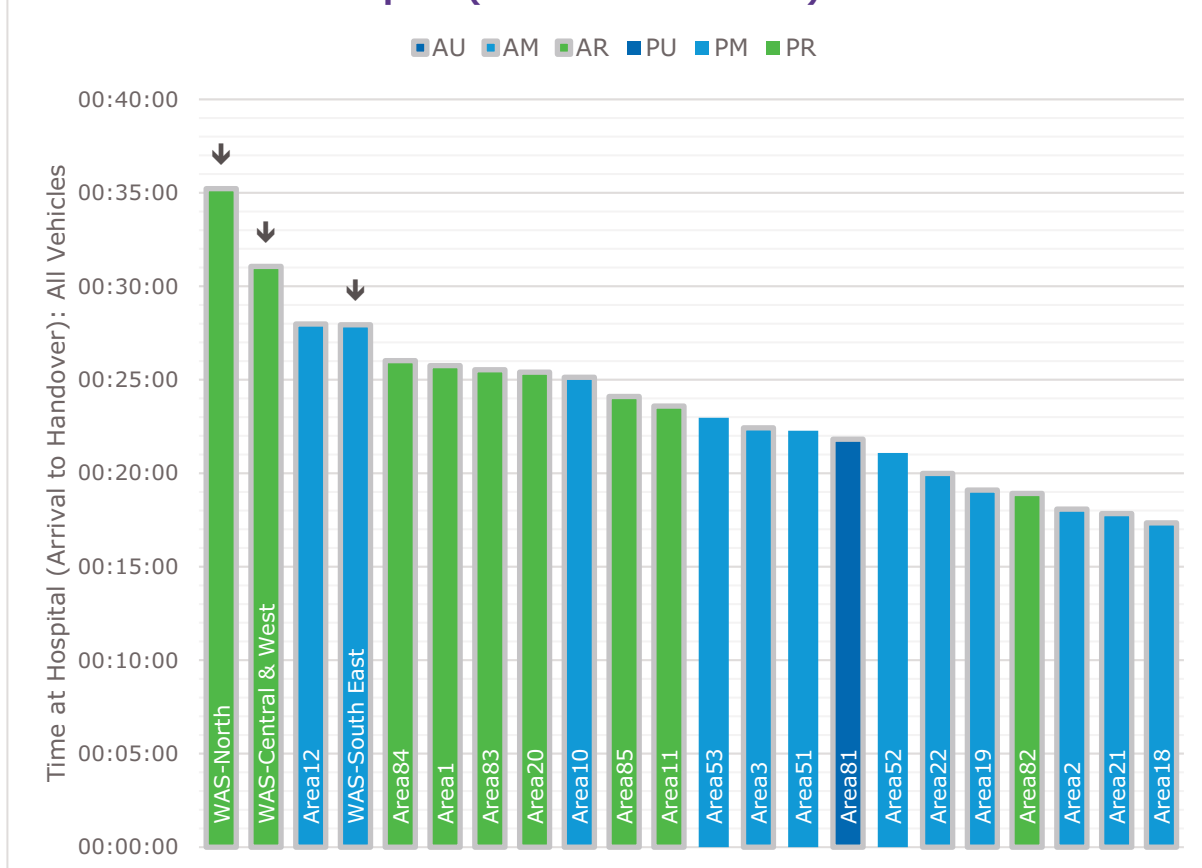
ORH compared WAST's CTA-suitable codesets with those of other UK ambulance services and found the potential to expand the CSD codeset and increase the Hear and Treat rate to 10.2%.

ORH analysed WAST's abstraction and relief information, and WAST suggested a more efficient relief rate of 42.7% for operations and 44.3% for CCCs, which would place them in the middle of benchmarked ambulance services.

-
- 4.1 Benchmarking is used by ORH to provide comparisons both internally and externally between its ambulance service clients. This is particularly useful in identifying potential efficiencies, either through comparison to other similar UK ambulance services or through comparison to past parameter values.

Figure 4-2: Arrival to Handover**2018/19 Arrival to Handover by Facility**

Hospital	Average Arrival to Handover	Weekly Patient Journeys
Royal Gwent Newport	43:26	472.9
Princess Of Wales Bridgend	43:09	237.0
Singleton Swansea	37:29	75.8
Glan Clwyd Bodelwyddan	37:22	440.3
Maelor General Wreccsam	37:16	349.2
Morriston Swansea	36:56	484.3
Ysbyty Gwynedd Bangor	34:08	360.9
Withybush Haverfordwest	32:19	182.8
University Of Wales	31:19	542.6
Royal Shrewsbury	30:29	69.9
Llandough	29:23	108.7
Bronglais Gen Aberystwyth	29:10	112.1
Nevill Hall Abergavenny	28:54	280.3
Countess Of Chester	26:01	75.1
Ysbyty Ystrad Fawr	25:18	36.0
Glangwili Carmarthen	24:18	294.8
Hereford County	23:46	39.9
Prince Philip Llanelli	14:56	111.9
Royal Glamorgan Pontyclun	13:46	297.3
Prince Charles Merthyr	11:30	304.1

Arrival to Handover Benchmarking**Time at Hospital (Arrival to Handover): All Vehicles**

- 4.2 All benchmarking included in this report was undertaken by ORH using the same methodology for all ambulance services, to ensure that fair comparisons could be made.

Internal Benchmarking

- 4.3 ORH was able to benchmark parameters by Health Board between the 2015/16 and 2018/19 samples to provide further detail on the changes that have occurred across WAST.
- 4.4 As part of the CAD software change in November 2017, the amount of time taken to undertake the primary triage process for Red calls had changed. This is evidenced by:
- A longer time from call answer to clock start in 2018/19 (see Appendix **D1**).
 - A shorter time from clock start to vehicle assign for the first vehicle on scene (see Appendix **D2**).
 - A similar total time from call answer to vehicle assign (see Appendix **D3**).
- 4.5 Effectively, the clock start occurs later in the call, which could potentially be part of the reason for improved Red performance in the latest sample (see paragraph 3.6).
- 4.6 The multiple attendance ratio (average number of vehicles attending scene per incident) for Red calls was higher in the latest sample, potentially reflecting increased use of RRVs and a change in clinical protocol for the highest acuity patients (see Appendix **D4**).
- 4.7 Conveyance rates and average time spent at scene were shown to be negatively correlated (see Appendix **D5**). Time at scene was longer and conveyance rates were lower in the 2018/19 sample compared to 2015/16. Cwm Taf HB was an outlier in both datasets, with the highest conveyance rate and lowest time at scene.
- 4.8 The average time from vehicle arrival to patient handover had generally improved between the two samples, however in all but one area (Cwm Taf HB) this was significantly higher than the 15-minute target (see Appendix **D6a**).
- 4.9 There is significant variation in average arrival to handover by hospital; the hospital with the longest average time was Royal Gwent in Newport at over 43m26s (see Appendix **D6b** and Figure **4-2**). This is not correlated to the number of patients each hospital receives; the hospital with the shortest time was Prince Charles Merthyr (11m30s) which received more patients per week than the hospital with the second highest time, Princess of Wales Bridgend (43m12s).
- 4.10 The average time from patient handover to posting clear had increased between the two samples, but this is under the 15-minute target for all Health Boards (see Appendix **D7**).
- 4.11 The average duration of a 999 call answered in the CCCs increased by nearly a third between 2017 and 2019, with most of the increase occurring since

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late 2018 (see Appendix **D8**). Based on observations of CCCs undertaken by ORH, call handlers are waiting on the line for considerable periods of time for a crew to arrive on scene.

External Benchmarking

- 4.12 WAST was divided into the three CCC areas for the purpose of benchmarking with other UK ambulance services. These services were also divided into similar-sized areas.
- 4.13 Analysis of the time from call answer to vehicle assign for the highest acuity call category (in WAST's case, Red calls) shows that WAST were similar to the average of all the benchmarked areas (see Appendix **E1**).
- 4.14 For lower acuity categories (in WAST's case, non-Red emergency calls), WAST had some of the highest activation times measured from clock start (see Appendix **E2**). This was particularly evident for South East CCC area where this is 49m10s. In ORH's experience, this parameter is strongly linked to the level of available resourcing (in particular, transport-capable resourcing) as assignments cannot be made until resources become available. This is a parameter which will naturally change in the model as resource availability increases; there is a clear efficiency, but the parameter does not need to be fixed.
- 4.15 The multiple attendance ratio for Red calls in WAST was higher than in any of the other benchmarked services, reflecting the clinical protocols and skill mix present within WAST (see Appendix **E3**).
- 4.16 The relationship between conveyance rate and time on scene was similar in WAST to that observed elsewhere (see Appendix **E4a**). Time at scene for conveyed incidents was similar to the benchmarked average (see Appendix **E4b**), and for non-conveyed incidents was generally lower than most ambulance services (see Appendix **E4c**).
- 4.17 Although average arrival to handover times have improved in WAST since the previous review (see paragraph 4.8), three of the four areas with the longest arrival to handover times benchmarked were in WAST (see Appendix **E5** and Figure **4-1**). This parameter was longest in the North CCC area in WAST at 35m13s, which is more than double that of the area with the shortest time (17m21s).
- 4.18 The average time from patient handover to posting clear benchmarked favourably in WAST compared to other areas (see Appendix **E6**).
- 4.19 Average ambulance utilisation in WAST broadly reflected the geography of the three areas and was in line with other areas ambulance services with similar levels of urbanity (see Appendix **E7**). It should be noted however that vehicle utilisation is an output of geography and performance levels; it is ORH's view that a 'target' utilisation should not be set, and instead utilisation should be treated as an output of the modelling. When an ambulance service is sufficiently resourced to meet its response time standards, the resulting utilisation is the appropriate utilisation for that service.

Figure 4-3: CTA-Suitable Calls Benchmarking

Codeset	Average Daily Calls	% of Verified Calls
WAST NHSD	133.7	10.5%
WAST CSD	81.9	6.5%
WAST Total	215.6	17.0%
Trust A Total	155.8	12.3%
Trust B Total	148.7	11.7%
Trust C Clinician	199.0	15.7%
Trust C Pharmacist	26.1	2.1%
Trust C Mental Health	62.0	4.9%
Trust C Total	287.1	22.6%

- 4.20 Across the three CCCs, WAST's average 999 call duration in 2019 was significantly longer than that of any benchmarked ambulance service, exceeding that of the next longest by over a minute (see Appendix **E8**).

Hear and Treat Rates

- 4.21 WAST's CSD staff use a CTA-suitable codeset to identify calls which are suitable for Hear and Treat.
- 4.22 Of the total calls successfully Hear and Treated, however, only one quarter came from the CSD codeset (see Section 3). The remainder originated from the triage of unsuitable calls due to operational pressures.
- 4.23 Including the NHSD Hear and Treat calls, WAST achieved a Hear and Treat rate of 7.9% in 2018/19.
- 4.24 Maximising the CSD and NHSD codesets would produce a potential Hear and Treat rate of 8.0%, assuming analysed success rates and no contribution from non-CTA suitable calls.
- 4.25 The WAST codeset compares favourably to three UK ambulance services when CSD and NHSD codesets are combined (see Appendix **F1** and Figure **4-3**).
- 4.26 The WAST CSD codeset could be expanded to include Pharmacist and Mental Health-suitable calls from Trust C's data, which would increase the CSD codeset from 81.9 to 171.1 calls per day. When combined with the current NHSD codeset, this would categorise 24% of call demand as CTA-suitable (see Appendix **F2**).
- 4.27 Assuming analysed success rates, this expanded codeset would provide a potential Hear and Treat rate of 10.2%.

Abstraction and Relief Rates

- 4.28 WAST provided ORH with abstraction data for the 2018/19 financial year by staff type and reason. Combining this with staff in post figures enabled the calculation of the abstraction rate.
- 4.29 The abstraction rate is the proportion of time staff are absent from work. For example, if a staff member is meant to work 100 hours in a given period but are absent for 25 hours, the abstraction rate is 25%.
- 4.30 In order to cover any abstractions, more staff are required. If the abstraction rate was 25%, employing 25% more staff would not cover all the abstractions because any additional staff employed to cover those abstractions will themselves have abstractions.
- 4.31 It is therefore important to calculate the relief rate (see Appendix **G1**). The relief rate is the rate that is required to cover the abstractions; that is, the level of additional staff required to ensure that absences are covered, taking account of 'abstraction on abstraction'. If the abstraction rate is 25%, the relief rate will be 33%.

Figure 4-4: Frontline Abstraction and Relief Rates***WAST Abstractions***

Reason	Rate
Annual Leave	12.66%
Bank Holidays	3.07%
Sickness	5.99%
Alternative Duties	3.00%
Training	3.00%
Maternity	1.20%
Other	1.00%
Total	29.91%
Relif Rate	42.67%

Relief Rate Benchmarking

Trust	Frontline Relief Rate
A	37.0%
B	38.5%
C	38.9%
WAST	42.7%
D	43.3%
E	46.2%
F	47.4%

- 4.32 An alternative approach is to base the calculation on total staff including relief staff; if the abstraction rate is 25%, then 25% of the total staff will be relief staff.

Operations

- 4.33 WAST's 2018/19 relief rate for all staff members was 49.4% (see Appendix **G2**). Benchmarking this against other ambulance services ORH has worked with showed that WAST's relief rate was the highest. Analysing this for Paramedic, Emergency Medical Technician (EMT) and Urgent Care Assistant (UCA) staff not in training produces a relief rate of 46.1%.
- 4.34 WAST proposed a more efficient abstraction rate which included a reduced sickness rate of 5.99%; the proposed abstraction rate was 29.91%, producing a relief rate of 42.67% (see Appendix **G3** and Figure **4-4**). Recalculating the benchmarking with this relief rate showed that this would be average for the sector.
- 4.35 A comparison to the ambulance service with the lowest abstraction rate, Trust A at 27%, showed similar sickness levels but lower levels of training and 'other' leave categories (see Appendix **G4**).
- 4.36 WAST also provides one hour of Continuing Professional Development (CPD) per week to staff, removed at source rather than included in the abstraction data. This means that, when calculating FTE in WAST, a 36.5-hour working week was used.
- 4.37 In the modelling scenarios (see Section 7) FTEs were calculated using three abstraction/relief rate and working week combinations:
- WAST proposed: 29.9% abstraction rate and 36.5-hour working week
 - Trust A abstraction: 27% abstraction rate and 36.5-hour working week
 - Trust A abstraction and working week: 27% abstraction rate and 37.5-hour working week

Clinical Contact Centres (CCCs)

- 4.38 WAST's 2018/19 abstraction rate for allocators, dispatchers, call handlers and clinicians was 35.1%, requiring a relief rate of 54.0%. This is the highest relief rate for ambulance services ORH has worked with recently (see Appendix **G5**).
- 4.39 WAST proposed a more efficient abstraction rate which included a reduced sickness rate of 5.99%; the proposed abstraction rate was 30.7%, producing a relief rate of 44.3%. The proposed rate would be average for the sector.
- 4.40 In the CCC modelling scenarios (see Section 8), FTEs were calculated using the proposed 44.3% relief rate and a 37.5-hour working week.

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5 Demand Projections

ORH used an age/gender-based demand projection method to create future demand scenarios. This involves analysing historical demand rates per 1,000 population, forecasting this forward and combining it with projected population figures.

Observations can be made about the historical demand and population information:

- In 2012 there were 346.7 ambulance calls per year per 1,000 people aged 65+; this increased to 385 in 2018 and is projected to reach 443 in 2025.
- The population:age profile across Wales is typical of an ageing population; the population aged 65+ is predicted to increase by 13% from 2018 to 2025.
- Total population is predicted to increase by 1.6% across Wales from 2018 to 2025; this rate is highest in Cardiff and Vale HB at 5.1%.

Combining the population projections and trended future demand rates per 1,000 produced a 2.5% year-on-year increase in demand across Wales on average.

ORH also used a Holt-Winters statistical time series forecasting method to produce an alternative year-on-year average of 2.3%.

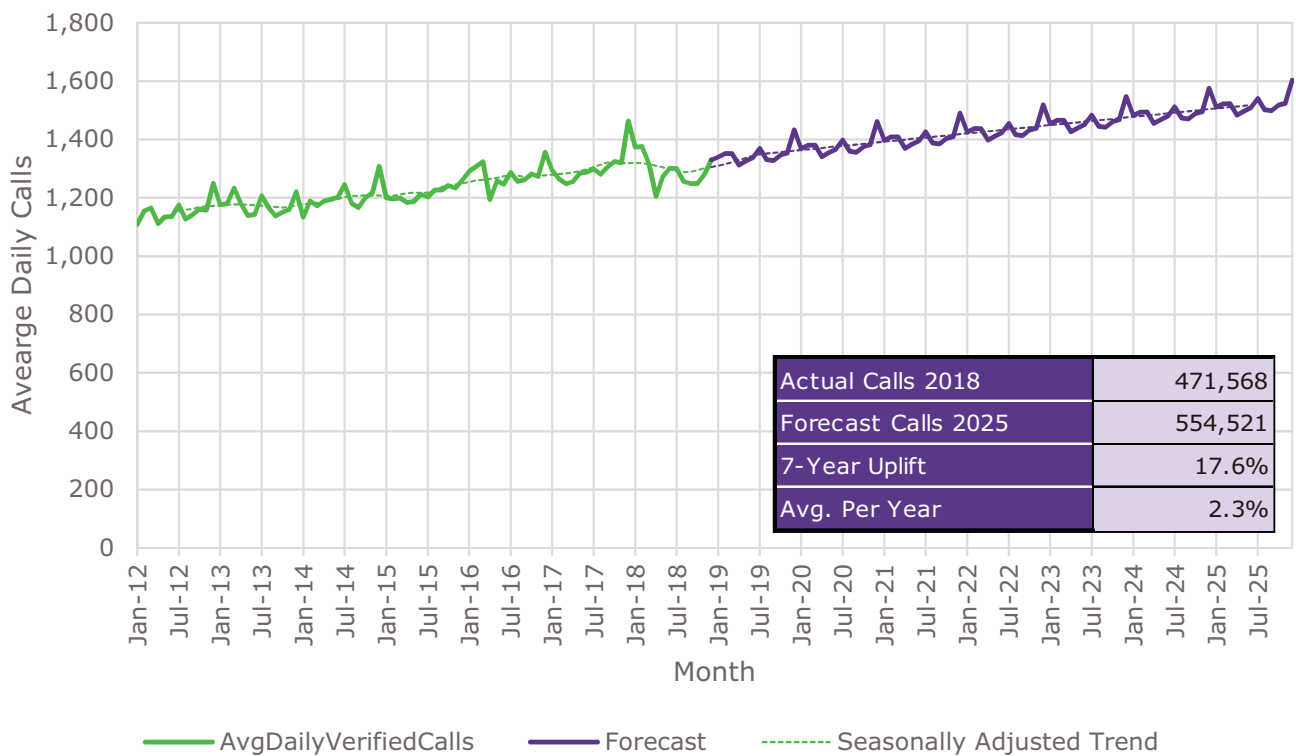
Historically, average annual demand growth across WAST from 2012 to 2018 was 2.1%.

The 2.3% demand increase was chosen as the core scenario by the Steering Group, with 2.1% and 2.5% being used for the sensitivity scenarios.

-
- 5.1 ORH analysed historical 'verified call' counts by age group and gender from 2012 to 2018 and combined these with historical population estimates from the Office for National Statistics (ONS). This enabled the calculation of demand rates per head of population by year, age group, gender and Health Board.
 - 5.2 The demand rate per head of population increased between 2012 and 2018 for three of the five age groups (see Appendix **H1**); for example, in 2012 there were 346.7 requests for ambulance assistance per 1,000 people aged 65+, increasing to 385 in 2018. The trend by age group was projected to continue through to 2025; for example, the 65+ age group projection is for 443 requests for ambulance assistance per 1,000 people per year in 2025.
 - 5.3 The population:age profile across Wales is also projected to change and is typical of an ageing population; the population aged 65+ is predicted to increase by 13% across Wales from 2018 to 2025, and by as much as 17% in Cardiff and Vale HB.

Figure 5-1: Demand Projections**Age/Gender Demand Projection**

	ABM	Bevan	Betsi	CV	CT	HD	Powys	All HBs
2018 Incidents	76,964	83,391	121,040	67,057	43,727	56,972	19,953	469,104
2025 Forecast	96,291	94,897	143,249	77,647	49,813	69,351	24,813	556,062
Increase over 7 years	25.1%	13.8%	18.3%	15.8%	13.9%	21.7%	24.4%	18.5%
Increase per year	3.3%	1.9%	2.4%	2.1%	1.9%	2.8%	3.2%	2.5%

Holt-Winters Forecasting (Avg Daily Calls)

- 5.4 Total population is predicted to increase by 1.6% across Wales from 2018 to 2025, with a 5.1% increase in Cardiff and Vale HB.
- 5.5 The 2025 population by age group, gender and Health Board was combined with the forecasted demand rates to produce an overall demand level by Health Board (see Figure **5-1**). There is a projected 2.5% year-on-year increase in demand across Wales; the largest increase is 3.3% in Abertawe Bro Morgannwg HB. Since 1 April 2019 the Health Boards in this area have been reconfigured to create Swansea Bay; this study continues reporting at Abertawe Bro Morgannwg HB level to mirror WAST's reporting during the sample period.
- 5.6 ORH also used a Holt-Winters seasonally-adjusted statistical projection method to provide an alternative future demand level. This method uses historical verified call counts by month and places greater emphasis on more recent trends when projecting future volumes. The Holt-Winters method produced a 2.3% year-on-year growth rate (see Appendix **H2**).
- 5.7 The average annual growth rate observed across WAST from 2012 to 2018 was 2.1%. The Steering Group agreed that the 2.3% demand increase should be used as the core projection, with 2.1% and 2.5% projections being incorporated into the sensitivity modelling.
- 5.8 The demand projections were undertaken at 'verified call' level to enable different Hear and Treat rates to be modelled from this position, and this affects the responded demand rate.

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6 Model Setup

ORH's bespoke ambulance simulation model, AmbSim, was set up based on analysed WAST workload and resourcing data for 2018/19.

AmbSim simulates the entire life cycle of emergency incidents, from the incident occurring through to transporting the patient to an appropriate hospital where necessary.

A careful calibration process was undertaken to ensure that the model replicated actual operations and performance as closely as possible.

Similar call handling and clinical triage simulation models were set up to model the future call handler and clinician requirements.

Operations

- 6.1 ORH has developed a bespoke ambulance simulation model, AmbSim (see Appendix **I1**).
- 6.2 AmbSim simulates the entire life cycle of emergency incidents, from generating the incident in-line with demand patterns, sending an appropriate response(s), spending time on scene, to potentially transporting patients to an appropriate hospital. Millions of incidents are generated and responded to during an individual simulation 'run'.
- 6.3 AmbSim was set up to replicate WAST operations. To achieve this, analysis of key parameters, including temporal and geographical demand patterns, components of the call cycle such as time at scene, and individual vehicle shift data, were imported. Geographical data, such as the underlying road network, station and hospital locations, and operational policies such as meal break rules and dispatch protocols, were also loaded into AmbSim.
- 6.4 The model was calibrated to replicate WAST operations and performance during the 2018/19 sample period as closely as possible. Performance modelling is targeted at a monthly achievement. To ensure this was possible with a single set of annual rosters, the modelling focused on December 2018, 2021 and 2024 (December being the highest demand month). The model showed a close match for all analysed parameters, including response times by Health Board and time of day (see Appendix **I2**).

Clinical Contact Centres (CCCs)

- 6.5 ORH's call handling simulation model was set up and calibrated against the calls answered and call answering performance achieved for the period November 2018 to March 2019, the period after the new rosters were introduced.
- 6.6 Once validated, the model was rebased to the calls that should have been answered by adding calls which were abandoned and those which should have been received in the Central and West HB Emergency Services line. This produced a more representative picture of the call handler workload.

Figure 6-1: Agreed Response Performance Modelling Parameters

Response Parameter	Pan Wales	By HB	Period	Comments
Red 8-minute	70%	65%	Monthly	<ul style="list-style-type: none"> With expectation of continuous improvement. Parameters are minimum.
Red 90th	15 mins	-	Monthly	<ul style="list-style-type: none"> As per English Ambulance Response Programme (ARP). Report HB level performance once pan-Wales parameter is achieved. Improve distribution curve.
Amber 1 (first on scene)	18 mins	-	Monthly	<ul style="list-style-type: none"> As per English ARP. Hybrid standard (as per ARP): 18 minutes if not conveyed, 18 minutes for conveying resource if conveyance required. Model first on scene as per EASC Ambulance Quality Indicators (ASIs).
Amber 1 90th (first on scene)	40 mins	-	Monthly	<ul style="list-style-type: none"> As per English ARP. Report HB level performance once pan-Wales parameter is achieved. Improve distribution curve. Hybrid standard. Model first on scene as per EASC AQIs.

Note: these parameters are for the response element only, and not CCC.

- 6.7 A clinical triage model was set up to simulate the secondary triage function of the CSD and NHSD, with inputs to the model being derived from historical analysis of operations in 2018/19. No other clinical functions were included.
- 6.8 Dispatch desk models were set up and fed with historical analysis of vehicle assignments, vehicle deployments and patient flows. These were mapped to the 11 dispatch divisions as currently configured.

Agreeing the Response Performance Parameters

- 6.9 In order to quantify future resourcing requirements, an agreement was required on the performance parameters to be used in the modelling. At the time of writing, WAST aims to respond to 70% of Red calls within 8 minutes across Wales. Amber and Green call performance is monitored but there is no formal standard.
- 6.10 ORH benchmarked the performance standards monitored by some of its ambulance service clients in the UK. A clinical sub-group decided that the modelling for this review should aim for the parameters shown in Figure **6-1**.
- 6.11 These parameters include greater emphasis on transporting resource arrival through the use of the 'hybrid' standard, in which the transporting resource stops the clock if transport is required for the Amber categories. This will mean that Amber performance is more visible, which aligns with the aims of the Amber Review.
- 6.12 There was also an initial aim for 95% of incidents to receive the 'ideal' first response according to WAST's 'ideal or suitable' response matrix. However, the Steering Group noted that this was predicated on the existing resource mix which was likely to change through the outcomes of the review, and therefore would not be possible to monitor.

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7 Operational Scenario Modelling

AmbSim was used to model the scenarios required for the objectives of the review. The key conclusions can be summarised as follows:

- There is a 'relief gap' of 262.5 FTE when comparing WAST's budgeted establishment and the requirement to run the current planned rosters assuming the more efficient 42.67% relief rate.
- If demand were to increase by 2.3% per annum, without any other changes to resources or operational parameters, the Amber 1 90th percentile in Wales in December 2024 would be 5h40m compared to the agreed performance parameter of 40m.
- To meet the agreed performance parameters with no operational efficiencies in December 2024 would require 2,150 FTE, representing an increase of 675 FTE from the budgeted position.
- Re-rostering frontline staff in this position equated to an efficiency of 72 FTE.
- Increasing the Hear and Treat rate to 10.2% from 8% created an efficiency of 45 FTE.
- The modelling of APPs in optimal locations targeted at a specific codeset to reduce the chance of conveyance resulted in an 11 FTE efficiency. There are also benefits for the patient and the wider healthcare system.
- A total of 2,037 FTE are required in the Final December 2024 position to meet the agreed performance parameters.

The 'Relief Gap'

- 7.1 AmbSim was set up in the first instance to model the actual resourcing deployed by WAST in 2018/19, taking account of any dropped shifts and overtime.
- 7.2 To model a representative future position, the model was then loaded with planned shifts (those that WAST plans to deploy on an average week). The planned shifts comprise 48,366 average staff hours per week in total, compared to an actual 2018/19 deployment of 44,326 staff hours (91.6% unit hour production or a dropped shift rate of 8.4%).
- 7.3 A major component of this difference is that the planned roster is predicated on a lower relief rate to that experienced by WAST in 2018/19; that is, for a given number of FTE there is a lower number of on-the-road hours in reality compared to the plan.
- 7.4 WAST's analysed relief rate for qualified Paramedics, EMTs and UCAs in 2018/19 was 46.1%. The Steering Group was provided with abstraction and relief rate benchmarking. WAST proposed a 42.67% relief rate, and that this

Figure 7-1: Staffing Relief Gap**Staff Requirement for Planned Shifts - including Relief By Grade**

Staff Grade	BCU	ABM	HD	CT	CV	AB	Powys	Total
Para (inc. EMT3)	228.3	125.6	134.7	77.4	84.2	166.4	71.4	887.8
Tech	160.3	82.6	102.2	43.5	51.3	86.7	55.8	582.3
UCA	48.0	32.7	24.7	31.5	22.4	38.2	22.6	220.1
Total	436.5	240.9	261.6	152.4	157.8	291.3	149.8	1690.3

Budgeted Staffing - including Relief By Grade - EMT3 as Para

Staff Grade	BCU	ABM	HD	CT	CV	AB	Powys	Total
Para (inc. EMT3)	199.4	136.3	145.0	75.9	90.5	145.0	65.5	857.6
Tech	114.8	44.0	54.0	19.1	39.9	61.0	39.5	372.3
UCA	49.0	33.0	23.0	29.0	18.9	31.0	14.0	198.0
Total	363.2	213.3	222.0	124.0	149.3	237.0	119.0	1427.8

Difference in Staffing

Vehicle Type	BCU	ABM	HD	CT	CV	AB	Powys	Total
Para (inc. EMT3)	-28.8	10.7	10.3	-1.5	6.4	-21.4	-5.9	-30.3
Tech	-45.5	-38.6	-48.2	-24.3	-11.4	-25.7	-16.3	-210.0
UCA	1.0	0.3	-1.7	-2.5	-3.5	-7.2	-8.6	-22.2
Total	-73.3	-27.6	-39.6	-28.4	-8.5	-54.3	-30.8	-262.5

% Difference

Vehicle Type	BCU	ABM	HD	CT	CV	AB	Powys	Total
Para (inc. EMT3)	-12.6%	8.5%	7.7%	-2.0%	7.6%	-12.9%	-8.2%	-3.4%
Tech	-28.4%	-46.7%	-47.2%	-56.0%	-22.2%	-29.6%	-29.2%	-36.1%
UCA	2.2%	0.9%	-6.8%	-8.0%	-15.5%	-18.9%	-38.0%	-10.1%
Total	-16.8%	-11.5%	-15.1%	-18.6%	-5.4%	-18.6%	-20.6%	-15.5%

should be used for the core results while also calculating FTE using two other methods (see 'Abstraction and Relief Rates' in Section 4).

- 7.5 Assuming this more efficient 42.67% relief rate across staff on EAs, RRVs and UCS vehicles, there is still a relief gap; the planned rosters with the efficient relief rate require 1,690.3 FTE to run, whereas WAST has a budgeted establishment of 1,427.8 FTE (see Figure **7-1**).
- 7.6 The budgeted establishment including APP and Clinical Team Leader (CTL) staff is 1,604.3 FTE.

'Do Nothing' Scenarios

- 7.7 In order to create representative base positions with no changes to operations or parameters other than increases in demand, 'do nothing' scenarios were modelled for December 2018 and December 2024.
- 7.8 From these positions, resources were added until the agreed response performance parameters were met. This is the cost required to meet these parameters without any operational efficiencies.

December 2018

- 7.9 The model was loaded with planned shifts (equivalent to the 1,690.3 FTE above) and December 2018 demand levels. Red 8-minute response performance was 77.3% across Wales (against a standard of 70%), and each Health Board was at 65% or above; however, the Amber1 mean was 35m43s against an 18-minute agreed parameter (see Appendix **J1a**).
- 7.10 Resources were then added into the model, on top of the planned shifts until the response performance parameters were met. With additional resources the Amber1 mean was 17m38s and the 90th percentile was 35m15s; the response time 'tails' were greatly reduced.
- 7.11 The additional resources are predominantly EAs as these can attend all calls and will always stop the clock for the Amber 'hybrid' measure. The total staffing requirement to meet the agreed parameters for modelling in this scenario is 2,039.0 FTE (see Appendix **J1b**).
- 7.12 Red 8-minute performance in this position is 82.1%; all CTLs (operating as RRVs) could be removed from frontline duties, with only 154 additional EA hours per week being required to ensure that the agreed modelled response times are still met. This effectively reduces the total frontline requirement to 1,955.0 FTE.

December 2024

- 7.13 In order to create an appropriate future base position with no changes to operations, the model was loaded with December 2024 demand (based on 2.3% growth per annum). Operating the 2018/19 planned shifts with no additional resources would see performance significantly deteriorate; the Amber1 90th percentile would be 5h40m.
- 7.14 The resource levels that enabled the agreed response parameters to be met in December 2018 were loaded into AmbSim and more resources were

Figure 7-2: Staffing Requirements by Efficiency***WAST Staffing Requirements***

Position	FTE	Impact
Add to Planned Shifts, No CTLs, December 24	2,150	-
Re-roster, No CTLs, December 24	2,078	-72
Increase Hear and Treat to 10%	2,105	-45
Optimal APP Locations	2,139	-11

deployed to ensure that response time did not fall in 2024. The total staffing requirement in December 2024 is therefore 2,150.0 FTE, assuming that CTLs are 0% operational.

Efficiency Modelling

- 7.15 Internal and external benchmarking (see Section 4) involved identifying potential efficiencies for testing within the model. It was noted that for the majority of WAST-controllable parameters, WAST generally benchmarks favourably against other ambulance services.
- 7.16 Following discussions with the Steering Group, it was decided that the efficient scenario should be based on the following parameters:
- Re-rostering staff:
 - Shift lengths between 8 and 12 hours.
 - No shift to start before 06:00 or after 23:00; if a 23:00 start, then a maximum shift length of 9 hours.
 - Model assumes current meal break policy.
 - Stations not required to be covered 24/7 if feasible.
 - Hear and Treat rate to increase from 8% to 10.2%.
 - Use of APPs at the most beneficial locations.
 - Efficient 42.67% relief rate.
- 7.17 All other operational parameters were kept as analysed during the sample period.

Re-rostering

- 7.18 The process involved creating shift patterns from scratch in AmbSim to best match demand patterns by location, time of day and day of week. It was noted that some re-rostering had taken place in Aneurin Bevan and Cwm Taf HBs based on outputs from the previous ORH review in 2016/17.
- 7.19 The modelling focused on meeting the response performance parameters (see 'Agreeing the Response Performance Parameters' in Section 6). This led to a relative increase in the transporting resource to solo responder ratio compared to planned shifts (2.5:1 to 7.2:1) as the Amber 1 performance parameters used the 'hybrid' measure which places greater emphasis on transporting resource. This differs to the current regime at time of writing, where only the Red 8-minute performance has a set standard, which is more suitable for solo responders to attend.
- 7.20 Re-rostering in December 2024 reduced the total frontline requirement to 2,078.0 FTE, down from 2,150.0 FTE, when adding resources to planned shifts (see Figure **7-2**).

Figure 7-3: Final December 2024 Position

Final December 24 Position: Resourcing

Area	Average Weekly Vehicle Hours					Staff Hours	FTE
	EA	RRV	UCS	APP	Overall		
WAST	22,234	1,706	3,314	1,820	29,074	54,622	2,037

Final December 24 Position: Performance

Area	Red	Red	Amber 1	Amber 2	Red	Amber 1	Amber 2
	8	Mean			90th Percentile		
ABM HB	82.0%	04:42	17:45	30:01	09:39	36:15	52:09
Aneurin Bevan HB	70.5%	06:17	19:30	36:29	13:13	38:08	57:52
Betsi HB	75.3%	05:26	17:39	31:18	11:25	36:20	56:25
Cardiff & Vale HB	77.7%	05:33	17:53	37:31	10:56	32:47	55:27
Cwm Taf HB	65.4%	06:54	16:52	27:07	13:31	31:45	39:09
Hywel Dda HB	67.3%	06:35	16:52	19:46	14:48	34:03	32:03
Powys HB	70.8%	05:53	14:55	16:03	14:43	31:02	26:42
Wales-wide	74.2%	05:44	17:42	29:44	12:01	35:12	49:09

Final December 24 Position: Utilisation

CCC Area	EA	RRV	UCS
Central & West	40.9%	28.2%	44.6%
North	47.9%	28.8%	49.5%
South East	52.1%	29.8%	44.2%
Overall	46.2%	29.1%	45.4%

Hear and Treat

- 7.21 The Hear and Treat rate was updated in the model from 8% to 10.2% based on the benchmarking (see 'Hear and Treat Rates' in Section 4).
- 7.22 By making this change, there were fewer incidents requiring a vehicle response in the model. This increased resource availability and therefore improved response performance.
- 7.23 It was then possible to remove shifts from the model to restore performance to base position levels; the equivalent of 45 FTE could be removed.

Advanced Paramedic Practitioners

- 7.24 ORH were provided with an APP-suitable codeset based on the trial in Betsi Cadwaladr HB. This included AMPDS prefixes 06, 17, 26 and 31.
- 7.25 The volume of calls contained within the codeset accounted for 37% of responded demand. ORH were asked to model a 30% reduction in the conveyance rate if an APP attended an APP-suitable call.
- 7.26 APPs were added at 14 locations with a minimum utilisation threshold of 50% across the week to ensure that the locations and times were beneficial. A total of 1,820 weekly APP staff hours were added into the model.
- 7.27 Fewer transports to hospital were required due to the effect of APPs reducing the conveyance rate when they attend a suitable call. This led to a reduction in EA utilisation, meaning that it was possible to remove 2,100 EA staff hours and maintain base position performance. This is equivalent to an 11.0 FTE efficiency.
- 7.28 The use of APPs is beneficial to the patient as they can receive care which is more appropriate for their condition due to the increased skillset of an APP. There is also a benefit for the wider healthcare system of a reduced level of conveyance to hospital.

Core Scenarios***Final December 2024 Position***

- 7.29 The final December 2024 scenario incorporated a 10.2% Hear and Treat rate and the 14 identified APP locations; it also assumed a 42.67% relief rate and that CTLs are frontline operational for 0% of their time. Vehicles were re-rostered to best match demand patterns by time of day, location and suitability to the type of vehicle.
- 7.30 A total of 2,037.0 FTE were required to meet the agreed response performance parameters, representing an increase of 562.2 FTE from the budgeted position (see Figure **7-3**).
- 7.31 If Trust A's relief rate was used (36.99%), this changes the total FTE requirement to 1,956 FTE assuming a 36.5-hour working week. If this relief rate was used alongside a 37.5-hour working week, the requirement would be for 1,904 FTE.

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- 7.32 Peak deployed EAs increased from 123 in the planned resourcing to 163 in the re-rostered position. Peak RRVs decreased from 69 to 18, moving WAST to a more ambulance-heavy model which is geared towards meeting the hybrid Amber measures.
- 7.33 Each Health Board meets the agreed response performance parameter of 65% in 8-minutes for Red calls. Abertawe Bro Morgannwg HB is the highest performing HB at 82.0% whilst Cwm Taf HB is the lowest at 65.4%. The Amber 1 mean is 17m42s against an agreed parameter of 18m00s; all bar one Health Board (Aneurin Bevan) meet this parameter. All Health Boards meet the 40m00s 90th percentile parameter for Amber 1 calls.
- 7.34 EA utilisation by area is at 40.9% in Central & West, 47.9% in North and 52.1% in South East, averaged across the week. This compares to 2018/19 analysed values of 50.8%, 60.6% and 70.6% respectively.

December 2021 Position

- 7.35 ORH were asked to model an interim step in December 2021, re-rostering the staff hours in the core planned rosters (equivalent to 1,691.0 FTE). This position assumed that the equivalent of 130 CTL FTE were 30% available for operational response.
- 7.36 The objective of this modelling was to maximise performance while ensuring that no Health Board had Red 8-minute response performance below 65%.
- 7.37 Red performance degraded compared to the planned roster position, but the increased availability of EAs significantly improved response times for the lower acuity patients. The Amber1 90th percentile improved from 2h03m to 1h18m, though this still exceeds the performance parameter of 40m (see Appendix J2).
- 7.38 EA utilisation by area is at 49.1% in Central & West, 50.6% in North and 56.4% in South East, averaged across the week. This compares to 49.3%, 53.1% and 61.3% using planned shifts in 2021.

Sensitivity Modelling

Increasing the Hear and Treat Rate

- 7.39 The core scenarios used a 10.2% Hear and Treat rate, which provided a 45 FTE efficiency compared to the analysed 8% rate.
- 7.40 Increasing this rate further to 15% resulted in a further increase in resource availability, therefore leading to improved response performance.
- 7.41 A further 80 FTE were removed (a total of 125 FTE) and core scenario performance was maintained.

Estates Locations

- 7.42 ORH used its optimisation model, OGRE, to identify the optimal estate configuration across Wales. This was undertaken in a 'blank canvas' scenario which takes no account of current station locations or other

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constraints, effectively producing the ideal station configuration from scratch.

- 7.43 This modelling, although hypothetical, is often used to identify where there are differences to the existing estate configuration and therefore could be opportunity to improve coverage.
- 7.44 The majority of existing WAST stations are closely aligned to the optimal configuration (see Appendix **J3**). There are however differences in certain areas; for example, a reconfiguration of station locations in Cardiff.
- 7.45 Given the increase in resourcing required to meet agreed response performance parameters as outlined in this report, a separate full estates review is suggested to incorporate station location optimisation alongside other considerations such as the required capacity and function of different sites across Wales.

Unscheduled Care System Efficiencies

- 7.46 The arrival at hospital to handover times in WAST are among the longest benchmarked by ORH (see Section 4).
- 7.47 ORH were asked to model two hospital handover scenarios:
 - Updating handover delays by facility to reflect the difference between April to October 2018 and April to October 2019, creating projected 2019/20 financial year figures.
 - Modelling a 15-minute average arrival to handover at every facility across Wales.

2019/20 Handover Delays

- 7.48 ORH were provided with monthly handover hours lost and transported patient numbers by facility for April to October 2019. This was compared to April to October 2018 from the main sample. No data was provided for Powys HB.
- 7.49 The handover hours lost were calculated as the sum of hours over 15 minutes. When divided by the number of transported patients, this provided the number of hours lost over 15 minutes per patient on average. Adding 15 minutes to these times created the average handover time per patient.
- 7.50 Displaying the average handover time by month and facility shows that five hospitals exhibit notable increases from April 2018 through to October 2019 (see Appendix **J4a-i**).
- 7.51 Morriston, Princess of Wales Bridgend and Royal Gwent Newport Hospitals experienced increases in average handover time during the winter of 2018/19, but levels did not decrease throughout the remainder of 2019. There was a step-change in average handover times at Glan Clwyd Hospital in July 2019. Average handover times at Bronglais General Hospital showed an upward trend throughout the period.
- 7.52 These figures can also be articulated in terms of 'handover hours lost'; this is the sum of handover time over 15 minutes (see Appendix **J4a-ii**). This

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takes into account the volume of patients attending each facility. The main difference between this and the previous graph is that the handover hours lost for Princess of Wales Bridgend are lower than Morriston or Royal Gwent, due to the differences in the number of patients received.

- 7.53 Only two hospitals have lower projected average handover times in 2019/20 compared to 2018/19; Llandough and Maelor General (see Appendix **J4b-i**). Handover times at Maelor General Hospital are projected to decrease by 16m43s, from 37m30s to 20m47s (a 45% decrease). The WAST average handover time is projected to increase from 31m37s to 41m27s.
- 7.54 The general ranking of handover times by facility does not drastically change from 2018/19 to 2019/20; the three hospitals with the highest handover times are Princess of Wales, Morriston and Royal Gwent. The improvements at Maelor General Hospital move it from fourth to fourteenth in the ranking.
- 7.55 Morriston Hospital has the highest level of handover hours lost in both years, increasing from 11,745 hours in 2018/19 to 30,311 projected for 2019/20 (see Appendix **J4b-ii**).
- 7.56 The handover times were updated in the model using the final December 2024 scenario. With no other changes to operations, Red 8-minute response performance would degrade from 75.4% to 70.2%, and the Amber 1 90th percentile would degrade by 19m45s (see Appendix **J4c**). None of the agreed response performance parameters would be met with the same level of resourcing.
- 7.57 Shifts were added into the model at the locations with the largest changes in utilisation (those which generally transport to the most affected hospitals). A total of 177 additional FTE were required to mitigate the performance changes assuming a 42.67% relief rate (see Appendix **J4d**).
- 7.58 The majority of resources were required in Central and West CCC as the two largest increases were modelled in this area (Morriston and Princess of Wales Hospitals). Morriston accounts for the largest required increase in FTE when measuring the nearest hospital to each station, though there is overlap with other hospitals as the changes in handover times were not modelled individually by hospital. No additional resources were required in Betsi Cadwaladr HB, as the increases at Glan Clwyd HB and Gwynedd Bangor HB were offset by the improvements at Maelor General Hospital.

Average Arrival to Handover of 15 Minutes

- 7.59 The Steering Group requested that an improved scenario be modelled where each facility had an average arrival to handover of 15 minutes. The average handover to clear at each facility was maintained, therefore this scenario represents a 16m37s improvement compared to the 2018/19 position (WAST average 31m37s).
- 7.60 Modelling this change resulted in a 2.8% improvement in Red 8-minute response performance compared to the final December 2024 position (see Appendix **J5a**). The Amber 1 90th percentile improved by 8m50s.
- 7.61 Resources were removed from this position to restore performance to the final December 2024 position levels. A total of 183 FTE were removed; this

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is effectively the staffing cost to the ambulance service for hospitals exceeding the 15-minute handover guidance value (see Appendix **J5b**).

- 7.62 The level of resourcing removed is not significantly larger than the requirement for additional resourcing should handover times follow 2019/20 year-to-date levels, despite a larger change in the time at hospital. This is in line with ORH's experience of working with other ambulance services.

Planned Service Changes

- 7.63 A clinical sub-group was formed in order to give ORH the necessary guidance on which planned hospital reconfigurations are material and have reasonably defined likely outcomes. This list is not extensive and the scenarios for these transformation plans are not finalised; further modelling in addition to this review may be required in the future.
- 7.64 ORH were advised to model the following changes:
- Opening of The Grange University Hospital.
 - Obstetrics reconfiguration in South East CCC.
 - Vascular surgery changes in South East and North CCCs.
 - Major Trauma Network in South East CCC.
 - Reconfiguration of services at Royal Glamorgan in line with the South Wales Programme.
- 7.65 All modelling in this section is undertaken in the efficient December 2024 demand scenario with sufficient staffing to meet the agreed modelling response parameters (2,037 frontline operational staff)

The Grange University Hospital

- 7.66 The Grange University Hospital in Aneurin Bevan HB is due to open in 2021. ORH were asked to model the likely impact of this on the ambulance service based on the most up-to-date assumptions at the time.
- 7.67 ORH were advised that 999 calls in Aneurin Bevan HB would travel to their nearest hospital, with the exception of Royal Gwent (RGH), Nevill Hall (NHH) and Ysbyty Ystrad Fawr (YYF). Patients previously in these catchments would now travel to Prince Charles Merthyr, University Hospital of Wales or The Grange University Hospital.
- 7.68 The assumption was made that there will also be additional journeys incurred as part of the change. These are as follows:
- 42 step-ups per day (total) from RGH, NHH and YYF to be undertaken by EMS/UCS crews, occurring from 08:00-18:00.
 - 39 step-downs per day (total) to RGH, NHH and YYF to be undertaken by UCS/PTS crews (assumed to be UCS in AmbSim).
- 7.69 These transfers were divided between the three hospitals in line with their existing levels of patient flow.

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- 7.70 The Grange University Hospital was modelled with the average time at hospital of the three hospitals in Aneurin Bevan HB.
- 7.71 ORH modelled this using a staged approach; first opening the new hospital and diverting existing patients, and then introducing the additional patient transfers. All modelling was undertaken with December 2024 demand levels and staffing to meet the agreed response parameters.
- 7.72 Diverting 999 patients to The Grange University Hospital or their next nearest hospital (with RGH, NHH and YYF closed to these patients) increased the average job cycle time for all patients across South East CCC by 1m26s. This is equivalent to approximately 70 more utilised hours per week.
- 7.73 The 42 step-ups and 39 step-downs per day are equivalent to 567 additional patient journeys per week. This was equivalent to an 18% increase in responded demand in South East CCC, and a 25% increase in conveyed patients. Assuming an average conveyed job cycle time of 1h46m, this is equivalent to approximately 1,000 more utilised hours per week.
- 7.74 Modelling the diversion of existing patients and the additional journeys increases the Amber 1 90th percentile across South East CCC from 35m16s to 2h35m12s (see Appendix **K1a**). Red 8-minute performance in Aneurin Bevan HB decreases from 71.3% to 56.7% against an agreed parameter of 65%.
- 7.75 EA utilisation increases from 54.2% in the base position to 63.8% when the changes are introduced. UCS utilisation increases from 42.7% to 60.7%.
- 7.76 To restore performance to base position levels, a total of 121 additional FTE are required, divided across EA and UCS crews (see Appendix **K1b**). This represents a 17% uplift in staffing compared to the 25% increase in conveyed patients.

South East Obstetrics

- 7.77 ORH were advised that all Cwm Taf AMPDS code 24 obstetric patients would no longer travel to Royal Glamorgan Hospital but instead be taken to Prince Charles or Princess of Wales Hospitals.
- 7.78 On average there were 0.6 code 24 patients per day in Cwm Taf HB in the sample period. This accounts for 6% of Cwm Taf Red calls and 0.4% of Amber and Green calls.
- 7.79 This change was modelled in AmbSim, but due to the relatively small patient numbers there was minimal performance impact and therefore negligible additional resource requirement.

South East Vascular Surgery

- 7.80 There is a proposed reconfiguration of vascular services in South East CCC which will result in additional journeys being undertaken by EA and UCS crews (see Appendix **K2**).
- 7.81 These journeys total two additional patient journeys per day, which is a 0.4% demand increase in South East CCC.

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- 7.82 To mitigate the performance degradation associated with this increased journey demand, one additional 24/7 UCS crew at Blackweir is required.

Major Trauma Network

- 7.83 ORH were provided with information on the number of patients who would be directly transferred to the Major Trauma Centre (MTC) at University Hospital of Wales (UHW) instead of their previous destination, and numbers of additional patient journeys transferring from Trauma Units (TUs) to the MTC.
- 7.84 The additional TU to MTC journey demand was equivalent to 0.5 patients per day on average.
- 7.85 Implementing this change in AmbSim produced negligible performance impact, and in Cardiff and Vale HB performance improved as more resources were posting clear at UHW.

Change of Services Provided at Royal Glamorgan Hospital

- 7.86 There may be potential changes to services provided at Royal Glamorgan Hospital in 2020.
- 7.87 The changes were made in AmbSim, with patients being diverted to the next nearest suitable hospital.
- 7.88 An additional 376 EA hours (756 staff hours) were required to restore base position performance.

North Vascular Surgery

- 7.89 Complex vascular surgery is due to be centralised in Glan Clwyd HB along with implementation of a hybrid theatre.
- 7.90 Currently, approximately 500 vascular cases per year are transported to Gwynedd, Wrexham Maelor and Glan Clwyd HBs; in future these will all be diverted to Glan Clwyd HB.
- 7.91 This equates to approximately 0.5 patients per day from each of Gwynedd and Wrexham Maelor HBs being diverted to Glan Clwyd HB.
- 7.92 This change was made in AmbSim, but due to the small patient numbers there was minimal impact for response performance and negligible additional resource requirement.

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8 Clinical Contact Centre Modelling

ORH appraised the staffing capacity of the call handling, clinical triage assessment (CTA) and dispatch functions within the three CCCs.

There is a 'relief gap' of 10.3 FTE in the CCCs when comparing WAST's budgeted establishment and the requirement to run the planned rosters assuming the more efficient 44.3% relief rate.

ORH assessed the new call handler rosters, introduced in 2018, against the requirement to deliver 95% of calls answered in 5 seconds and 85% of calls answered in their home CCC in 2024. Two efficiencies were agreed for inclusion: a reduction in duplicate calls and a return to 2018 call durations.

With efficiencies achieved targets can be met with the planned rosters, plus 21-hour adjustment, therefore requiring a total of 106.4 FTE. This staffing level would also provide sufficient capacity for undertaking welfare calls.

ORH optimised CTA staff numbers to maximise the current CSD and NHSD codesets (8% Hear and Treat) and maximise an expanded CSD codeset based on benchmarked data (10.2% Hear and Treat) in December 2024.

To maximise the current codesets will require 29.9 FTE CSD staff and 26.7 FTE NHSD staff, increasing to 43.0 FTE CSD staff for the expanded codeset.

ORH developed a new dispatch desk configuration, based on the vehicle deployment and workload from the 'Final December 2024' position, which better equalised workload and minimised patient flows between desks.

It is proposed that WAST operates 11 EA/RRV desks in the day and evening periods, supplemented with 2 HCP desks and 1 APP desk. At night, lower workload and vehicle numbers could allow for a reduction to 7 desks.

By 2024 the combination of a number of factors will achieve a level of workload on each desk that can be managed by a single allocator without the reliance on a dispatcher. These factors include a reduction in radio communications, the introduction of auto-allocation to Red calls, the reconfiguration of dispatch desks and a more simplified dispatch process.

To staff these desks will require 87.6 FTE if EA/RRV desks are reduced at night, increasing to 93.0 FTE if they are covered 24/7. A total of 4.8 APPs are required to staff the APP desk.

8.1 ORH appraised the staffing capacity of the three core CCC functions:

- Call handling
- Clinical triage assessment (CTA)
- Dispatch

Figure 8-1: CCC Relief Gap (FTE)

Position	Staff Requirement*	Budgeted Establishment	Relief Gap
Call Handler	105.7	96.9	-8.9
Call Supervisor	18.1	3.0	-15.1
Allocator	78.6	76.0	-2.6
Dispatcher	68.2	66.8	-1.4
Clinician	24.2	41.0	16.8
Senior Clinician	6.3	7.0	0.7
Total	300.9	290.6	-10.3

* Staff Requirement to fill 2019 planned rosters, assuming a 44.3% relief rate.

- 8.2 Staffing calculations are based on a 37.5-hour working week and a 44.3% relief rate, with an allowance for 50 minutes of rest breaks during a 12-hour shift.

The 'Relief Gap'

- 8.3 In late 2018 WAST introduced new call handler rosters based on the recommendations of the previous ORH review.
- 8.4 Planned shifts comprise 2,879 staff hours per week across the three CCCs, compared to an actual deployment of 2,387 staff hours in Q3 and Q4 of 2018/19 (a 17.1% difference). Smaller differences were seen in allocator and dispatcher hours, while clinician hours were put out at planned levels.
- 8.5 A component of these differences is that the planned rosters are predicated on a different relief rate to that experienced by WAST in 2018/19.
- 8.6 WAST's analysed relief rate across call handlers, allocators, dispatchers and clinicians in 2018/19 was 54%; this is the highest relief rate for ambulance services ORH has worked with recently. A more efficient relief rate of 44.3% was suggested by WAST.
- 8.7 Assuming this more efficient 44.3% relief rate across call handling, dispatch and clinical triage staff, there is still a relief gap; the planned rosters require 300.9 staff to run, whereas WAST has a budgeted establishment of 290.6 FTE. The largest deficit exists for call supervisors (see Figure **8-1**).

Call Handling

Approach

- 8.8 WAST has an aspiration to answer 95% of 999 calls in 5 seconds (a change from the previously reported KPI of 6 seconds) and aims for 85% of calls to be answered in the home CCC for Business Continuity Planning purposes.
- 8.9 Across 2018/19, average 999 call answer performance was 85.8% in 5 seconds, with 67.6% of calls answered by the home CCC.
- 8.10 Modelling showed that, had the new rosters been in place and fully staffed across 2018/19, call answer performance would have been 97.3%, with 84.4% of calls answered by the home CCC. An additional 21 call handler hours per week (0.7 FTE) would have been required to achieve 85% of calls answered by the home CCC.
- 8.11 Modelling was undertaken to identify the call handler requirement in December 2024 to achieve:
- 95% in 5 seconds call answer performance on 999 lines.
 - 85% of calls answered by the home CCC.
- 8.12 Since the previous review of CCCs by ORH in 2016/17, the volume of duplicate/repeat calls has almost doubled from 11% to 19%. At the same time call durations have increased significantly, to the highest of any ambulance service ORH has worked with recently.

Figure 8-2: Call Handling Requirement***No Efficiencies***

CCC	Weekly Staff Hours	Staff (FTE)
Central and West	1,096.5	40.3
North	884.0	32.4
South East	1,362.0	49.9
Total	3,342.5	122.6

With Efficiencies

CCC	Weekly Staff Hours	Staff (FTE)
Central and West	982.5	36.1
North	793.0	29.1
South East	1,124.0	41.2
Total	2,899.5	106.4

Figure 8-3: Call Handling Achievement (December 2024)

Modelled Scenario	999 Call Answer Performance	Calls Answered by Home CCC
No Efficiencies	91.8%	76.2%
Duplicate Reduction	94.3%	79.4%
2018 Call Handling Times	98.2%	87.8%
Combined Efficiencies	98.8%	89.5%
Efficiencies + Welfare	98.3%	88.2%

- 8.13 As response performance improves in line with the operational trajectory, it is anticipated that reductions in call handling times and duplicate calls will be realised. As such, it was agreed to model the following efficiencies in 2024:
- A reduction in duplicate call volumes from 19% to 11%.
 - A return to 2018 call handling times, averaging 5m11s per 999 call.
- 8.14 Modelling was subsequently undertaken to understand the impact of welfare calls on the call handler requirement.
- 8.15 Welfare calls should be undertaken when an incident has not had a resource allocated within the agreed time period. Based on the 'Final December 2024' position, 210 welfare calls per day will be required (see Appendix **L1**).
- 8.16 In the absence of any historical data on welfare calls, an average duration of two minutes per welfare call was assumed for modelling.

Call Handler Requirement

- 8.17 With demand growth of 2.3% per annum, call answer performance would be expected to fall to 91.8% by December 2024, with 76.2% of calls answered by the home CCC.
- 8.18 With no changes to operations an additional 16.1 FTE would be required in 2024, taking the total to 122.6 FTE (see Figure **8-2**).
- 8.19 With efficiencies achieved, 95% of calls would be answered in 5 seconds and 85% answered in their home CCC in December 2024 with the planned rosters, plus a 21-hour adjustment; therefore requiring a total of 106.4 FTE. This is an increase of 9.5 FTE from the budgeted position.
- 8.20 Call handling remains robust to the welfare call requirement, with no further staffing required to maintain call answer times (see Figure **8-3**).
- 8.21 The call handler staffing profile by weekday and hour is shown in Appendix **L2**.

Clinical Triage Assessment (CTA)

Approach

- 8.22 In 2018/19 WAST achieved a Hear and Treat rate of 7.9%, 4.4% of which was from calls which WAST considers CTA-suitable. The remainder were the result of staff working in a stack safety role.
- 8.23 Maximising WAST's current CTA-suitable codesets would give a Hear and Treat rate of 8% assuming current success rates, while an expanded CSD codeset based on data from benchmarked ambulance services would increase the potential Hear and Treat rate to 10.2%.
- 8.24 Modelling was undertaken to identify the CSD and NHSD requirements to:
- Maximise the current CSD and NHSD codesets (8% Hear and Treat).
 - Maximise an expanded CSD codeset (10.2% Hear and Treat).

Figure 8-4: CTA Requirement***Weekly Hour Requirement***

Codeset	CSD				NHSDW
	Clinician	Pharmacist	Mental Health	Total	
Current	336	168	308	812	726
Expanded	585	168	418	1,171	726

Staff Requirement (FTE)

Codeset	CSD				NHSDW
	Clinician	Pharmacist	Mental Health	Total	
Current	12.4	6.2	11.3	29.9	26.7
Expanded	21.4	6.2	15.4	43.0	26.7

- 8.25 Based on data provided by benchmarked Trust C, both the current and expanded codesets were divided into calls suitable for clinician, pharmacist and mental health clinician.
- 8.26 Modelling assumed that staff were dedicated to clinical triage with complete separation between positions (that is, a pharmacist cannot triage a call considered suitable for a clinician).
- 8.27 Staff numbers were optimised, by position, to best match the workload profile and allow 90% of patients to be called back within 30 minutes in December 2024.
- 8.28 An efficiency to reduce average CSD triage durations from 26m31s to 23m24s was agreed to bring durations in line with NHSD and other UK ambulance services.

CTA Requirement

- 8.29 A total of 29.9 FTE CSD staff and 26.7 FTE NHSD staff are required to maximise the current codesets. The CSD requirement increases to 43.0 FTE for the expanded codeset, representing an increase of 2.0 FTE from the budgeted position (see Figure 8-4).
- 8.30 The CTA staff requirement by weekday and hour is shown in Appendix L3.

Dispatch

Approach

- 8.31 ORH undertook an assessment of WAST's dispatch function and its ability to manage the projected demand increase and future vehicle requirements.
- 8.32 There is a good case for redefining the current dispatch desk boundaries because, since the last review, there continues to be wide disparity in workload between dispatch desks. These variations in workload will invariably lead to variations in time to dispatch and, potentially, the quality of dispatch decisions.
- 8.33 Furthermore, the current dispatch desks boundaries do not always respect patient-hospital flows, which means that an allocator will 'lose' vehicles when they go out-of-area while taking a patient to hospital.
- 8.34 ORH developed new dispatch desk boundaries by combining station catchments while trying to achieve the following, often competing, objectives:
- Minimise the variation in workload between desks (number of incidents requiring assignment).
 - Ensure that the number of vehicles per desk is limited to an amount manageable by an allocator (targeting a maximum of 20 vehicles per desk at peak times).
 - Respect patient-hospital flows as far as possible (ensure that major receiving hospitals are located in the dispatch areas from which they receive most of their patients).

Figure 8-5: Dispatch Requirement***Proposed Dispatch Desks***

Desks	Period	Central and West	North	South East	Total
EA/RRV	07:00 - 02:00	4	3	4	11
EA/RRV	02:00 - 07:00	3	2	2	7
HCP	08:00 - 20:00	1		1	2
APP	08:00 - 02:00		1		1

Staff Requirement (FTE)

Desks	Period	Central and West	North	South East	Total
EA/RRV	-	23.4	17.2	22.1	62.8
HCP	-	3.1		3.1	6.2
Break Cover	-	6.2	6.2	6.2	18.6
Allocator	-	32.7	23.4	31.4	87.6
APP	-		4.8		4.8

- 8.35 Modelling used the vehicle deployment and projected workload from the 'Final December 2024' position.

Dispatch Requirement

- 8.36 It is proposed that WAST operates 11 EA/RRV desks during the day and evening periods (four in Central and West, three in North and four in South East CCCs). These should be supplemented with 2 HCP desks and 1 APP desk (see Appendix **L4**).
- 8.37 At night, lower workload and vehicle numbers (with some desks managing as few as five vehicles) could allow for a reduction to 7 desks (three in Central and West, two in North and two in South East CCCs). In each CCC, no desk would be busier at night than the busiest desk in the day.
- 8.38 By 2024 the combination of a number of factors will achieve a level of workload on each desk that can be managed by a single allocator without the reliance on a dispatcher (see Appendix **L5**). Some of these factors are existing while others will occur through the changes indicated in this report:
- A historical reduction in radio communications through the introduction of Mobile Data Terminal (MDT).
 - The introduction of auto-allocation to Red calls in late 2017.
 - The reconfiguration of dispatch desks by 2024 (based on patient flows).
 - A more simplified dispatch process by 2024 (due to the shifting vehicle mix)
- 8.39 This review does not consider other performance, quality support or supervisory roles within the CCCs. A separate project underway by WAST is exploring opportunities to reorganise the roles within the CCCs based on the recent CAD system upgrade, which also supports the single allocator model.
- 8.40 An additional three allocators 24/7, one in each CCC, are required to cover rest breaks and other breaks that allocators take while on shift.
- 8.41 To staff these desks will require 87.6 FTE if EA/RRV desks are reduced at night, increasing to 93.0 FTE if they are covered 24/7, assuming one allocator per desk. A total of 4.8 APPs are required to staff the APP desk (see Figure **8-5**).
- 8.42 The allocator staffing profile by weekday and hour is shown in Appendix **L6**.
- 8.43 Workload variation between desks still exists due to the disparity between vehicle numbers and incident workload which is caused by rurality.

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Appendices

A	Glossary and Data Specifications
B	Sample Comparison Analysis
C	2018/19 Analysis
D	Internal Benchmarking
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G	Abstraction and Relief Rates
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Welsh Ambulance Services NHS Trust

Demand and Capacity Review

Final Report

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A Glossary and Data Specifications

A1 Glossary of Terms

A2 Operational Data Specification

A3 Clinical Contact Centre (CCC) Data Specification

Glossary of Terms

Term	Description
AMPDS	Advanced Medical Priority Dispatch System
APP	Advanced Paramedic Practitioner
AVL	Automatic Vehicle Location
CAD	Computer Aided Dispatch
CCC	Clinical Contact Centres
CFR	Community First Responder
CPD	Continuing Professional Development
CSD	Clinical Support Desk
CTA	Clinical Triage Assessment
CTL	Clinical Team Leader
DDI	Direct Dial In
EA	Emergency Ambulance
EASC	Emergency Ambulance Services Committee
EMT	Emergency Medical Technician
FTE	Full Time Equivalents
GPS	Global Positioning System
HB	Health Board
HCP	Health Care Professional
KPI	Key Performance Indicator
MDT	Mobile Data Terminal
MTC	Major Trauma Centre
NHH	Nevill Hall Hospital
NHSD	Welsh National Health Service Direct
OGRE	Optimisation by Genetic Resource Evolution
ONS	Office for National Statistics
ORH	Operational Research in Health Limited
RGH	Royal Gwent Hospital
RRV	Rapid Response Vehicle
TU	Trauma Unit
UCA	Urgent Care Assistant
UHW	University Hospital of Wales
VOR	Vehicle Off-Road
WAST	Welsh Ambulance Services NHS Trust
YYF	Ysbyty Ystrad Fawr

ORH Draft Operational Data Specification

Sample Period: *TBC*

Workload Data

A Service-wide, CAD-generated database (possibly many tables) is required that includes all calls that pass through the control centre, encompassing the fields listed below. In the case where a vehicle is assigned, please include fields for all vehicle assignments (ie, not limited to the first vehicle on scene).

1. Unique Identifier (eg, 'Job Number')
2. Initial Incident Detailed Code (eg, AMPDS Code) (*)
3. Initial Category (eg, 'C2')
4. Final Incident Detailed Code (prior to scene arrival)
5. Final Category – (prior to scene arrival, eg, 'C1')
6. Time and Date of Call
7. Pre-Triage Sieve Reason
8. Pre-Triage Sieve Date and Time
9. NOC [Nature of Call] Fields - Reason and Date time
10. Call Time Components including all available datetime fields within the activation and mobilisation period, including (but not limited to) the following:
 - a. Call connect
 - b. Call answer
 - c. Clock start (used for performance calculation – please also supply all related fields and exclusion codes used to calculate this. ORH will be comparing the clock start and clock stop to the ASI guidelines as well as the Demand and Performance to the monthly reports)
 - d. Initial clock start (before updates - upgraded/downgraded/Overrides etc)
 - e. Time of call upgrade/downgrade (if applicable)
 - f. Location confirmed
 - g. What's the problem (datetime)
 - h. Chief complaint (datetime)
 - i. Time passed to the clinical desk for further triage
 - j. Full AMPDS determinant confirmed
 - k. Time Call Closed
 - l. Job sent to MDT
 - m. Job received on MDT
 - n. Time resource allocated
 - o. Time mobile or 'en-route' to incident
 - p. Time arrive at scene
 - q. Time Initial Request For Transport' (TIRT)
 - r. Time left scene
 - s. Time arrive at hospital
 - t. Time of patient handover
 - u. Time posted clear/available
 - v. Time of appointment (urgent and routine incidents only)

- w. Response Time from any resource (for reporting purposes)
 - x. Response Time from conveying resource (for reporting purposes)
11. Destination Hospital (*)
 12. Patient Specialty (eg, Cardiac, Stroke)
 13. Patient Age and Gender
 14. Request for transport priority (eg, P1-Lights and Sirens, P2-Non-Lights and sirens, P3-Other)
 15. Responding vehicle call sign (*)
 16. Resource type (to establish how vehicle was used on day, eg, DSA, ITV, RRV, ECP, DEFIB, St Johns)
 17. Is the vehicle considered an emergency vehicle?
 18. Highest responding skill level / Crew mix
 19. Responding vehicle base station (*)
 20. Was a patient on the vehicle when it travelled to hospital? 1/0
 21. Did the transporting vehicle travel to hospital under lights and sirens? 1/0
 22. Incident location (incident co-ordinates)
 23. Mobilisation location (co-ordinates) of responding vehicle
 24. Call Origin (eg, 111, 999, HCP)
 25. IFT request flag 1/0 (To identify calls where an IFT request was made)
 26. Triage flag (To identify calls passed to triage if 10i. Time passed to the clinical desk for further triage is unavailable)
 27. What's the problem/Chief Complaint descriptions – to help identify upgrades/downgrades
 28. Status/call stop reason (eg, abort, duplicate, complete, no responses due to demand management. Please include a list of codes for any incidents excluded from demand and performance reporting)

Note: (*) Please provide any corresponding look-up tables where required. For example there may be more than one AMPDS lookup table in the sample.

Historical Data

Monthly Demand & Performance Reports

The Service's routine monthly monitoring reports of demand (by category of call) and performance (against all mobilisation/response/transport targets) are required for the same sample period as the CAD workload sample period.

Please supply in the CAD data all fields that are required to calculate these figures.

Operational Changes

Please stipulate any changes in the deployment of resources, station locations or significant changes to operational policy which have taken place during the sample period (in the form - date and type of change).

Historical Demand Data

1. Counts of calls and responded incidents by category and month for the five years preceding the sample period.
2. Counts of responded incidents by age, gender and year for the past five years.

Resource Data

Planned Vehicle Deployments

Planned rosters/deployed shifts by vehicle type and station that were in place during the sample period.

Actual Vehicle Deployments

Data to allow the calculation of the actual vehicle deployment during the sample period are required. This could be a database of shifts actually put out by the Service, or alternatively a list of shifts that were dropped. This data should be at a station level, by vehicle type, showing standby points used where available. This data should (if possible) separate out end of shift overruns from the rostered time.

Vehicle Downtime/Out of Service

Information regarding the time crew or vehicle being unavailable to respond due to events such as vehicle breakdowns, cleaning etc.

Vehicle Numbers

The number of operational vehicles (eg, ambulances, fast response cars) available at each station.

Vehicle Types

A list of callsigns with vehicle type, skill level, transport capable flag, description, base station, non-emergency/emergency flag.

Meal Break Arrangements

Information regarding the frequency and length of meal breaks available to operational staff, including information on whether meal breaks can be interrupted by certain categories of call. Data showing the number of meal breaks taken and missed during the sample period should also be included if available.

Resource Deployment Model

Information regarding the dispatch protocols operated by the dispatch centre during the sample period. This should include the recommended response, vehicle appropriateness and vehicle prioritisation to each category of call, as well as information on the use of lights and sirens by call category.

End-of-Shift Procedures

Information regarding any restrictions on resource responses to certain categories of call when they are near the end of their shift.

Standby Policy

Information regarding standby point usage. For each standby point, this should include hours of operation and whether meal breaks can be taken.

Staff Establishments

Funded and actual (staff in post) establishment levels are required, broken down by skill level.

Staff Abstractions

Information on the number of abstracted hours due to leave, training and sickness etc, broken down by skill level.

Geographical Data

Location Data

A list of all currently used ambulance stations, dispatch points, main receiving hospitals, community responder schemes, defib sites and any 'other agency' sites that may be relevant, along with easting and northing co-ordinates.

Boundary definitions of subareas against which performance targets are measured.

AVL Data

AVL data detailing the location and speed of operational vehicles during the sample period (if available).

Hospital Data

A list of the main receiving hospitals, their Hospital code, Location, the specialties they accept (eg Stroke, Cardiac, Childrens etc) and their opening hours.

Where and How to Send the Data

All data should be sent to: ORH
3 Queens Road,
Reading, RG1 4AR
UK

Telephone: +44 (0)118 959 6623
Fax: +44 (0)118 959 6626

For data checking purposes, please initially supply a one month sample of workload data, monthly demand & performance reports and actual deployments, along with a one week sample of AVL data (if available).

Call workload data should be in a tab-delimited format and compressed using WinZip or a similar package.

Boundary definitions should be provided as MapInfo TAB files or ESRI shapefiles.

Small data files (less than 10Mb) can be emailed directly.

Larger data files can be uploaded to the ORH website. This requires a client account with the ORH website, which can be obtained by contacting ORH.

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ORH Draft Control Centre Data Specification

Sample Period: *TBC*

Call-Logging Data

A Service-wide database to include all phone calls that pass through or are offered to the CCCs. Ideally, this data should be in a call-by-call format, including (but not limited to) the following fields:

1. Time hit switch
2. Time phone rings
3. Time call answer
4. Time call ends
5. Incoming/Outgoing call
6. Call Type (emergency, urgent, admin, other, etc)
7. Extension of person making/taking the call
8. Staff grade of person taking/making call (call taker, dispatcher etc)
9. Answered/Lost call
10. Incident Number identifier (if appropriate)

Agent Activity Data

A breakdown of agent time, including the following:

1. # Total calls
2. # Answered calls
3. # Abandoned Calls
4. # Outgoing calls
5. Average speed answer
6. Average abandoned time
7. Average call duration (incoming calls)
8. Average call duration (outgoing calls)
9. Average after call work/wrap time
10. Time spent on rest/meal breaks

Clinical Triage Data

Information on current clinical triage workload, including:

1. The process of clinical triage (transfer, ring back etc.)
2. The volumes of calls passed to/made by clinical triage positions, by month, day and hour (if available)
3. The duration of calls passed to/made by clinical triage positions, by month, day and hour (if available)

Information on clinical triage staffing (clinicians, supervisors etc) in each CCC.

Welfare Call Data

The actual number of ring-backs undertaken of held calls, and the staff skill level undertaking these.

The frequency/intervals at which ring-backs of held calls should occur (where capacity allows).

Dispatch Function

Dispatch group/sector boundaries that define the geographical areas used for vehicle allocation.

Information on the organisation of dispatch desks, including:

1. How vehicles are assigned to each desk (eg, geography and/or crew type)
2. Number of dispatch desks, and how this varies by time of day and day of week

Information on the staffing of dispatch desks (dispatchers, dispatch assistants, radio operations, supervisors etc).

Other CCC Functions

Information on any other desks/functions present in the CCC (e.g. HCP, hospital pre-alert). Where available, this should include:

1. A description of the function
2. Information on the workload volumes of the function
3. Information on the resourcing of the function

Resource Data

Planned/Actual CCC Staff Deployments

Planned, forecasted, and filled shifts for each staff grade (call-takers, dispatchers, clinicians etc) for both planned and actual deployment levels, for the CCCs.

Meal and Rest Break Arrangements

Information on the frequency and length of all meal breaks available to CCC staff.

Staff Establishments

Funded and actual (staff in post) establishment levels are required, broken down by staff grade, CCC, and month (if available).

Staff Abstractions

Information on the number of abstracted hours due to leave, training and sickness etc. This should be broken down by staff grade, CCC, and month (if available).

Organisational Structure

Organisation chart, showing all management, supervisory and supporting positions, including admin support.

Miscellaneous Data

CCC room layout / floor plan.

Where and How to Send the Data

All data should be sent to: ORH
3 Queens Road,
Reading, RG1 4AR
UK

Telephone: +44 (0)118 959 6623
Fax: +44 (0)118 959 6626

Data should not be sent by email: contact ORH for upload details for using our secure upload facility.

For data checking purposes, please initially supply a one month sample of call-logging agent activity, and deployment data.

Call workload data should be in a tab-delimited format and compressed using WinZip or a similar package.

Boundary definitions should be provided as MapInfo TAB files or ESRI shapefiles.

Please Treat as Confidential

B Sample Comparison Analysis

B1 Demand and Performance Validation

B2 Daily Verified and Attended Calls

B3 Verified Calls with No Response

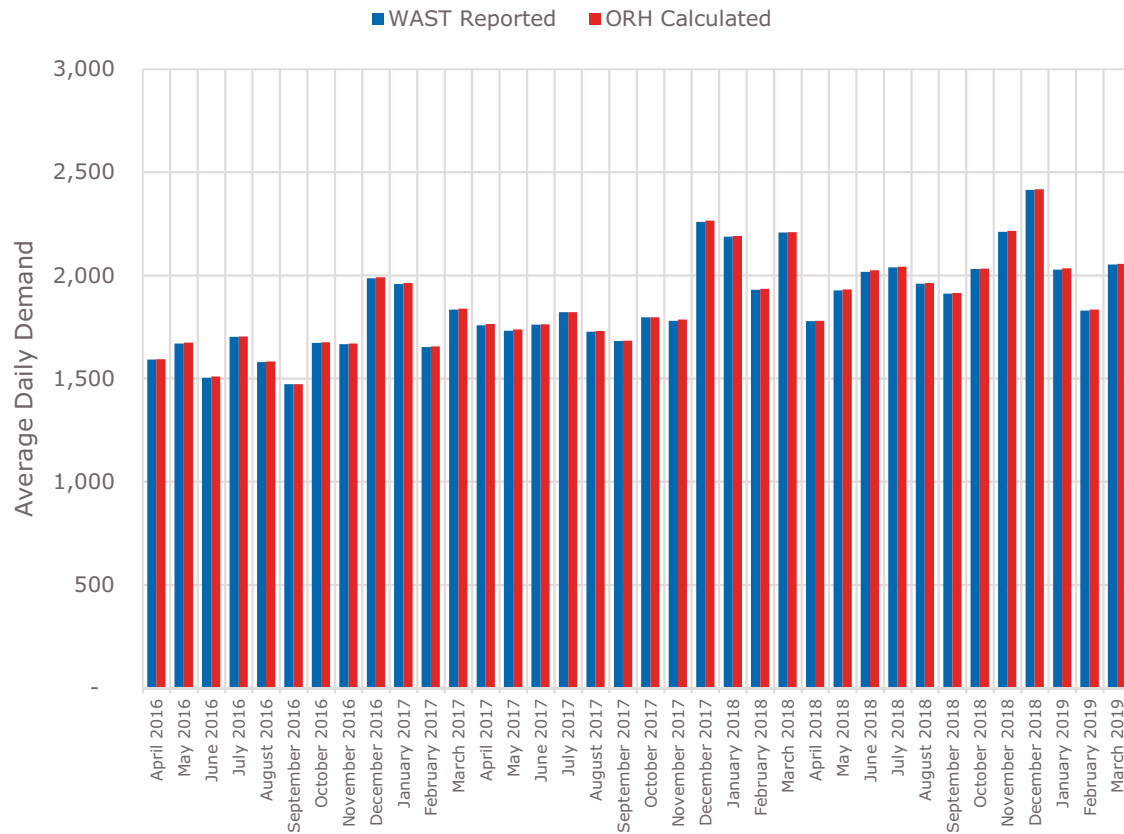
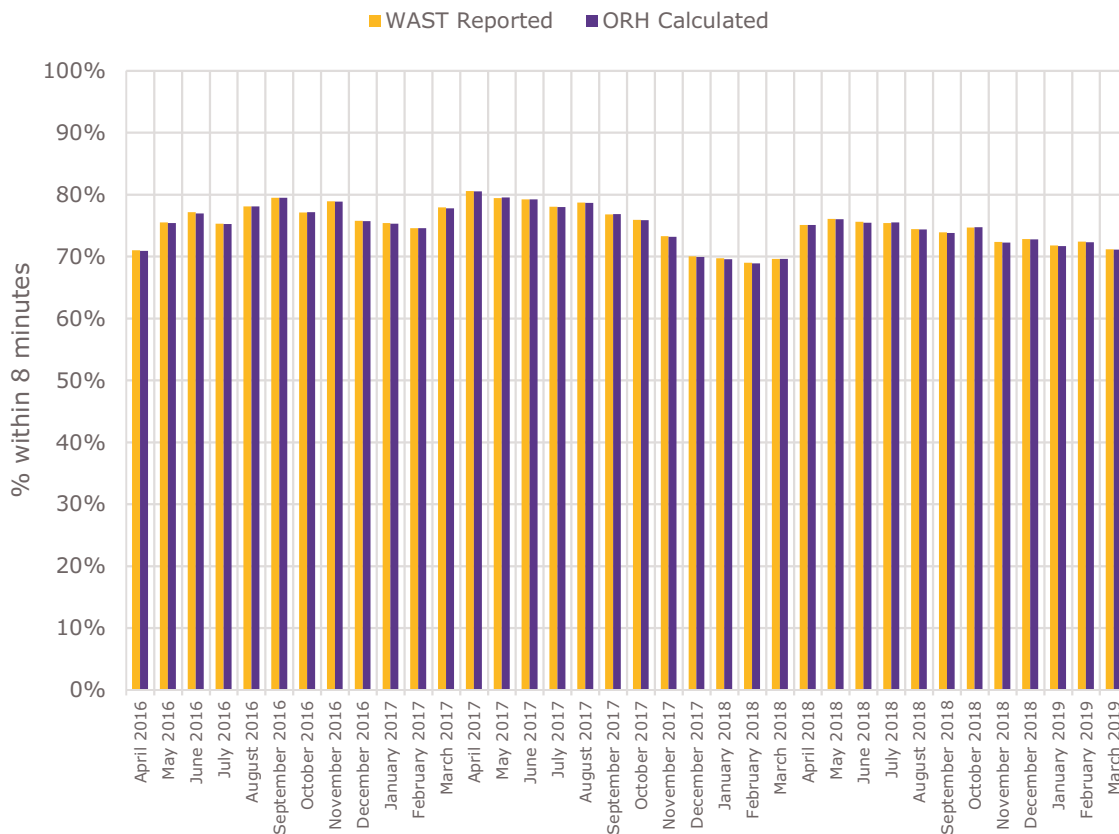
B4 Total Calls by Month

B5 Responded Demand Comparison

B6 Performance Comparison

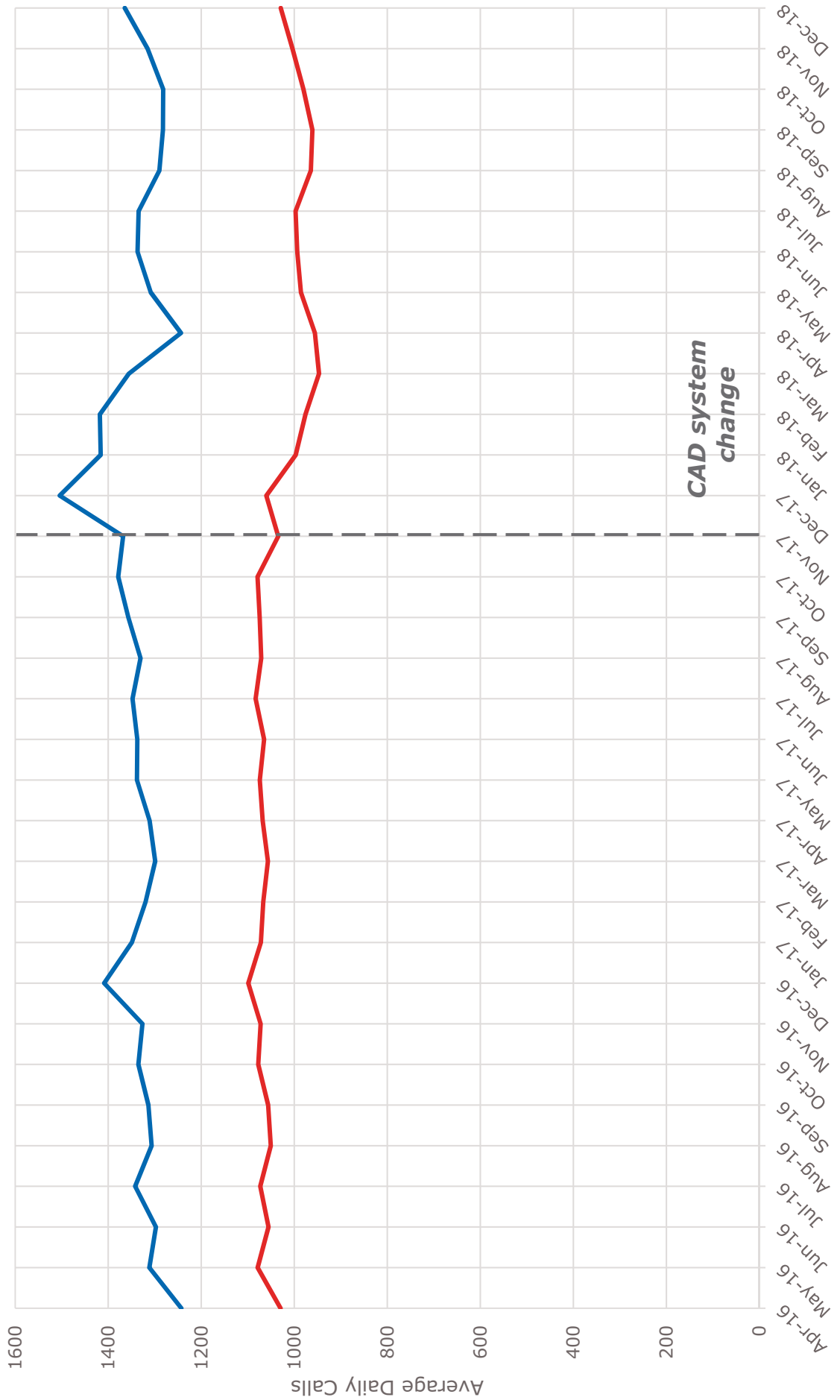
B7 Weekly Vehicle Hours

Please Treat as Confidential

Red Demand by Month**Red-8 Response Performance by Month**

Average Daily Verified and Attended Calls

Daily Verified Calls Daily Attended Calls



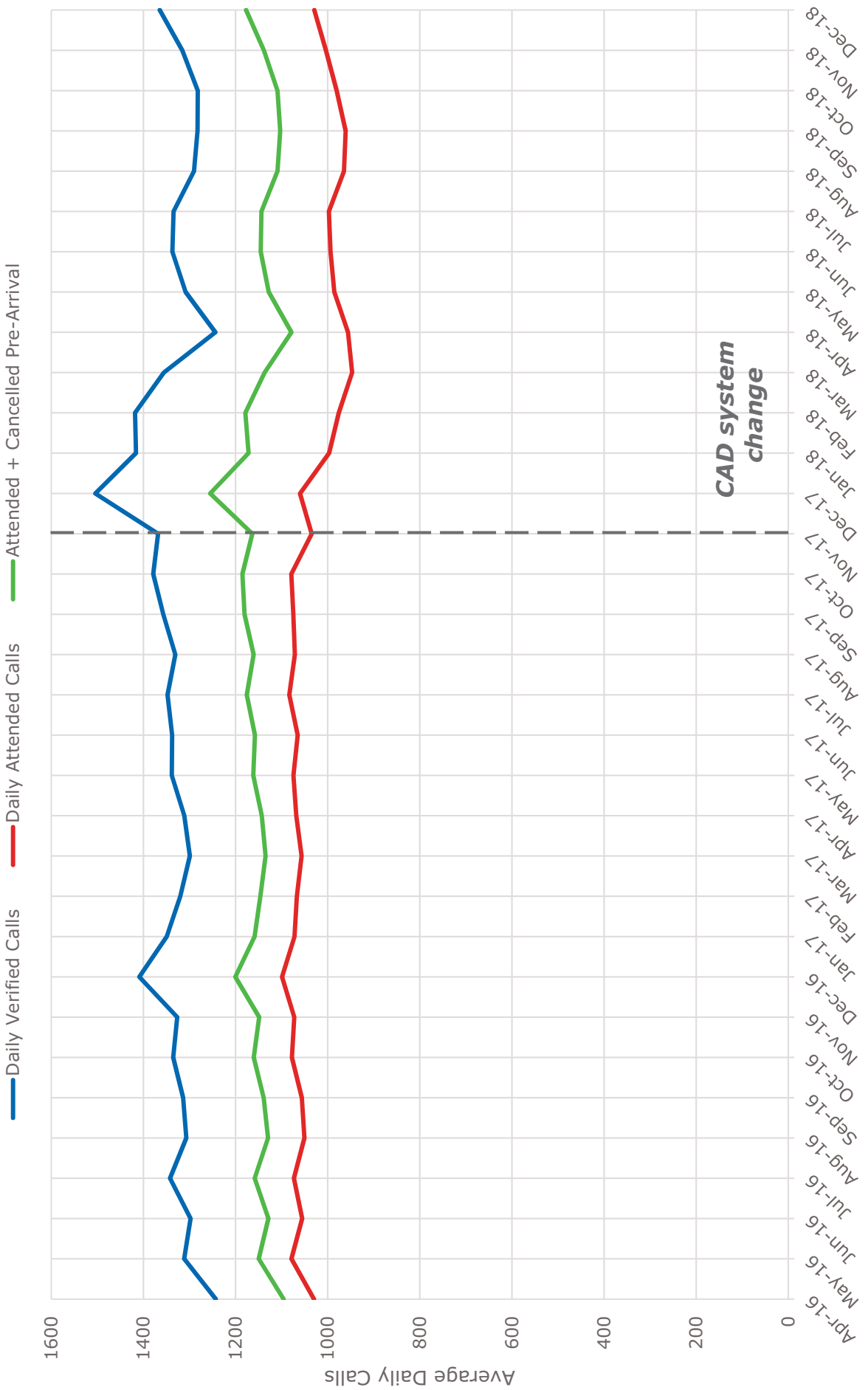
Welsh Ambulance Services NHS Trust

Verified Calls with no response to scene by Incident stop code

April 18 to March 19

Incident Stop Code Description	Daily Non-Responded Incidents	% of Non-Responded incidents	% of all unique Incidents
Cancelled Pre-Arrival	135.8	42.2%	10.4%
Automaticaly Closed Call	76.9	23.9%	5.9%
Clinical Desk Dealing	36.4	11.3%	2.8%
Patient Deteriorated	35.6	11.0%	2.7%
Police Dealing	16.7	5.2%	1.3%
Transferred NHSD Nurse Advisor	4.5	1.4%	0.3%
Unable To Return Call	3.8	1.2%	0.3%
Downgraded - Emergency To Routine	2.3	0.7%	0.2%
Police Conveyed (Other)	2.0	0.6%	0.2%
Passed To PCS	1.6	0.5%	0.1%
Hoax/Malicious	1.5	0.5%	0.1%
Other	4.9	1.5%	0.4%
Total	322.1	100.0%	24.6%

Average Daily Verified, Attended and Cancelled Pre-Arrival Calls



Welsh Ambulance Services NHS Trust

Responded Demand Comparison**2018/19 Responded Demand per day**

Health Board	RED	AMBER	GREEN	ROUTINE	TOTAL
Abertawe Bro Morgannwg University	12.9	114.1	21.5	7.3	155.8
Aneurin Bevan	12.1	125.7	28.0	4.4	170.1
Betsi Cadwaladr University	13.7	193.4	44.5	3.5	255.0
Cardiff & Vale University	11.1	94.9	19.7	3.5	129.3
Cwm Taf	6.3	69.2	16.1	3.5	95.1
Hywel Dda	7.7	95.4	22.6	5.8	131.5
Powys	2.6	34.6	9.0	0.1	46.3
Total	66.4	727.3	161.6	28.4	983.6

2018/19 Comparison to 2015/16

Health Board	RED	AMBER	GREEN	ROUTINE	TOTAL
Abertawe Bro Morgannwg University	1.8 -	7.7 -	15.9 -	2.2 -	24.0
Aneurin Bevan	0.7 -	7.2 -	14.7 -	1.9 -	23.1
Betsi Cadwaladr University	0.6	14.1 -	27.7 -	7.2 -	20.3
Cardiff & Vale University	1.1 -	11.9 -	10.9 -	1.1 -	22.8
Cwm Taf	0.3	3.1 -	8.4 -	1.1 -	6.1
Hywel Dda	1.5	13.2 -	13.8 -	1.6 -	0.8
Powys	0.5	5.7 -	4.4 -	0.1	1.7
Total	6.5	8.9 -	95.8 -	15.6 -	96.0

2018/19 Demand Proportions by HB

Health Board	RED	AMBER	GREEN	ROUTINE	TOTAL
Abertawe Bro Morgannwg University	8.3%	73.2%	13.8%	4.7%	100.0%
Aneurin Bevan	7.1%	73.9%	16.5%	2.6%	100.0%
Betsi Cadwaladr University	5.4%	75.8%	17.4%	1.4%	100.0%
Cardiff & Vale University	8.6%	73.4%	15.3%	2.7%	100.0%
Cwm Taf	6.6%	72.8%	16.9%	3.7%	100.0%
Hywel Dda	5.8%	72.6%	17.2%	4.4%	100.0%
Powys	5.7%	74.7%	19.4%	0.3%	100.0%
Total	6.8%	73.9%	16.4%	2.9%	100.0%

Welsh Ambulance Services NHS Trust

Performance comparison**RED8**

Health Board	October 2015 to April 2016	April 2018 to March 2019	Performance Change
Abertawe Bro Morgannwg University HB	68.5%	76.4%	7.9%
Aneurin Bevan HB	67.4%	73.0%	5.6%
Betsi Cadwaladr University HB	70.6%	72.4%	1.7%
Cardiff & Vale University HB	72.4%	81.3%	8.9%
Cwm Taf HB	66.5%	72.5%	6.0%
Hywel Dda HB	63.1%	65.6%	2.5%
Powys HB	61.5%	65.9%	4.4%
Z-OOA	63.6%	52.1%	-11.6%
WAST Wide	68.4%	73.7%	5.3%

AMBER20

Health Board	October 2015 to April 2016	April 2018 to March 2019	Performance Change
Abertawe Bro Morgannwg University HB	68.6%	36.6%	-32.0%
Aneurin Bevan HB	60.9%	37.2%	-23.6%
Betsi Cadwaladr University HB	75.1%	46.6%	-28.5%
Cardiff & Vale University HB	57.6%	38.6%	-19.0%
Cwm Taf HB	71.2%	43.7%	-27.5%
Hywel Dda HB	72.0%	46.4%	-25.6%
Powys HB	69.9%	48.7%	-21.2%
Z-OOA	75.0%	43.9%	-31.1%
WAST Wide	67.8%	42.1%	-25.7%

AMBER30

Health Board	October 2015 to April 2016	April 2018 to March 2019	Performance Change
Abertawe Bro Morgannwg University HB	80.5%	50.4%	-30.1%
Aneurin Bevan HB	73.9%	50.8%	-23.1%
Betsi Cadwaladr University HB	87.8%	63.5%	-24.3%
Cardiff & Vale University HB	69.9%	51.7%	-18.2%
Cwm Taf HB	83.7%	60.0%	-23.7%
Hywel Dda HB	86.6%	63.6%	-22.9%
Powys HB	84.9%	65.8%	-19.1%
Z-OOA	88.5%	78.0%	-10.4%
WAST Wide	80.7%	57.5%	-23.2%

Welsh Ambulance Services NHS Trust

Average Weekly Vehicle Hours

15/16 to 18/19 Comparison

Sample Period	Average Weekly Deployed Vehicle Hours		
	EA	RRV+CTL +APP	UCS+St John
October 2015 to April 2016	16,150.10	6,670.60	2,891.60
April 2018 to March 2019	15,979.20	6,540.90	2,892.90
Difference	-170.9	-129.7	1.3

Please Treat as Confidential

C 2018/19 Analysis

C1 Performance by Vehicle Type

C2 Red and Amber Performance Response Performance

C3 Actual vs Planned Shift Analysis

C4 Demand and Resource Matching

C4a Central & West Weekday

C4b Central & West Weekend

C4c North Weekday

C4d North Weekend

C4e South East Weekday

C4f South East Weekend

C5 Utilisation by Health Board

C6 Utilisation by Hour and Day

C6a Central & West Utilisation

C6b South East Utilisation

C6c North Utilisation

C7 Vehicle Off-Road Analysis

C8 Calls Answered by Home CCC

C9 999 Call Durations

C10 Call Handler Staffing

C11 Call Handling Demand and Resource Matching

C12 Dispatch Desk Workload

C13 Patient Journeys to Major Hospitals

Please Treat as Confidential

Vehicle Type Description	Health Board							Overall
	Aneurin Bevan HB	Betsi Cadwaladr University HB	Cardiff & Vale University HB	Cwm Taf HB	Abertawe Bro Morgannwg University HB	Hywel Dda HB	Powys HB	
	33.9%	44.4%	44.6%	37.6%	39.9%	45.5%	38.9%	
	30.0%	16.9%	28.9%	25.6%	27.2%	10.7%	12.2%	
	2.6%	3.0%	3.3%	4.7%	1.7%	2.3%	3.3%	
Core	0.5%	1.2%	0.0%	0.4%	1.7%	0.6%	0.1%	
	4.0%	4.2%	2.8%	3.5%	3.8%	3.7%	4.8%	
	1.7%	1.8%	0.9%	0.4%	1.0%	1.1%	2.3%	
	0.3%	0.8%	0.8%	0.3%	1.2%	1.6%	4.3%	
Other	73.0%	72.4%	81.3%	72.5%	76.4%	65.6%	65.9%	73.7%
Core Vehicles	67.1%	65.5%	76.9%	68.4%	70.4%	59.1%	54.5%	67.7%
	5.9%	6.9%	4.4%	4.2%	6.0%	6.5%	11.3%	6.0%

Red 8-minute and Amber 20-minute Performance

2018/19

Response Performance

Health Board	Red 8-minute Performance	Amber 20-minute Performance
Abertawe Bro Morgannwg University HB	76.4%	36.6%
Aneurin Bevan HB	73.0%	37.2%
Betsi Cadwaladr University HB	72.4%	46.6%
Cardiff & Vale University HB	81.3%	38.6%
Cwm Taf HB	72.5%	43.7%
Hywel Dda HB	65.6%	46.4%
Powys HB	65.9%	48.7%
WAST Wide	73.7%	42.1%

Actual vs. Planned Shift Analysis

2018/19

Actual Weekly Vehicle Hours

Model Area	EA	RRV	UCS	APP	Overall
Central & West	6,849	1,750	1,000	204	9,802
North	4,284	1,081	635	178	6,178
South East	4,852	3,204	1,273	123	9,453
Overall	15,984	6,036	2,908	505	25,433

Planned Weekly Vehicle Hours

Model Area	EA	RRV	UCS	APP	Overall
Central & West	7,144	1,954	998	288	10,383
North	4,758	1,373	652	168	6,950
South East	5,395	3,998	1,233	229	10,855
Overall	17,296	7,324	2,882	685	28,187

Difference

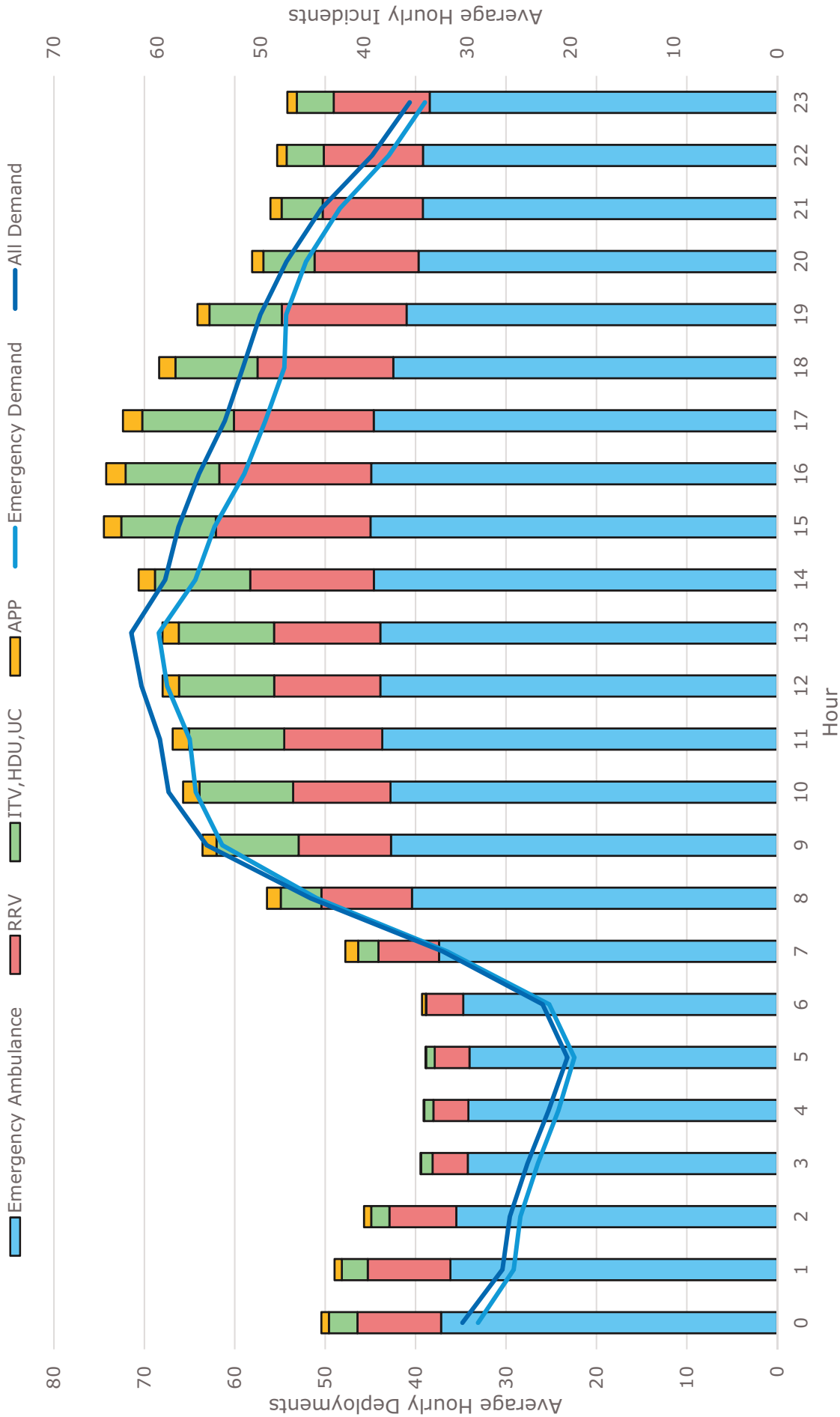
Model Area	EA	RRV	UCS	APP	Overall
Central & West	-295	-204	2	-84	-581
North	-474	-291	-16	10	-771
South East	-543	-793	40	-106	-1,402
Overall	-1,312	-1,288	26	-180	-2,754

Dropped Shift Rate

Model Area	EA	RRV	UCS	APP	Overall
Central & West	4.1%	10.4%	-0.2%	29.3%	5.6%
North	10.0%	21.2%	2.5%	-6.0%	11.1%
South East	10.1%	19.8%	-3.3%	46.3%	12.9%
Overall	7.6%	17.6%	-0.9%	26.3%	9.8%

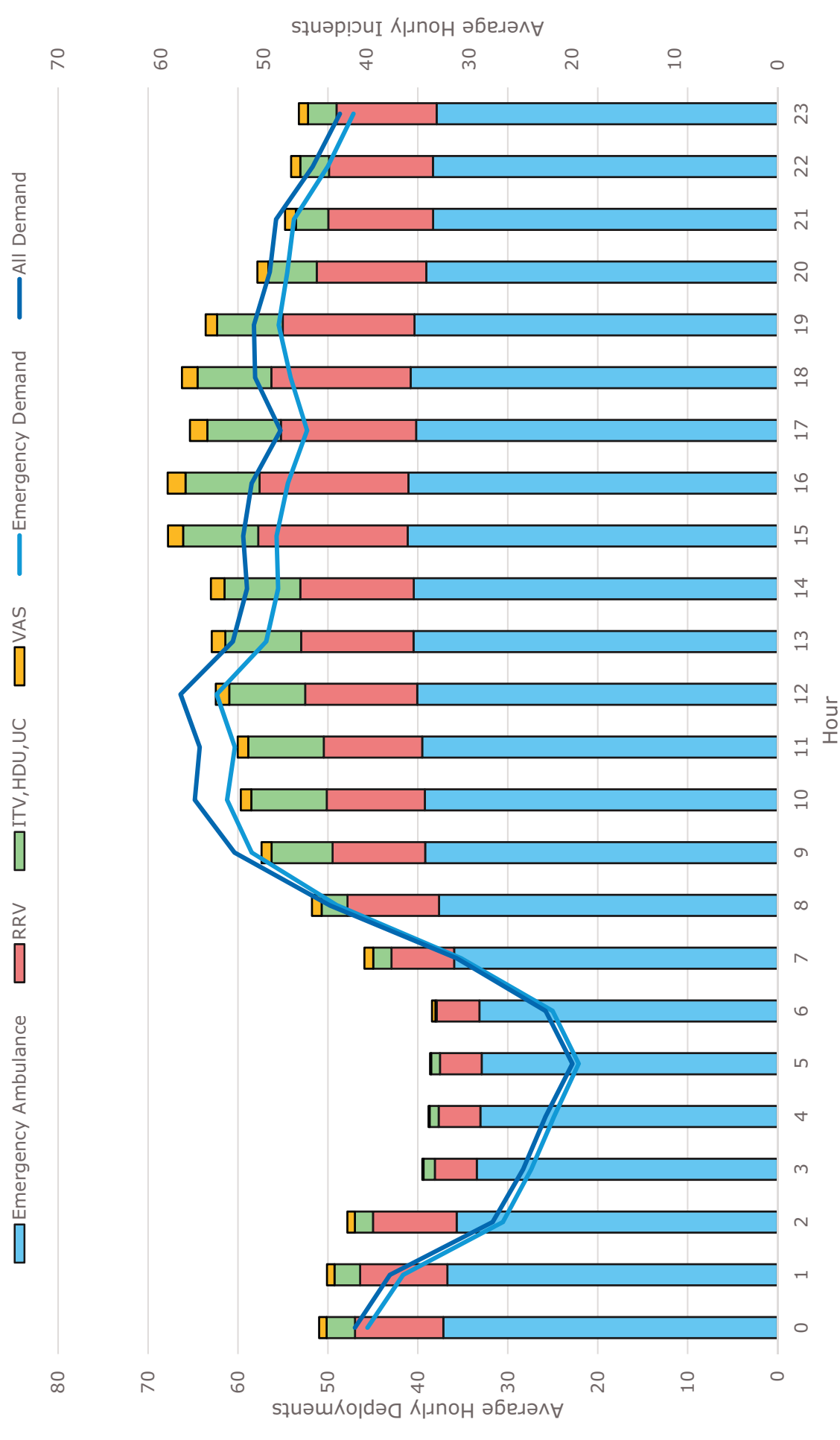
Central & West- Demand & Resource Matching - Weekdays

12-Month Sample (April 2018 to March 2019)



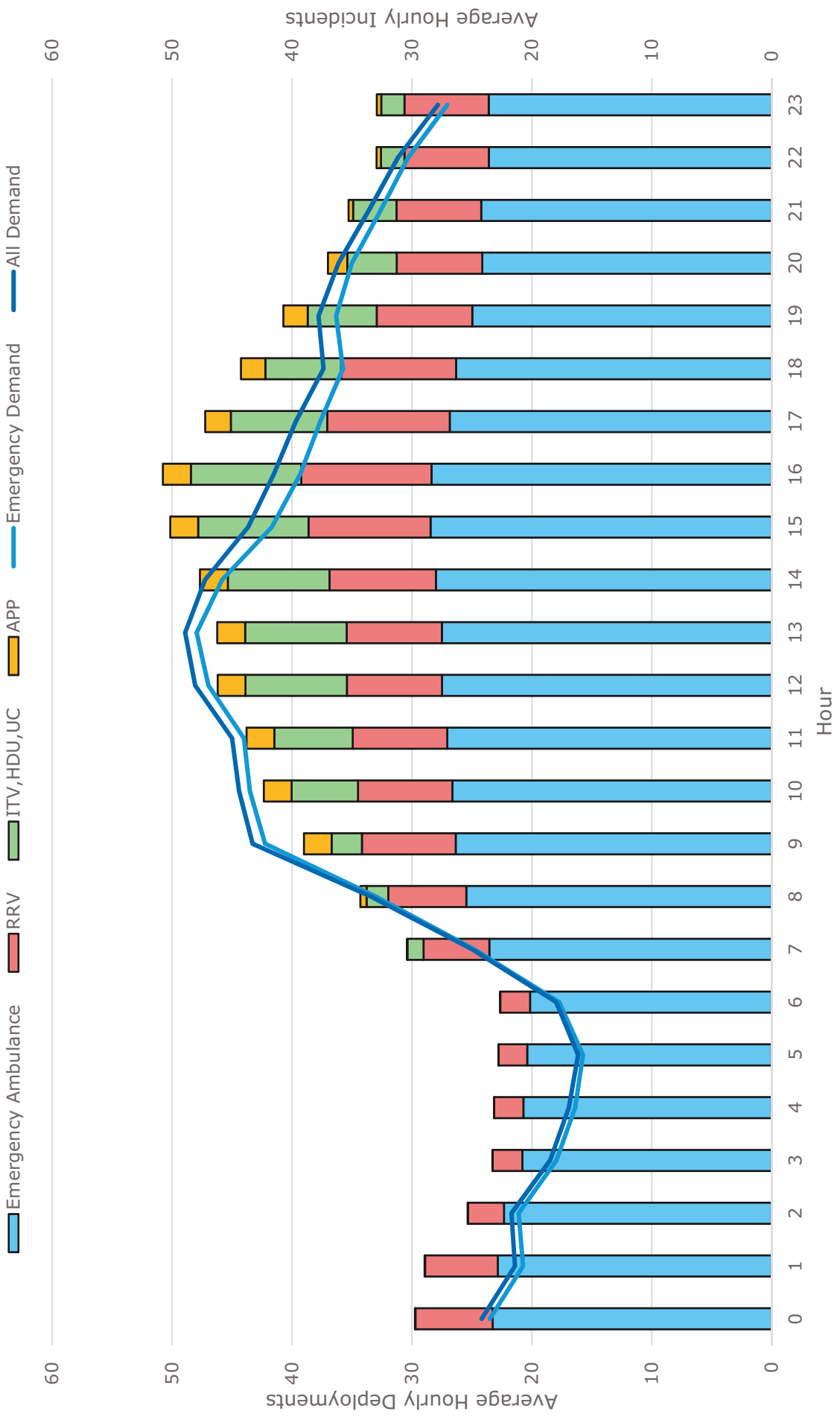
Central & West - Demand & Resource Matching - Weekends

12-Month Sample (April 2018 to March 2019)



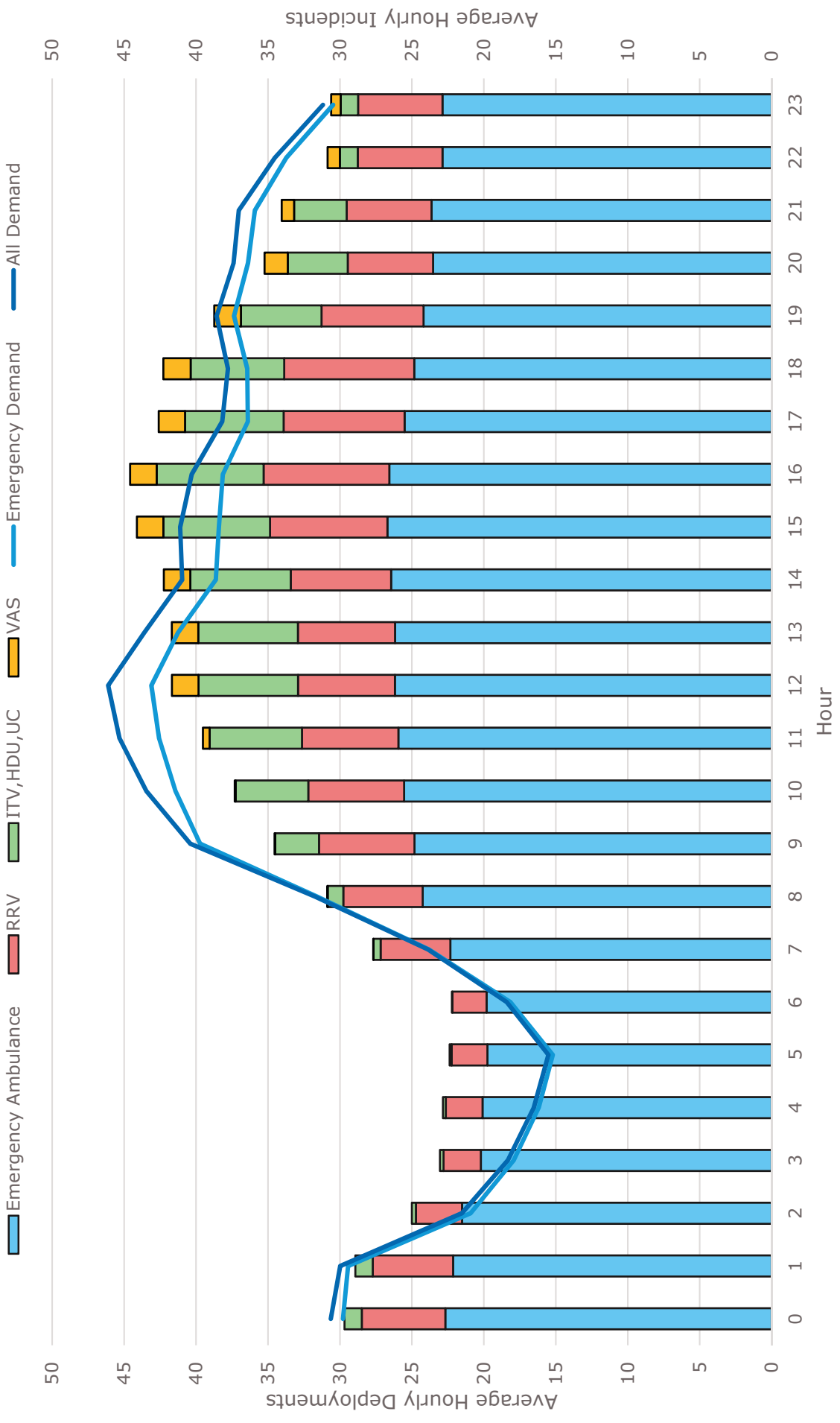
North - Demand & Resource Matching - Weekdays

12-Month Sample (April 2018 to March 2019)



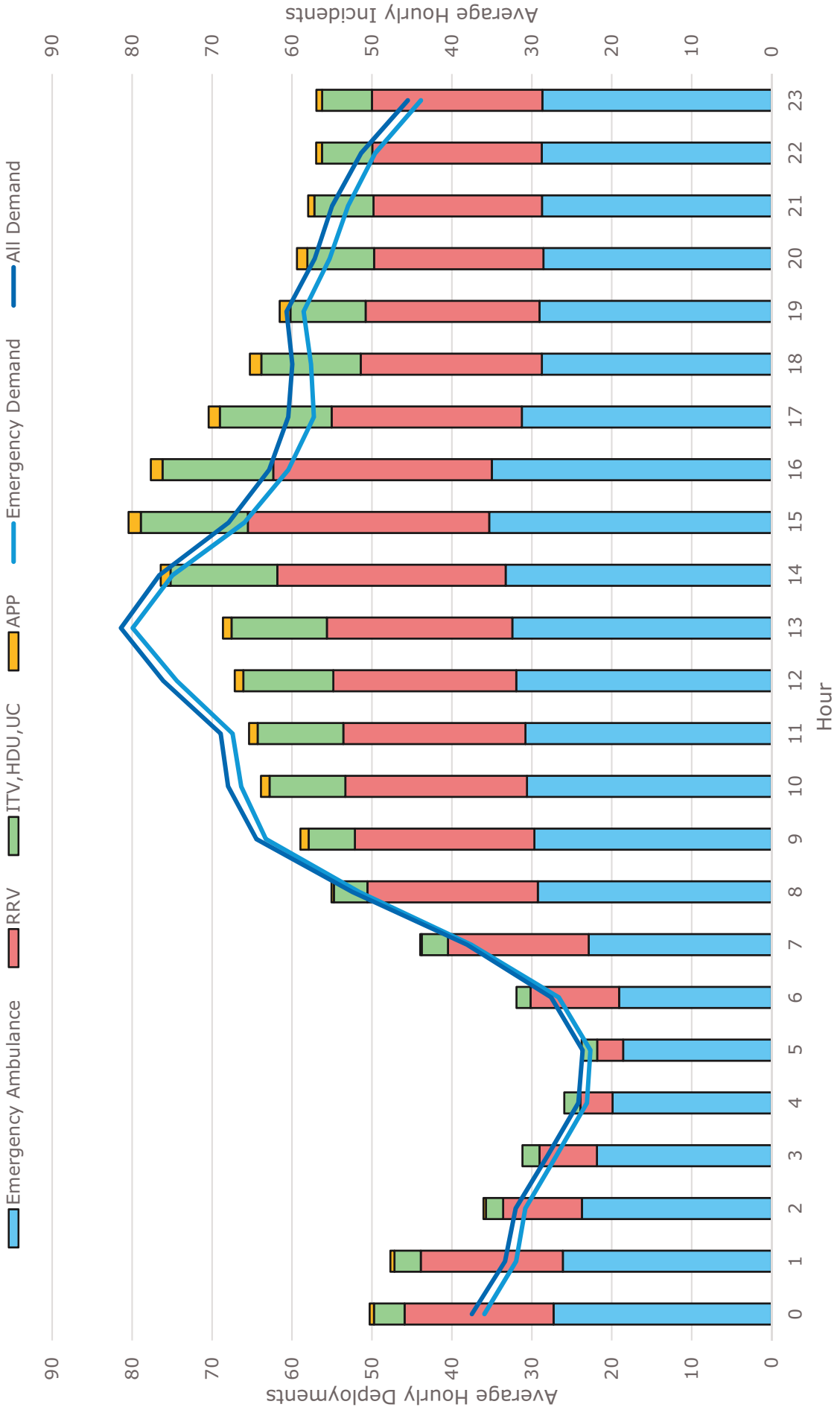
North - Demand & Resource Matching - Weekends

12-Month Sample (April 2018 to March 2019)



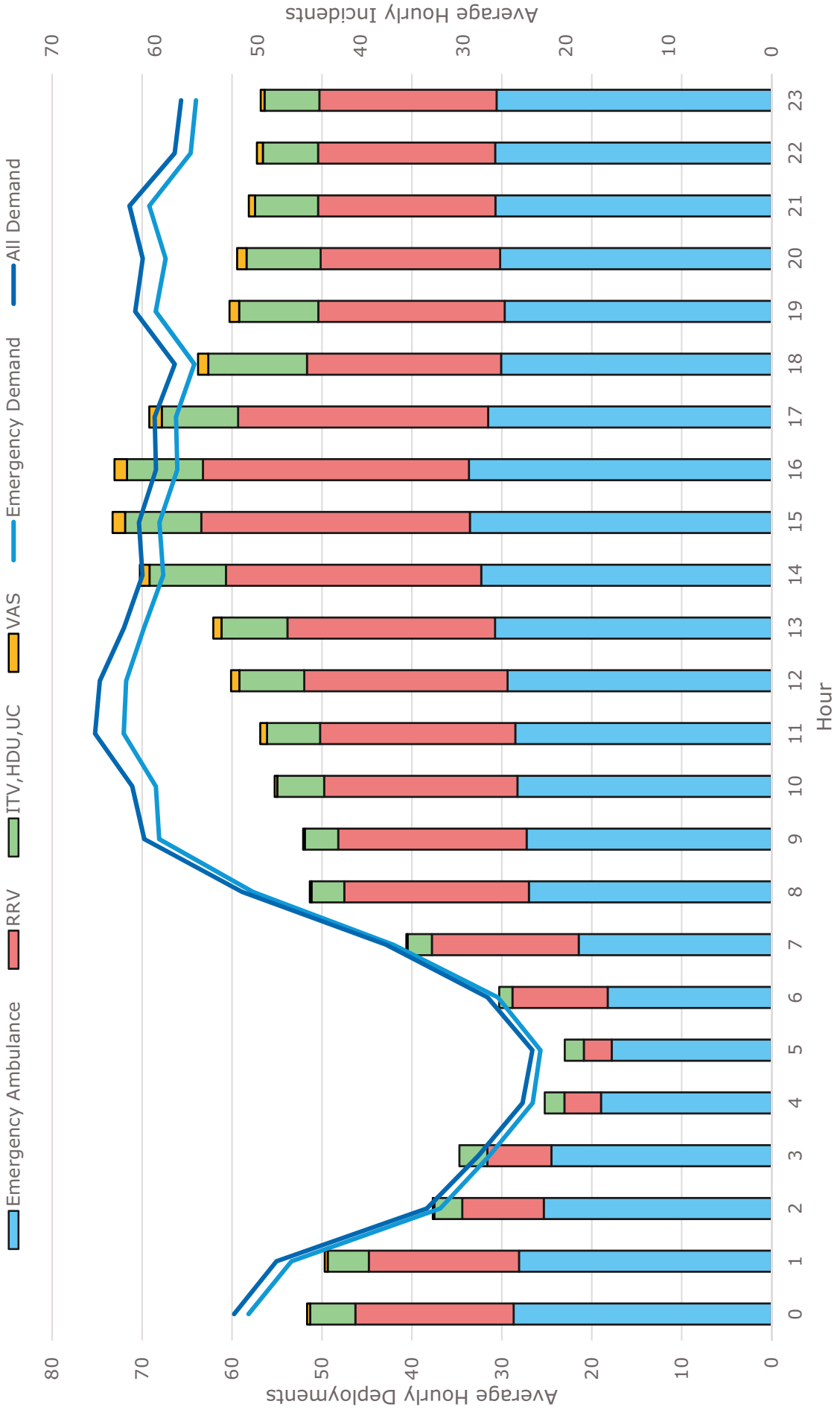
South East - Demand & Resource Matching - Weekdays

12-Month Sample (April 2018 to March 2019)



South East - Demand & Resource Matching - Weekends

12-Month Sample (April 2018 to March 2019)



Utilisation by Health Board

1-Year Sample (April 2018 to March 2019)

Emergency Ambulance

Health Board	Weekly Vehicle Hours	Avg Weekly Occupied Time	Utilisation
Aneurin Bevan	2,240.8	1,635.7	73.0%
Cardiff & Vale	1,461.6	1,086.9	74.4%
Cwm Taf	1,204.2	727.8	60.4%
Betsi Cadwaladr	4,283.5	2,579.9	60.2%
Abertawe Bro Morgannwg	2,288.5	1,519.9	66.4%
Hywel Dda	3,010.9	1,374.3	45.6%
Powys	1,549.3	576.7	37.2%
Trust Wide	16,038.7	9,501.1	59.2%

RRV

Health Board	Weekly Vehicle Hours	Avg Weekly Occupied Time	Utilisation
Aneurin Bevan	1,565.3	582.8	37.2%
Cardiff & Vale	822.6	283.7	34.5%
Cwm Taf	816.6	243.7	29.8%
Betsi Cadwaladr	1,081.1	378.1	35.0%
Abertawe Bro Morgannwg	991.8	397.1	40.0%
Hywel Dda	442.3	166.0	37.5%
Powys	315.7	60.8	19.3%
Trust Wide	6,035.5	2,112.2	35.0%

UCS

Health Board	Weekly Vehicle Hours	Avg Weekly Occupied Time	Utilisation
Aneurin Bevan	442.6	301.9	68.2%
Cardiff & Vale	420.9	222.2	52.8%
Cwm Taf	409.7	226.2	55.2%
Betsi Cadwaladr	635.4	389.1	61.2%
Abertawe Bro Morgannwg	442.5	271.4	61.3%
Hywel Dda	354.3	192.4	54.3%
Powys	202.7	82.9	40.9%
Trust Wide	2,908.2	1,686.0	58.0%

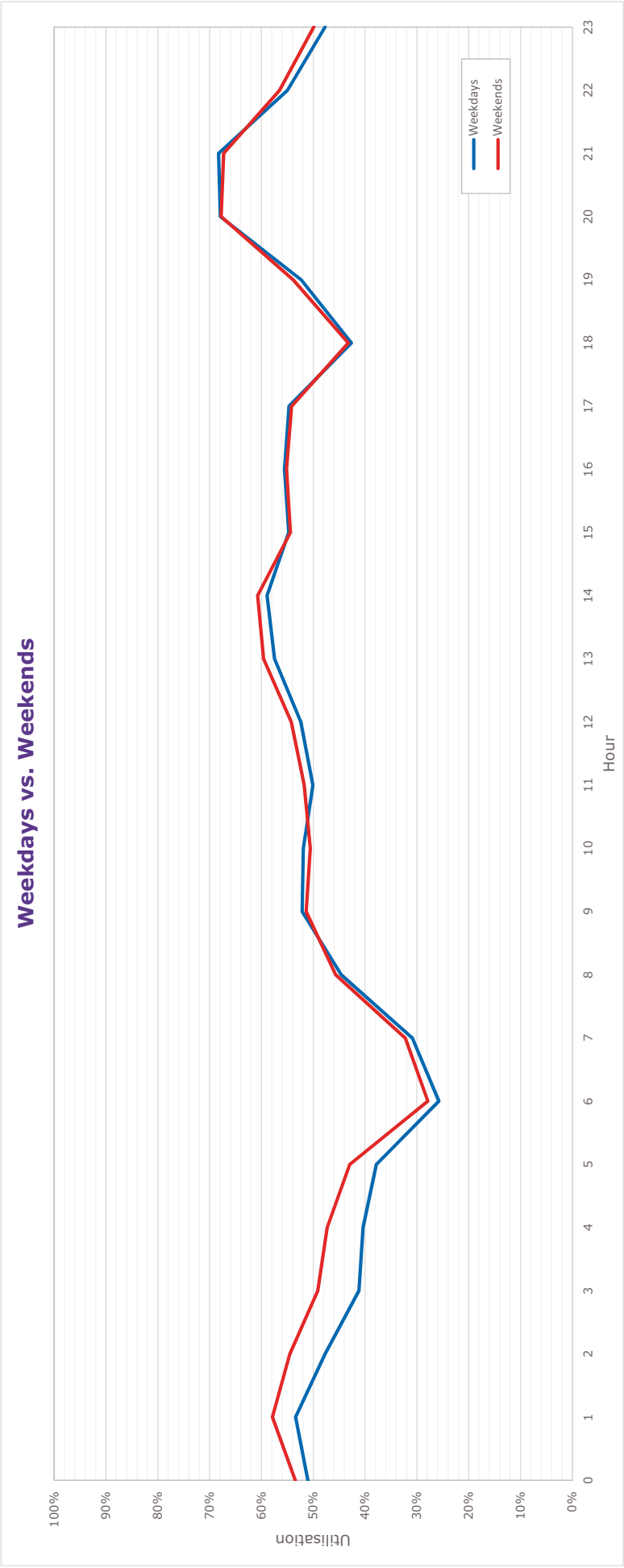
APP

Health Board	Weekly Vehicle Hours	Avg Weekly Occupied Time	Utilisation
Aneurin Bevan	25.1	18.3	73.0%
Cardiff & Vale	-	0.4	-
Cwm Taf	14.0	9.7	69.1%
Betsi Cadwaladr	94.1	55.1	58.6%
Abertawe Bro Morgannwg	67.2	42.7	63.6%
Hywel Dda	44.5	15.4	34.5%
Powys	10.3	1.4	13.4%
Trust Wide	255.2	143.0	56.0%

Central & West
EA Utilisation by Hour and Day (Based on Actual Deployments)
April 18 to March 19

Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total
Monday	54%	55%	49%	42%	44%	41%	28%	34%	47%	55%	55%	54%	55%	59%	59%	58%	60%	59%	46%	54%	69%	71%	58%	49%	53%
Tuesday	51%	55%	51%	45%	42%	40%	27%	31%	45%	53%	53%	50%	51%	58%	60%	54%	55%	56%	42%	52%	67%	68%	55%	48%	51%
Wednesday	52%	52%	45%	39%	38%	36%	24%	30%	46%	53%	52%	49%	52%	57%	58%	54%	55%	55%	42%	52%	69%	68%	54%	47%	50%
Thursday	49%	53%	48%	40%	40%	39%	25%	29%	42%	51%	51%	50%	52%	56%	57%	52%	54%	53%	42%	51%	65%	65%	53%	46%	49%
Friday	49%	51%	45%	39%	38%	34%	24%	30%	43%	50%	49%	48%	51%	58%	59%	55%	53%	51%	41%	53%	68%	69%	55%	48%	49%
Saturday	53%	57%	52%	46%	42%	39%	26%	29%	43%	51%	49%	51%	54%	59%	59%	53%	55%	54%	43%	54%	68%	68%	57%	51%	51%
Sunday	54%	59%	57%	53%	52%	47%	30%	36%	49%	52%	52%	52%	55%	60%	62%	56%	56%	54%	44%	53%	67%	67%	56%	49%	53%
Total	52%	55%	50%	43%	42%	39%	26%	31%	45%	52%	52%	51%	53%	58%	59%	55%	55%	55%	43%	53%	68%	68%	55%	48%	50.8%
Weekdays	51%	53%	48%	41%	40%	38%	26%	31%	45%	52%	52%	50%	52%	57%	59%	55%	56%	55%	43%	52%	68%	68%	55%	48%	50%
Weekends	53%	58%	55%	49%	47%	43%	28%	32%	46%	51%	51%	52%	54%	60%	61%	54%	55%	54%	43%	54%	68%	67%	56%	50%	52%

Colour Key: 0 to 20 % 20 to 40% 40 - 60% > 60%



South East

EA Utilisation by Hour and Day (Based on Actual Deployments)

April 18 to March 19

Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total
Monday	67%	67%	74%	70%	71%	56%	41%	60%	74%	87%	81%	70%	68%	74%	77%	76%	71%	72%	59%	68%	85%	87%	77%	67%	72%
Tuesday	67%	68%	75%	71%	73%	60%	44%	59%	71%	83%	78%	69%	62%	70%	76%	77%	73%	74%	59%	65%	83%	82%	74%	68%	71%
Wednesday	65%	65%	73%	67%	67%	51%	40%	57%	70%	82%	77%	66%	65%	75%	79%	76%	74%	75%	58%	66%	86%	86%	78%	67%	70%
Thursday	68%	69%	75%	71%	72%	56%	41%	59%	66%	78%	73%	64%	64%	72%	79%	75%	68%	71%	58%	65%	82%	85%	78%	67%	70%
Friday	65%	66%	73%	68%	68%	53%	38%	51%	61%	72%	69%	65%	63%	70%	71%	72%	68%	69%	56%	67%	84%	84%	73%	65%	67%
Saturday	67%	70%	77%	68%	76%	59%	42%	61%	75%	83%	77%	69%	67%	75%	76%	79%	70%	70%	58%	67%	86%	83%	73%	67%	71%
Sunday	69%	74%	82%	72%	78%	64%	45%	67%	79%	86%	76%	71%	68%	74%	78%	76%	71%	74%	61%	67%	83%	82%	75%	68%	73%
Total	67%	69%	76%	70%	72%	57%	42%	59%	71%	82%	76%	68%	65%	73%	77%	76%	71%	72%	58%	67%	84%	84%	75%	67%	70.6%
Weekdays	66%	67%	74%	69%	70%	55%	41%	57%	68%	80%	76%	67%	64%	72%	76%	75%	71%	72%	58%	66%	84%	85%	76%	67%	70%
Weekends	68%	72%	79%	70%	77%	61%	43%	64%	77%	85%	76%	70%	68%	74%	77%	78%	71%	72%	60%	67%	84%	82%	74%	67%	72%

Colour Key:

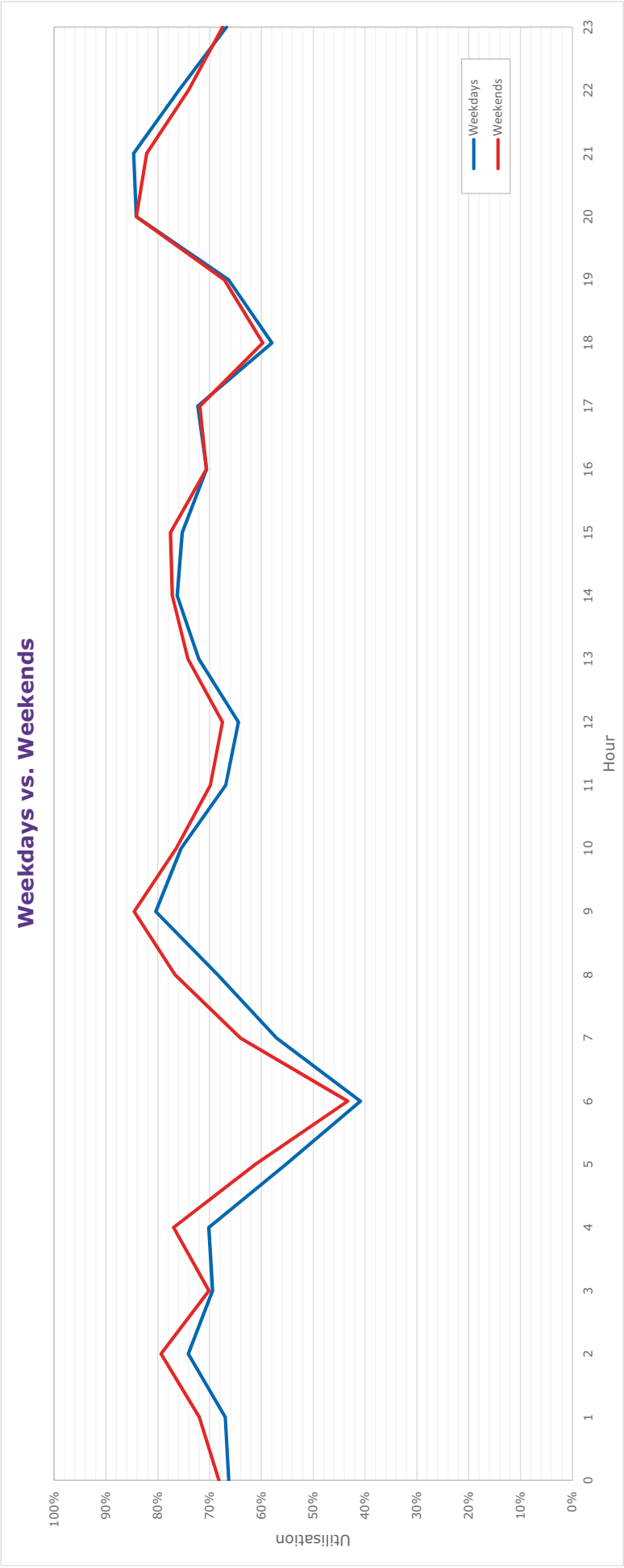
0 to 20 %

20 to 40%

40 - 60%

> 60%

Weekdays vs. Weekends



North

EA Utilisation by Hour and Day (Based on Actual Deployments)

April 18 to March 19

Day	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total
Monday	58%	61%	60%	54%	51%	48%	40%	41%	55%	68%	67%	59%	60%	68%	70%	65%	62%	64%	61%	65%	77%	78%	70%	60%	62%
Tuesday	59%	62%	60%	55%	55%	51%	42%	41%	54%	65%	64%	60%	59%	69%	73%	64%	60%	63%	60%	64%	76%	76%	67%	57%	61%
Wednesday	57%	61%	56%	50%	46%	44%	39%	41%	54%	60%	60%	59%	59%	66%	69%	65%	60%	63%	58%	60%	74%	77%	70%	58%	59%
Thursday	55%	60%	59%	53%	48%	44%	38%	39%	52%	61%	61%	57%	57%	63%	66%	62%	59%	62%	59%	60%	73%	74%	66%	55%	58%
Friday	56%	58%	56%	48%	42%	43%	37%	38%	49%	59%	60%	57%	62%	69%	70%	63%	59%	62%	58%	60%	73%	76%	69%	59%	58%
Saturday	59%	67%	69%	62%	56%	54%	44%	43%	52%	60%	59%	56%	63%	72%	72%	63%	58%	61%	59%	61%	76%	78%	69%	59%	62%
Sunday	62%	69%	72%	65%	59%	59%	48%	46%	60%	68%	64%	60%	65%	72%	72%	65%	63%	65%	61%	64%	76%	77%	69%	58%	64%
Total	58%	63%	62%	55%	51%	49%	41%	41%	54%	63%	62%	58%	61%	69%	70%	64%	60%	63%	60%	62%	75%	77%	69%	58%	60.6%
Weekdays	57%	60%	58%	52%	48%	46%	39%	40%	53%	63%	62%	58%	59%	67%	70%	64%	60%	63%	59%	62%	75%	76%	68%	58%	60%
Weekends	60%	68%	70%	63%	58%	56%	46%	45%	56%	64%	62%	58%	64%	72%	72%	64%	60%	63%	60%	62%	76%	77%	69%	58%	63%

> 60%

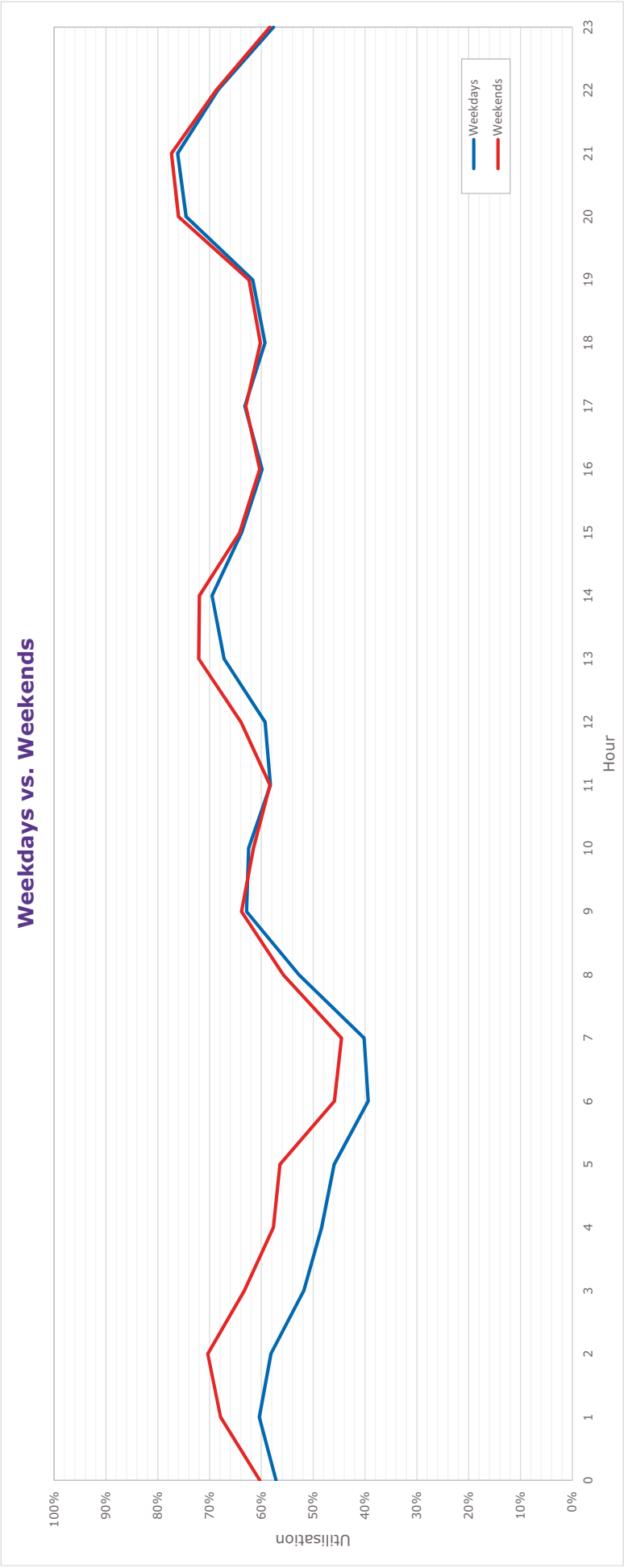
40 - 60%

20 to 40%

0 to 20 %

Colour Key:

Weekdays vs. Weekends



Vehicle Off-Road by Reason and Vehicle Type

May 2018 - March 2019

Emergency Ambulances

VOR Reason	% of Shift VOR
Communications	0.1%
Equipment	0.4%
Halo Duties	0.5%
Leave	0.0%
Police Interview	0.1%
RTB S/D Mealbreak	8.6%
Safeguarding/POVA	0.2%
Soiled Uniform	0.2%
Staff Illness	0.1%
Staff Injury	0.1%
Training On Base	0.0%
Training Vehicle	0.0%
Traumatic Stand Down	0.2%
Vehicle Cleaning	0.7%
Vehicle Defect	0.8%
Total	11.9%
Total without RTB Mealbreak	3.3%

Rapid Response Vehicles

VOR Reason	% of Shift VOR
Communications	0.4%
Equipment	0.7%
Halo Duties	4.2%
Leave	0.2%
Police Interview	0.4%
RTB S/D Mealbreak	4.6%
Safeguarding/POVA	0.2%
Soiled Uniform	0.3%
Staff Illness	0.2%
Staff Injury	0.1%
Training On Base	0.2%
Training Vehicle	0.4%
Traumatic Stand Down	0.4%
Vehicle Cleaning	0.5%
Vehicle Defect	0.8%
Total	13.5%
Total without RTB Mealbreak	9.0%

Welsh Ambulance Services NHS Trust

Calls Answered by Home CCC2018/19**999 Calls by CCC**

Line Area	CCC Answered		
	Central and West	North	South East
Central and West	64.0%	20.8%	15.2%
North	12.1%	75.3%	12.6%
South East	14.5%	19.7%	65.8%

Average Call Duration (999 Lines, Minutes)

Line Area	CCC Answered		
	Central and West	North	South East
Central and West	06:01	05:51	05:55
North	05:42	05:42	05:39
South East	05:52	05:48	05:53

Welsh Ambulance Services NHS Trust

Call Handler Staffing2018/19***Weekly Staff Hours (Q3/Q4)***

CCC	Planned	Actual	Difference	% Difference
Central and West	982.8	714.2	-268.6	-27.3%
North	793.0	794.3	1.3	0.2%
South East	1,103.0	878.7	-224.3	-20.3%
Total	2,878.8	2,387.2	-491.6	-17.1%

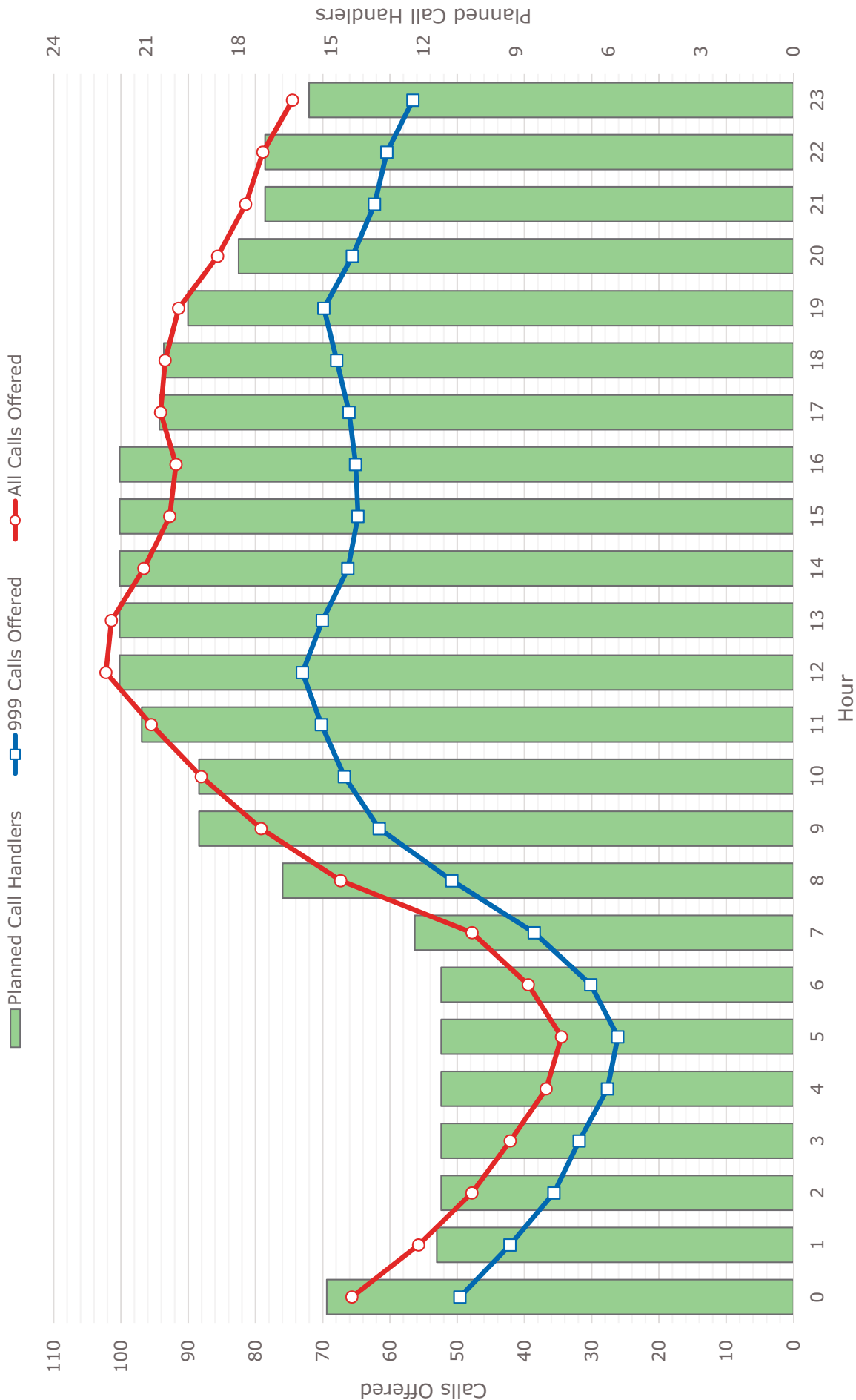
Welsh Ambulance Services NHS Trust

999 Call Durations2018/19***Average 999 Call Duration (Minutes)***

CCC Answered	2018/19	Jan 18 - Sep 18	Jan 19 - Jul 19	Difference
Central and West	05:57	05:29	06:44	01:15
North	05:45	05:19	06:07	00:48
South East	05:52	04:52	07:10	02:18
WAST Wide	05:51	05:11	06:40	01:29

Emergency Services	02:37	02:26	02:49	00:23
HCP Urgent	03:29	03:20	03:40	00:20
Routine	02:24	02:25	02:29	00:04

Resource Demand Matching - 2018/19



Welsh Ambulance Services NHS Trust

Dispatch Desk Workload

2018/19

Planned Vehicle Numbers

Dispatch Area	Average Planned Vehicles (EAs, RRVs & UCS)		
	Day (07:00-19:00)	Evening (19:00-02:00)	Night (02:00-07:00)
Carmarthenshire & Pembrokeshire	16.8	16.0	13.5
Neath Port Talbot & Bridgend	14.1	14.2	9.7
Powys & Ceredigion	20.5	18.2	12.9
Swansea	9.4	9.9	7.5
Anglesey & Gwynedd	15.4	15.4	10.5
Conwy & Denbighshire	13.2	10.8	9.0
Flintshire & Wrexham	13.2	12.3	8.3
Cardiff & Vale	15.8	17.9	10.3
North & West Aneurin Bevan	17.5	17.8	11.9
Rhondda Cynon Taf	16.5	15.9	8.3
South Aneurin Bevan	13.5	13.3	7.8
HCP North	8.5	-	-
HCP Central and West	9.4	-	-
HCP South East	9.2	-	-
APP North	2.0	2.0	-
APP Central and West	1.8	1.4	1.0
APP South East	1.7	1.4	1.1

Incident Workload

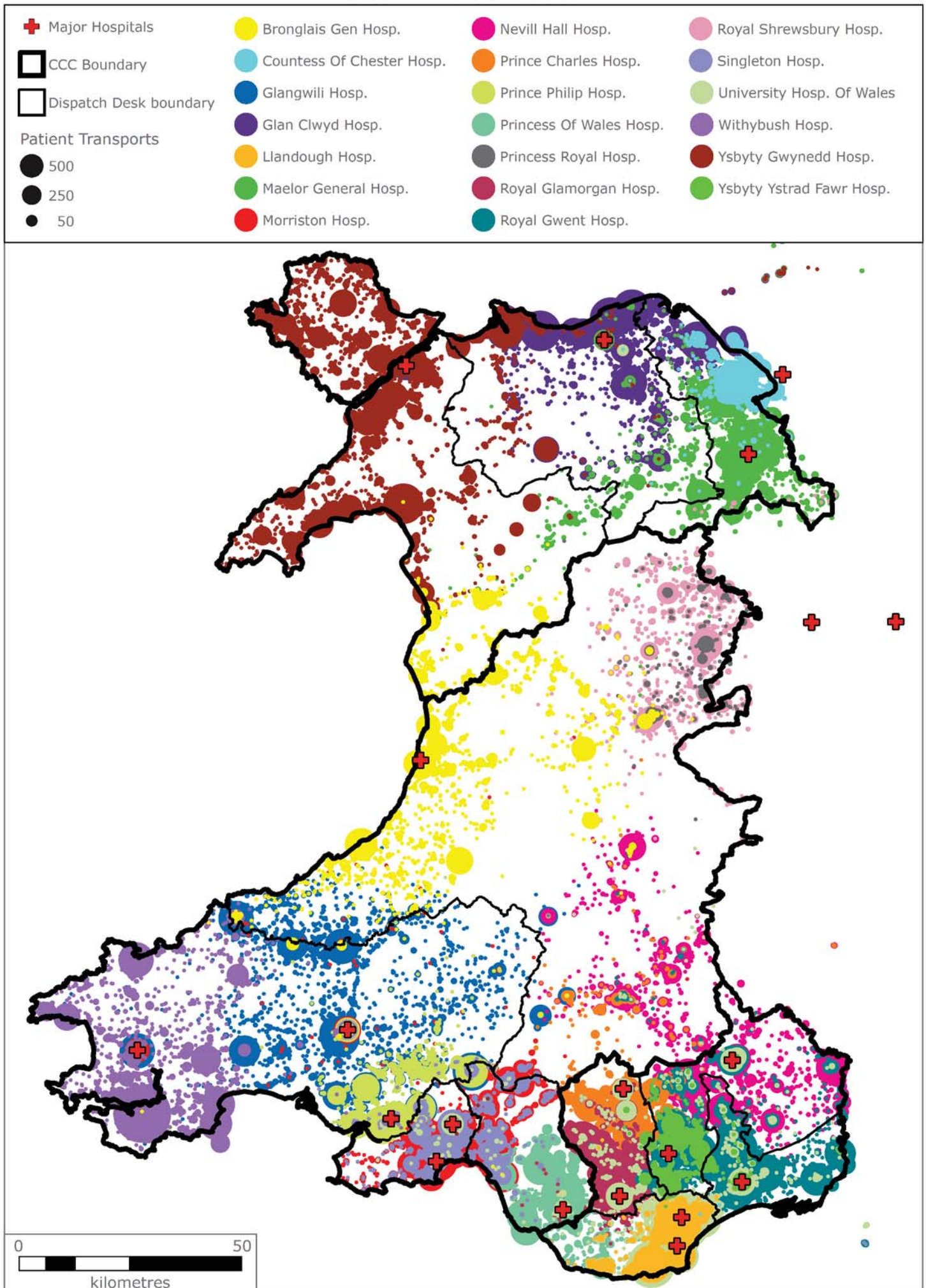
Dispatch Area	Average Hourly Assigned Incidents		
	Day (07:00-19:00)	Evening (19:00-02:00)	Night (02:00-07:00)
Carmarthenshire & Pembrokeshire	4.9	4.2	2.3
Neath Port Talbot & Bridgend	3.6	3.4	1.9
Powys & Ceredigion	3.2	2.6	1.4
Swansea	3.0	3.0	1.7
Anglesey & Gwynedd	3.3	2.8	1.5
Conwy & Denbighshire	3.9	3.3	2.1
Flintshire & Wrexham	4.2	3.6	2.1
Cardiff & Vale	5.2	5.1	2.7
North & West Aneurin Bevan	3.8	3.5	1.9
Rhondda Cynon Taf	4.1	3.7	2.0
South Aneurin Bevan	3.6	3.2	1.8
HCP North	3.1	-	-
HCP Central and West	3.4	-	-
HCP South East	4.3	-	-
APP North	0.6	0.3	-
APP Central and West	0.4	0.3	0.1
APP South East	0.2	0.1	0.0

Please Treat as Confidential

Please Treat as Confidential
Patient Journeys to Major Hospitals

April 2018 to March 2019

C13

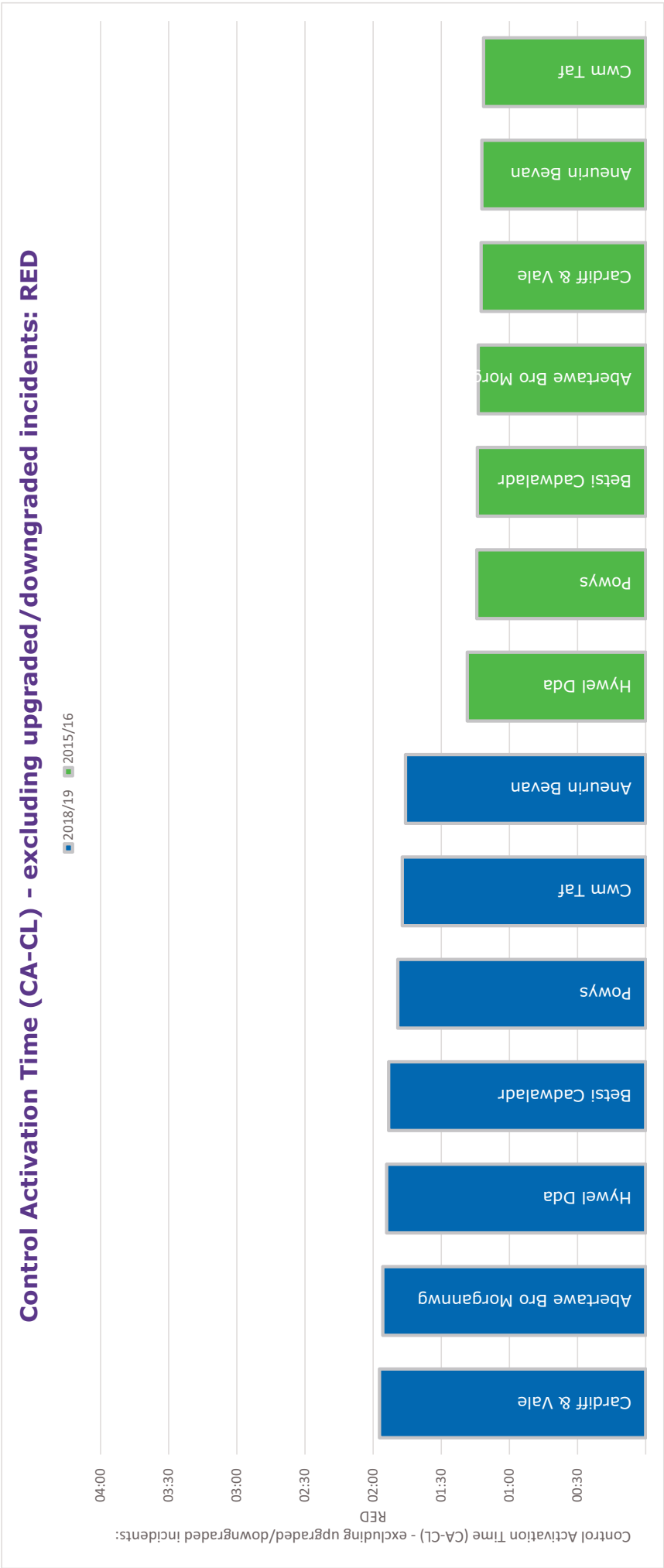


Please Treat as Confidential

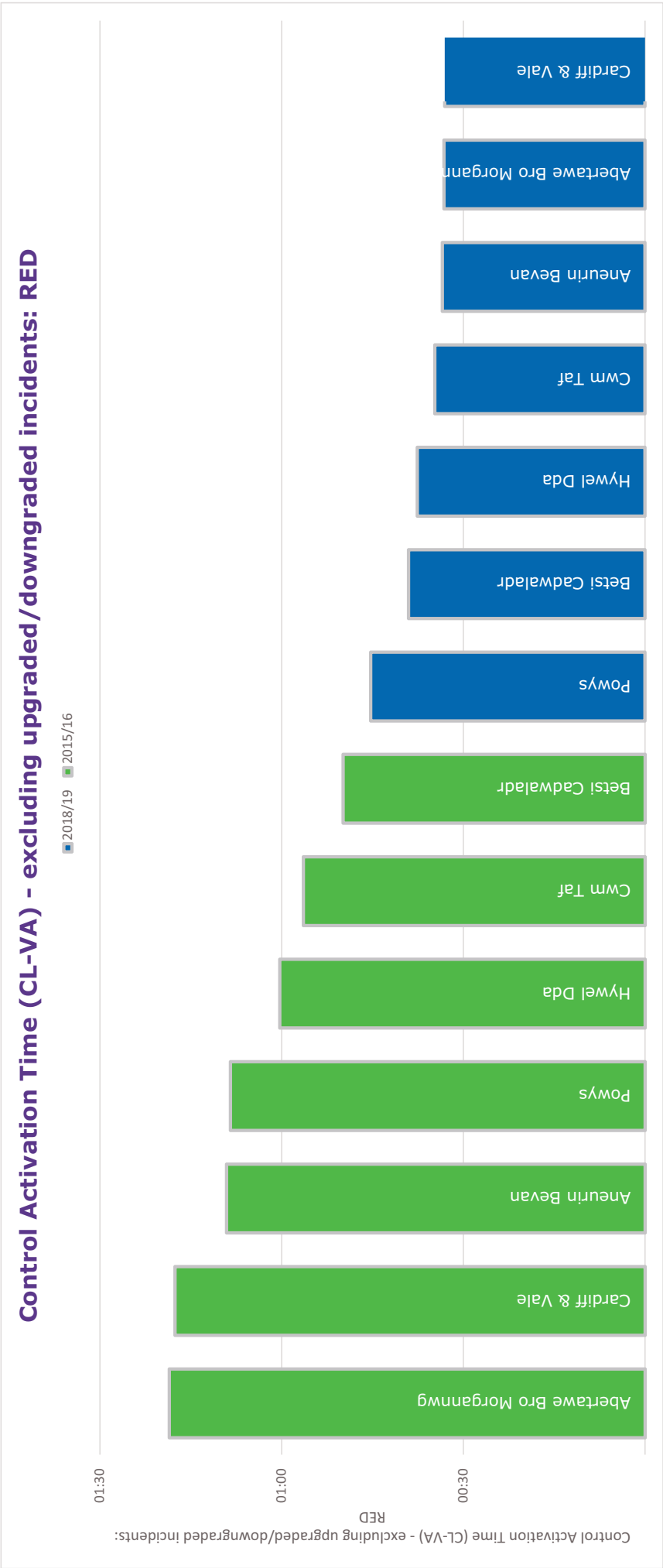
D Internal Benchmarking

- D1 Control Activation Time (CA-CL)**
- D2 Control Activation Time (CL-VA)**
- D3 Control Activation Time (CA-VA)**
- D4 Multiple Attendance Ratio**
- D5 Time at Scene & Conveyance Rate**
- D6 Time at Hospital - Arrival to Handover**
 - D6a** By Health Board
 - D6b** By Hospital
- D7 Time at Hospital – Handover to Clear**
- D8 Average Call Duration**

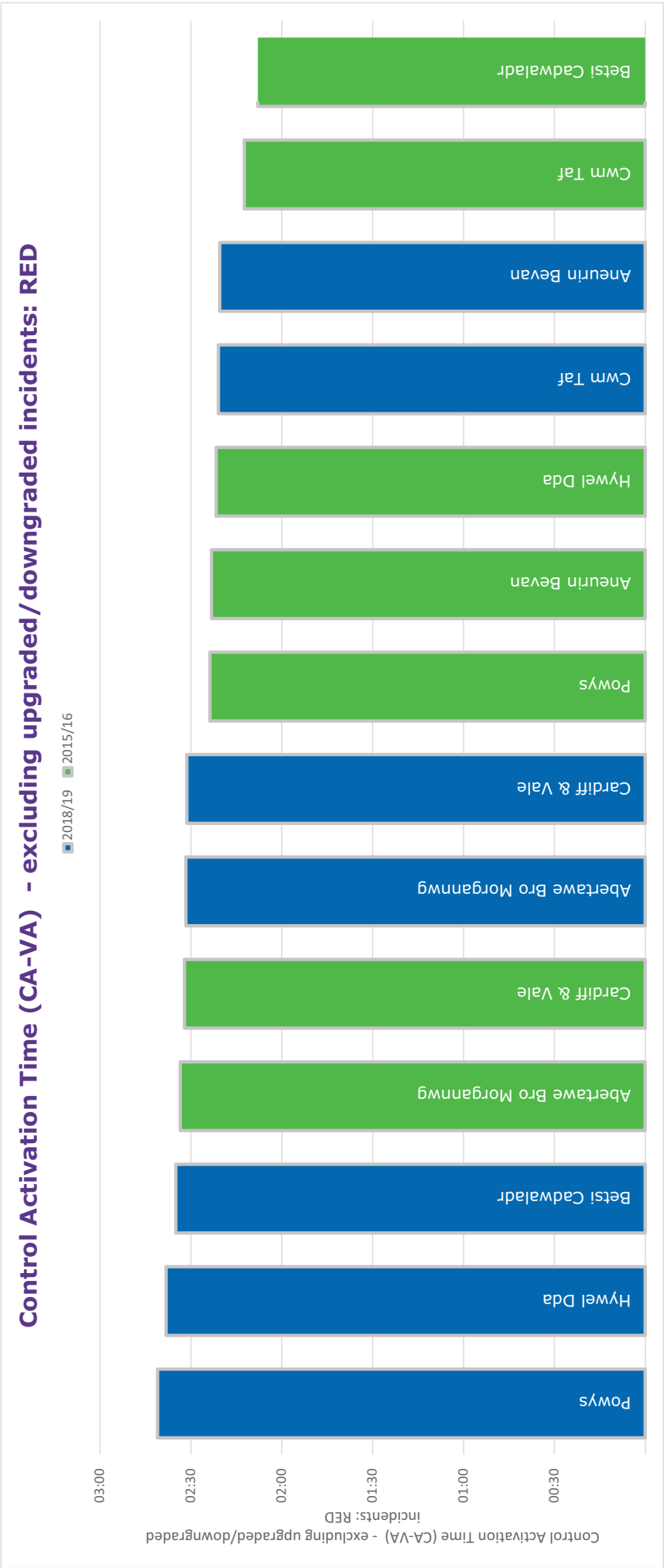
Please Treat as Confidential



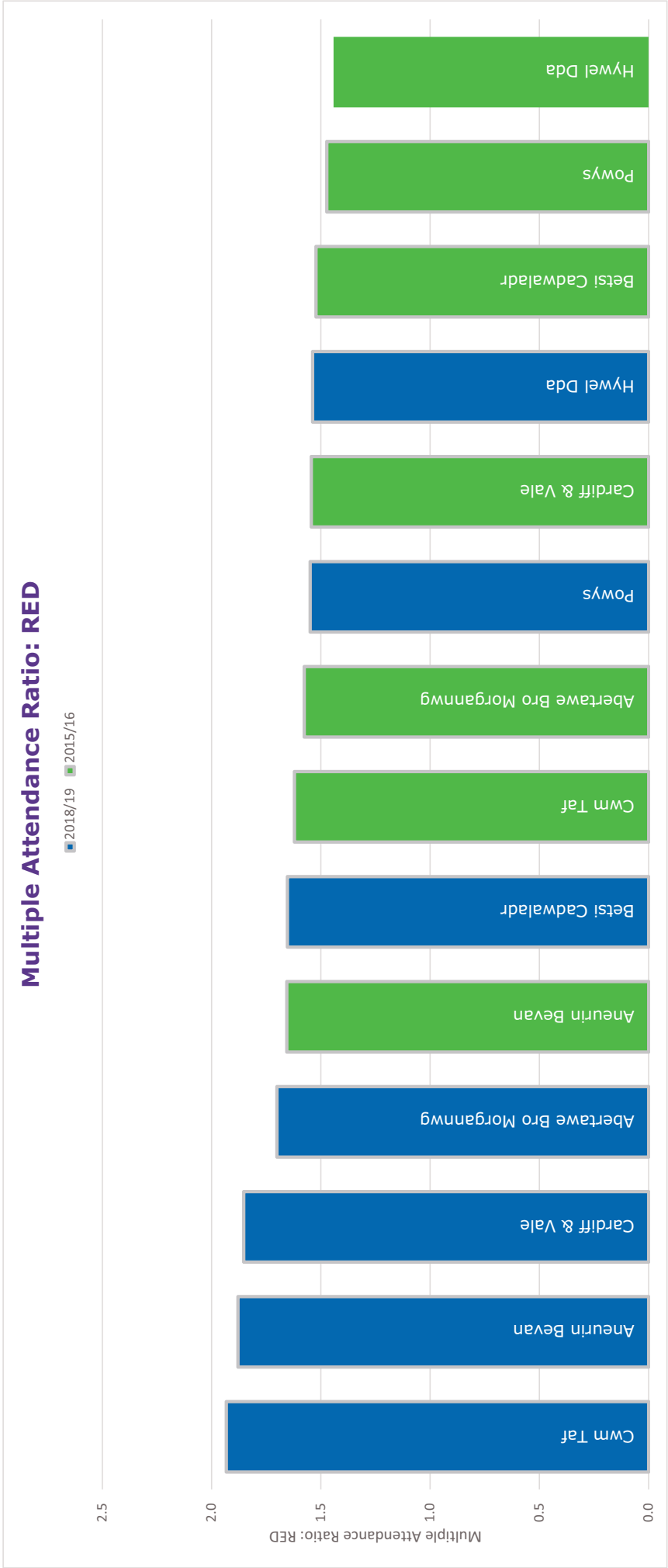
Activation time is defined as the time between call answer and clock start.



Activation time is defined as the time between clock start and the time that the first resource is assigned to the incident. Activation Times shown are for the first resource that arrives on scene to the incident.



Activation time is defined as the time between call answer and the time that the first resource is assigned to the incident. Activation Times shown are for the first resource that arrives on scene to the incident.



The Multiple Attendance Ratio is the average number of resources (DFI) that arrive on scene to each incident.

Time at Scene & Conveyance Rate : Ambulance Responses

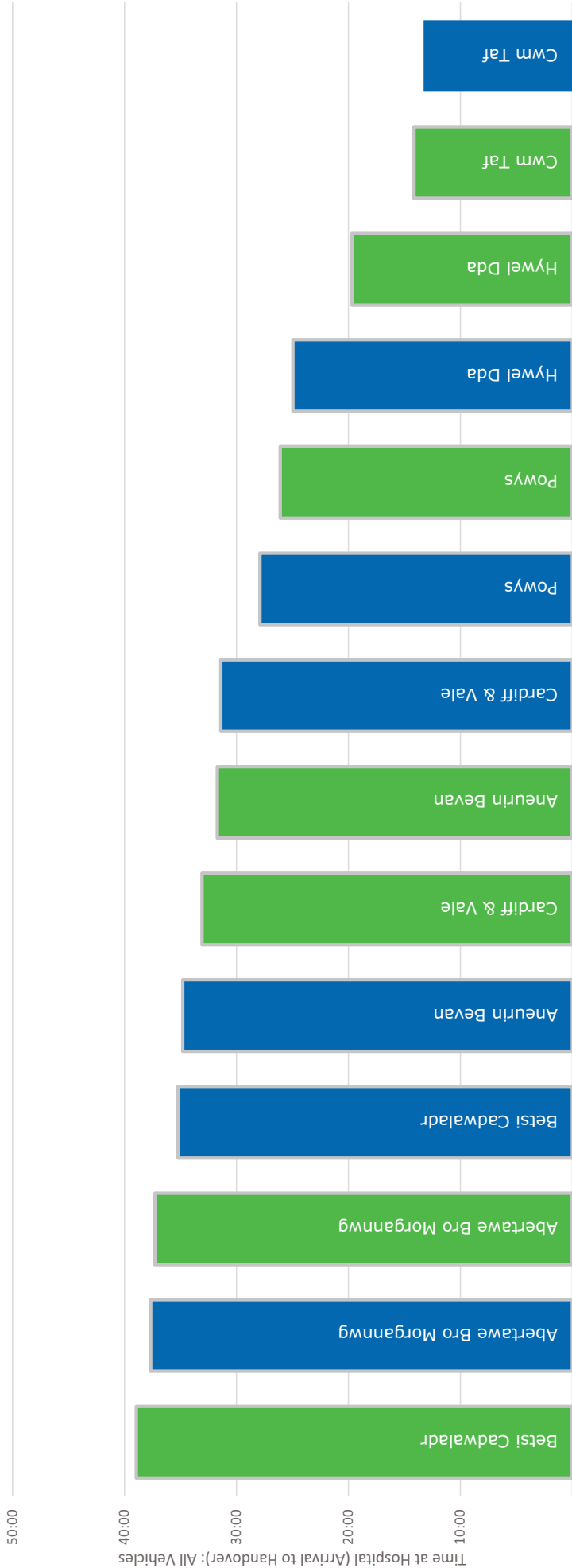
Legend: 2018/19 (Blue), 2015/16 (Green), Conveyance Rate (Black Diamond)

Health Board	2018/19 Time at Scene (min)	2018/19 Conveyance Rate (%)	2015/16 Time at Scene (min)	2015/16 Conveyance Rate (%)
Powys	38.5	68.5%	40.0	71.3%
Abertawe Bro Morgannwg	39.0	68.6%	40.0	70.6%
Hywel Dda	39.5	74.3%	40.0	70.3%
Aneurin Bevan	39.5	70.6%	40.0	69.2%
Betsi Cadwaladr	39.5	69.2%	40.0	73.8%
Cardiff & Vale	39.5	70.3%	40.0	72.2%
Cwm Taf	39.5	79.9%	40.0	70.8%
Cardiff & Vale	39.5	72.2%	40.0	68.6%
Hywel Dda	39.5	73.8%	40.0	73.2%
Abertawe Bro Morgannwg	39.5	70.8%	40.0	81.0%
Aneurin Bevan	39.5	73.2%	40.0	
Cwm Taf	39.5		40.0	

Time at Scene is the average time taken from when the resource arrives on scene to the time the resource leaves the scene. This measure is for all responding resources to the incident.

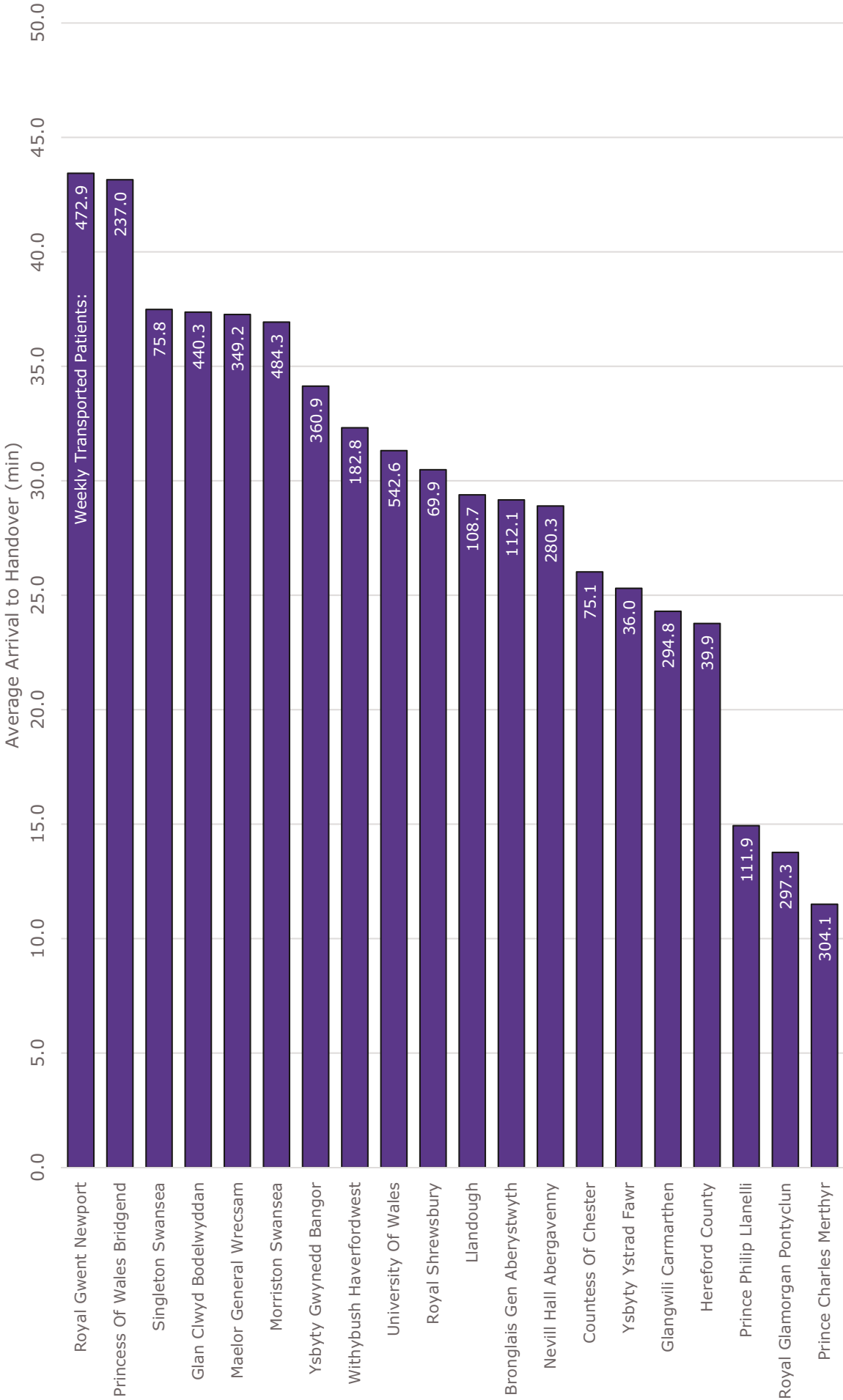
Time at Hospital (Arrival to Handover): All Vehicles

2018/19 2015/16



The Time at Hospital is the average time taken from when the resource arrives at hospital to when the patient is handed over to the hospital.

Average Arrival to Handover by Hospital



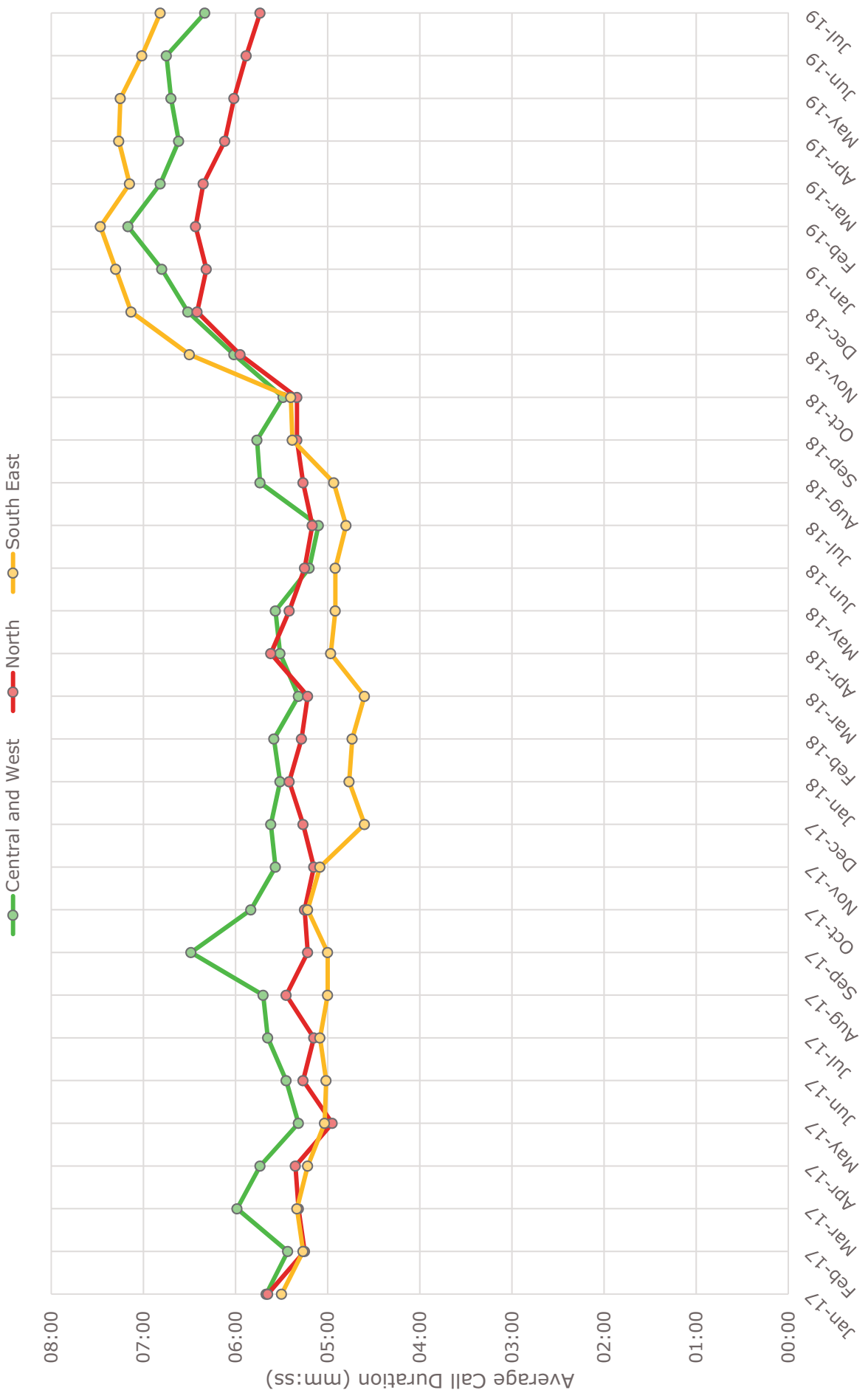
Time at Hospital (Handover to Clear): All Vehicles

■ 2018/19 ■ 2018/19



The Time at Hospital is the average time taken from when the patient is handed over to when the resource is clear for the next assignment.

Average 999 Call Duration by CCC



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E External Benchmarking

E1 Control Activation Time - RED

E2 Control Activation Time – Other Emergency Categories

E3 Multiple Attendance Ratio - RED

E4 Time at Scene and Conveyance Rates

E4a Time at Scene & Conveyance Rate: First Ambulance

E4b Time at Scene for Conveyed Incidents

E4c Time at Scene for Non-Conveyed Incidents






E5 Time at Hospital - Arrival to Handover

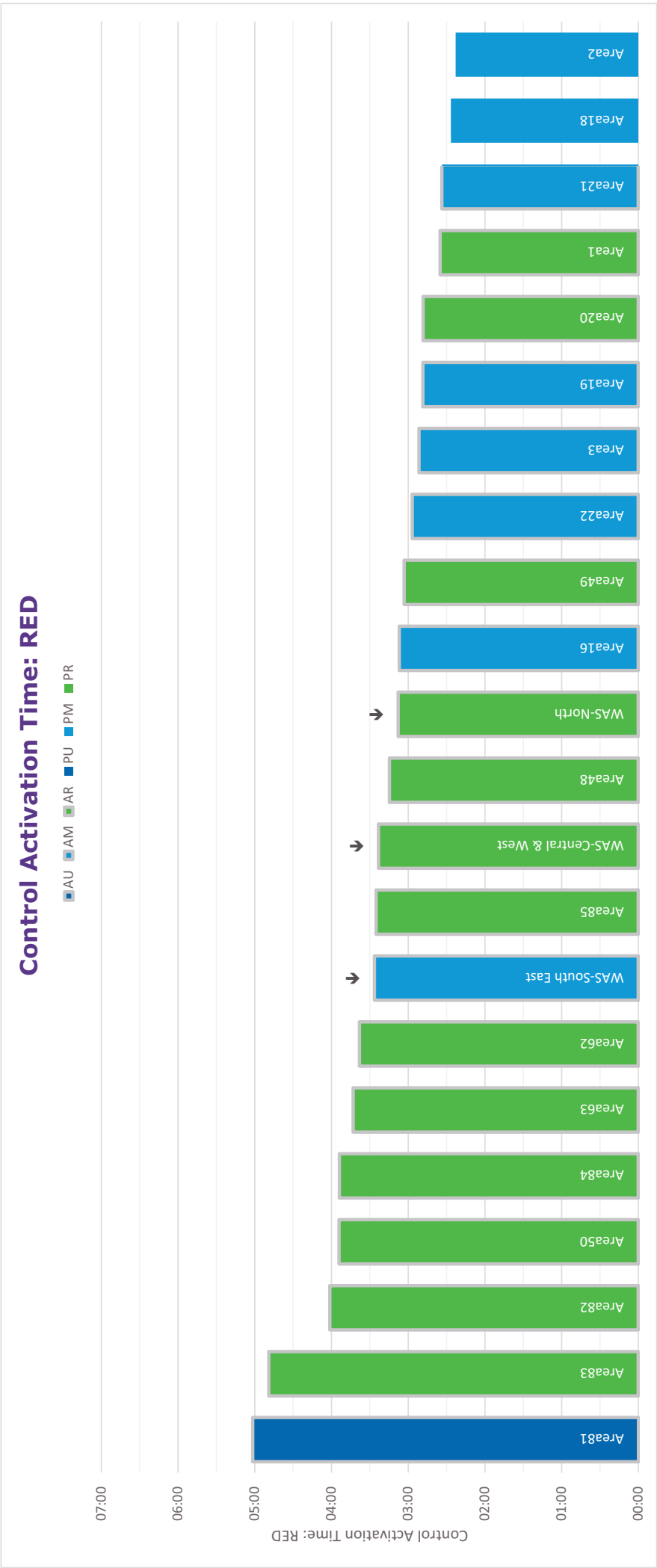
E6 Time at Hospital - Handover to Clear

E7 DCA Utilisation

E8 999 Call Durations

Benchmarking Legend

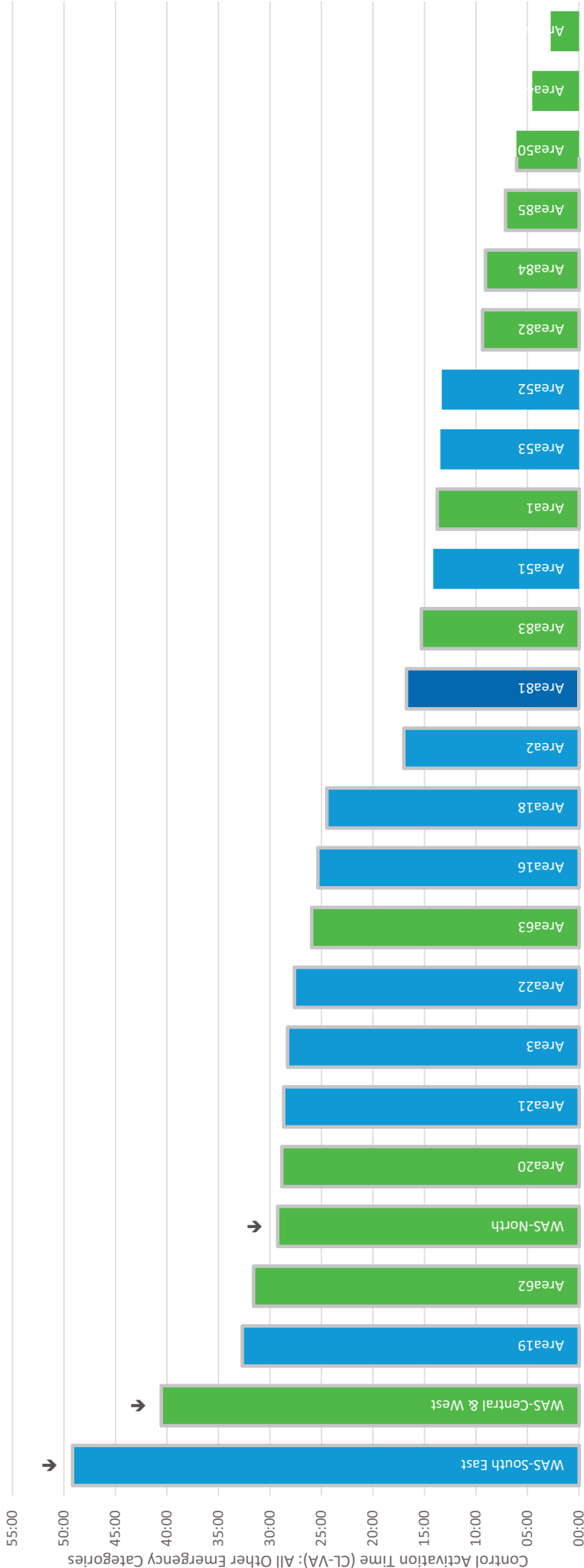
 PR	NHS Pathways Rural
 PM	NHS Pathways Mixed
 PU	NHS Pathways Urban
 AR	AMPDS Rural
 AM	AMPDS Mixed
 AU	AMPDS Urban



Activation time is defined as the time between call answer and the time that the first resource is assigned to the incident. Activation Times shown are for the first resource that arrives on scene to the incident.

Control Activation Time (CL-VA): All Other Emergency Categories

■ AU ■ AM ■ AR ■ PU ■ PM ■ PR



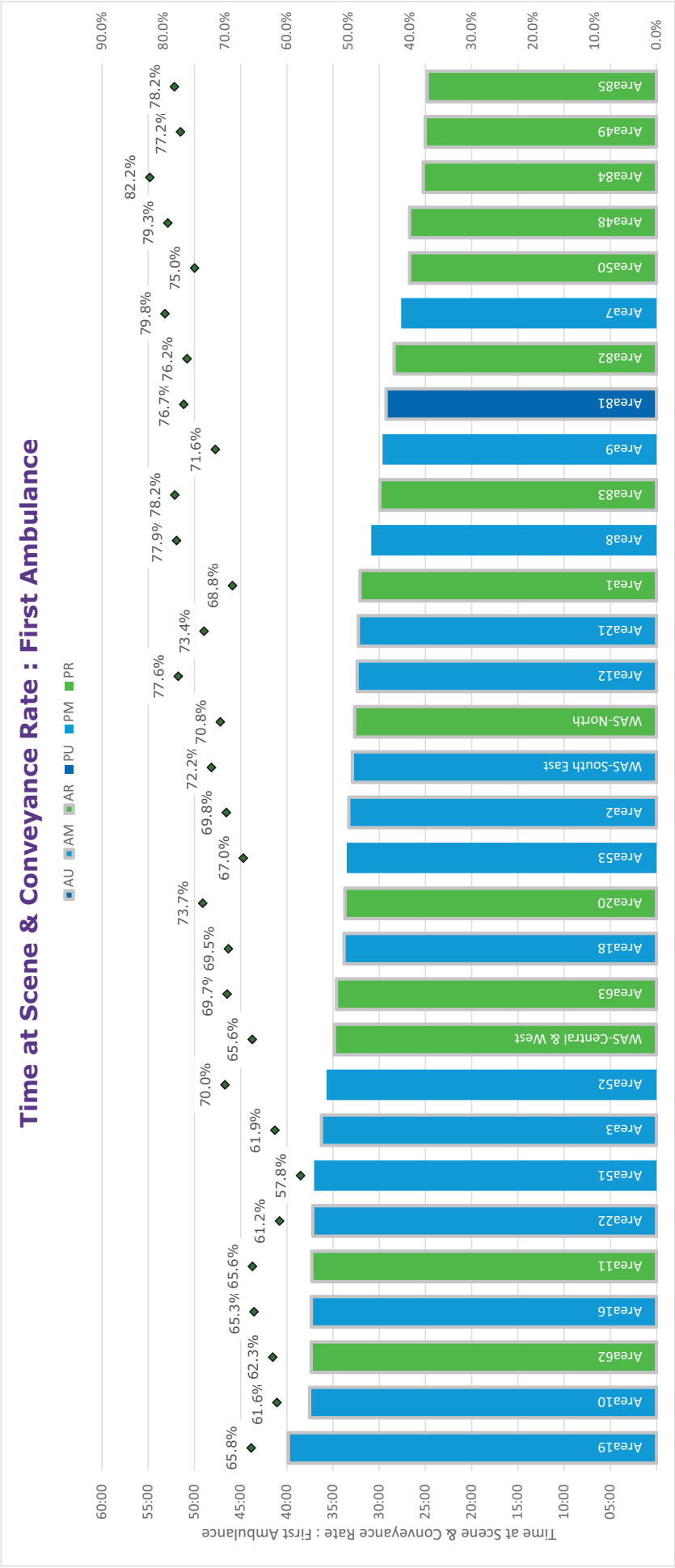
Activation time is defined as the time between clock start and the time that the first resource is assigned to the incident. Activation Times shown are for the first resource that arrives on scene to the incident.

Multiple Attendance Ratio: RED

AU AM AR PU PM PR



The Multiple Attendance Ratio is the average number of resources (DFI) that arrive on scene to each incident.



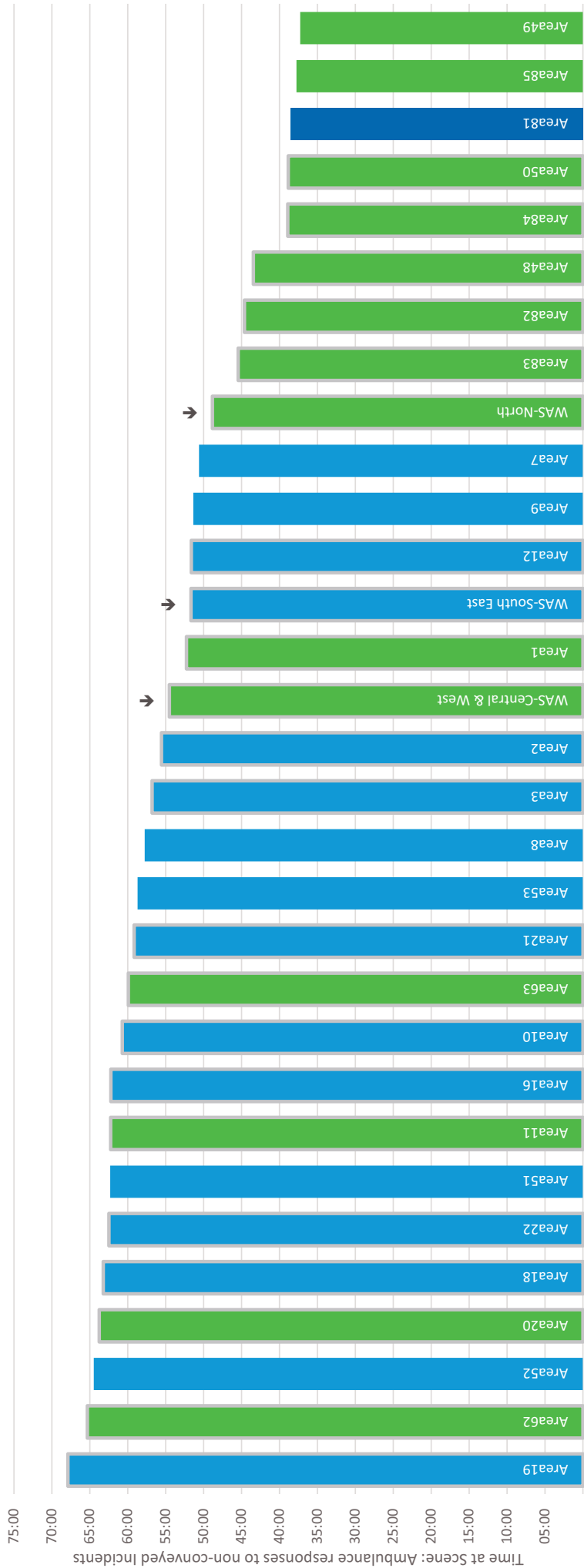
Time at Scene is the average time taken from when the resource arrives on scene to the time the resource leaves the scene. This measure is for all responding resources to the incident.



Time at Scene is the average time taken from when the resource arrives on scene to the time the resource leaves the scene. This measure is for all responding resources to the incident.

Time at Scene: Ambulance responses to non-conveyed Incidents

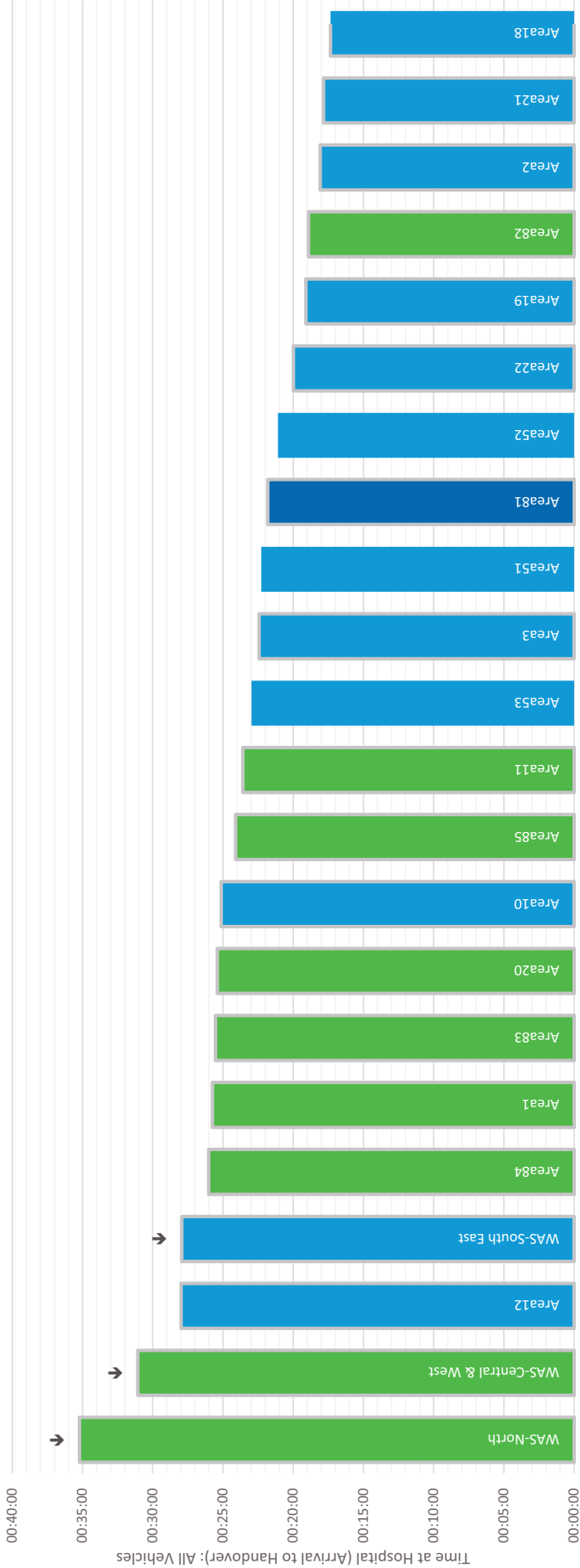
AU AM AR PU PM PR



Time at Scene is the average time taken from when the resource arrives on scene to the time the resource leaves the scene. This measure is for all responding resources to the incident.

Time at Hospital (Arrival to Handover): All Vehicles

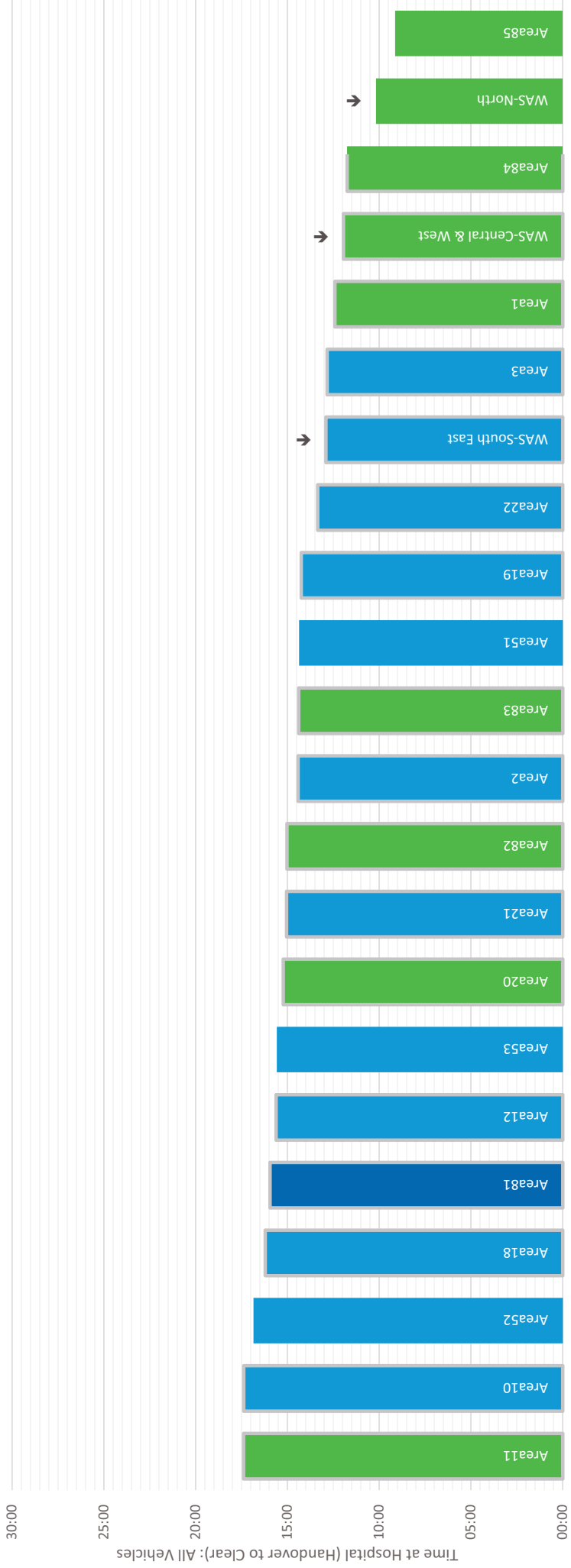
AU AM AR PU PM PR



The Time at Hospital is the average time taken from when the resource arrives at hospital to when the patient is handed over to the hospital.

Time at Hospital (Handover to Clear): All Vehicles

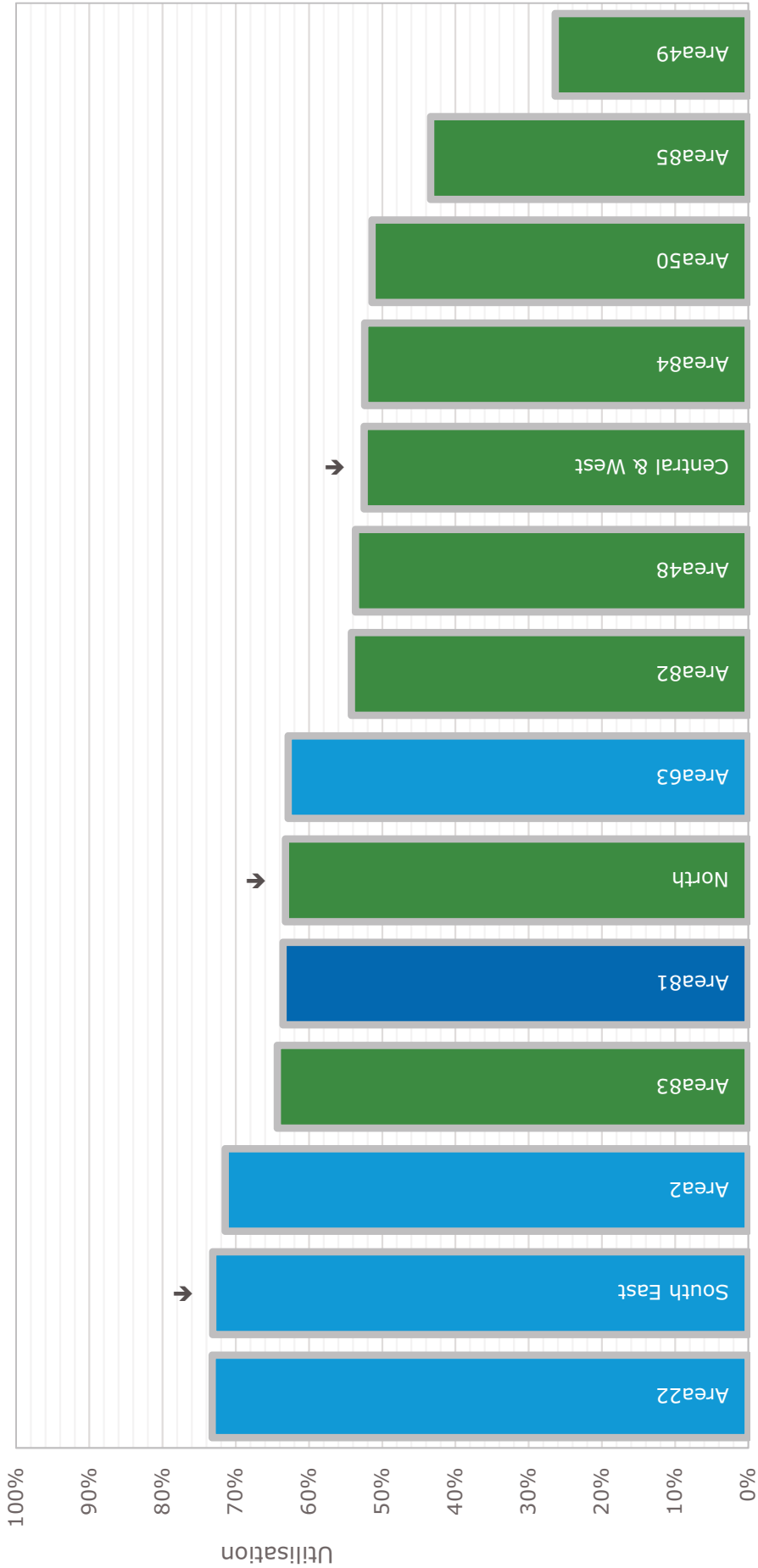
AU AM AR PU PM PR



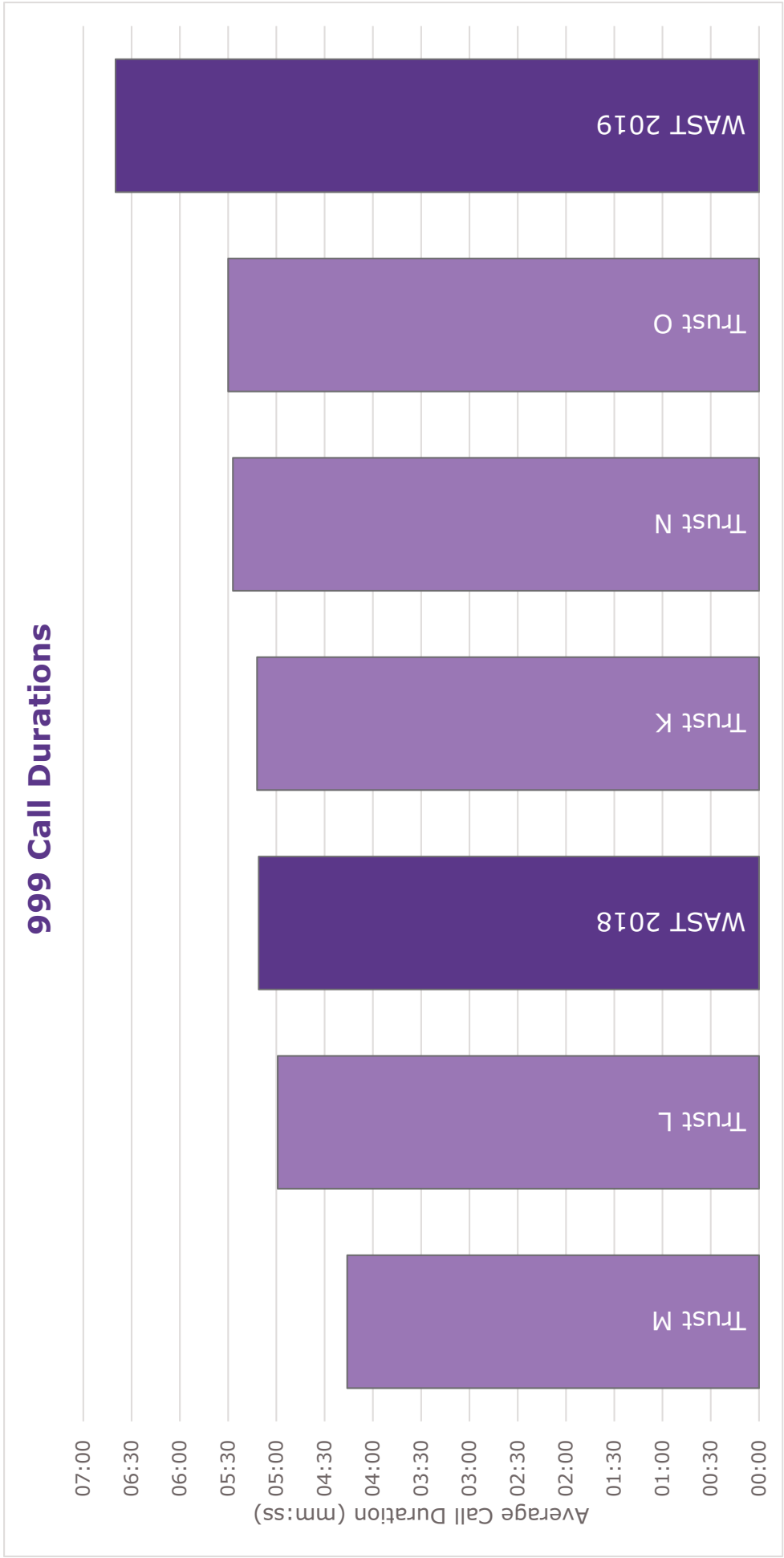
The Time at Hospital is the average time taken from when the patient is handed over to when the resource is clear for the next assignment.

Emergency Ambulance Utilisation

■ R ■ M ■ U ■ AMPDS Dispatch



Utilisation is the time the Vehicle is occupied with an incident over the total time the vehicle is available



Call Duration is measured from the time a call is answered to the time a call ends. This measure is across all 999 lines.

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F CTA Codeset Benchmarking

F1 CTA-Suitable Calls Benchmarking

F2 Hear and Treat Potential

Average Daily CTA Suitable Calls

Initial Category	WAST Codeset			Trust C Codeset			
	NHSD	CSD	Total	Clinician	Pharmacist	Mental Health	Total
Red	0.1	0.1	0.2	0.2	0.1	0.2	0.5
Amber 1	0.1	0.0	0.1	2.2	0.1	0.0	2.2
Amber 2	0.0	29.7	29.7	51.1	0.0	50.0	101.1
Green 2	0.0	42.1	42.1	36.7	2.2	4.4	43.3
Green 3	133.4	10.1	143.5	108.7	23.8	7.3	139.9
HCP	0.1	0.0	0.1	0.1	0.0	0.0	0.1
Total	133.7	81.9	215.6	199.0	26.1	62.0	287.1
% of Verified Calls	10.5%	6.5%	17.0%	15.7%	2.1%	4.9%	22.6%

Trust A Codeset	Trust B Codeset
0.1	0.1
2.2	2.2
7.0	13.6
20.6	21.4
125.8	111.2
0.1	0.1
155.8	148.7
12.3%	11.7%

Average Daily CTA Suitable Calls

Initial Category	Current Codeset (WAST)			Expanded Codeset (WAST + Trust C)				
	NHSD	CSD	Total	NHSD	CSD			Total
					Clinician	Pharmacist	Mental Health	
Red	0.1	0.1	0.2	0.1	0.1	0.0	0.2	0.5
Amber 1	0.1	0.0	0.1	0.1	2.1	0.0	0.0	2.2
Amber 2	0.0	29.7	29.7	0.0	52.0	0.0	50.0	102.1
Green 2	0.0	42.1	42.1	0.0	49.9	2.2	4.4	56.5
Green 3	133.4	10.1	143.5	133.4	1.8	8.3	0.0	143.5
HCP	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.1
Total	133.7	81.9	215.6	133.7	106.0	10.4	54.7	304.9
% of Verified Calls	10.5%	6.5%	17.0%	10.5%	8.4%	0.8%	4.3%	24.0%
Hear & Treat %*	5.9%	2.1%	8.0%	5.9%	2.7%	0.3%	1.4%	10.2%

* Assumes current CSD and NHSD success rates.

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G Abstraction and Relief Rates

- G1 Abstraction and Relief Rate Definitions**
- G2 Ops – Analysed Abstraction and Relief Rates**
- G3 Ops – Proposed Abstraction Rate**
- G4 Ops – Abstraction Rate Comparison**
- G5 CCC - Abstractions and Relief Rates**

Abstraction and Relief Rates

The abstraction rate is the percentage of hours a staff member is absent for.

For example, imagine a paramedic who is rostered to work 2,000 hours a year, but is absent for 500 hours a year.

The abstraction rate is $\frac{500}{2000} = 25\%$.

The relief rate is the percentage that needs to be applied to cover all abstractions.

For example, imagine a paramedic who is rostered to work 2,000 hours a year, but is absent for 500 hours a year.

The relief rate is $\frac{500}{2000 - 500} = \frac{500}{1500} = 33\%$.

'Relief' staff also have their own abstractions.

Analysed Abstraction Rates by Reason

Reason	2018/19 Average Weekly Hours	Abstraction Rate
Alternative	2,462.8	4.3%
Annual Leave	8,078.9	14.3%
Maternity	689.6	1.2%
Other	824.4	1.5%
Sickness	4,670.7	8.2%
Special Leave	319.8	0.6%
Training	1,697.9	3.0%
Travel Time	0.3	0.0%
Total	18,744.4	33.1%

Relief Rate
49.4%

Analysed Relief Rates

Trust	Frontline Relief Rate
A	37.00%
B	38.50%
C	38.90%
D	43.30%
E	46.20%
F	47.40%
WAST	49.40%

Operational Frontline Abstraction and Relief Rates

WAST-proposed Abstraction Rates

Abstraction Reason	Rate
Annual Leave	12.66%
Bank Holidays	3.07%
Sickness	5.99%
Alternative Duties	3.00%
Training	3.00%
Maternity	1.20%
Other	1.00%
Total	29.91%

Relief Rate	Rate
WAST	42.67%

Relief Rate Benchmarking

Trust	Frontline Relief Rate
A	37.0%
B	38.5%
C	38.9%
WAST	42.7%
D	43.3%
E	46.2%
F	47.4%

Abstraction versus Relief

The **abstraction rate** is the percentage of hours a staff member is absent for.

The **relief rate** is the percentage that needs to be applied to cover all abstractions, because relief staff are also abstracted.

Abstraction Rate Comparison

Reason	Trust A	WAST 18/19	WAST Proposed
Annual Leave	16.1%	14.3%	15.7%
Sickness	6.2%	8.7%	6.0%
Training	1.5%	2.3%	3.0%
Maternity/Paternity Leave	0.8%	1.3%	1.2%
Special Leave	0.5%	0.6%	-
Court	0.1%	-	-
Other	1.9%	5.0%	4.0%
Total	27.0%	32.0%	29.9%

Note: WAST includes 'Alternative' (included in Other). No mention in Trust A's rate.

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Welsh Ambulance Services NHS Trust

CCC Abstractions and Relief2018/19**CCC Staff Abstractions**

Absence Reason	Analysed	WAST Proposed
Annual Leave	14.0%	15.7%
Sickness	9.7%	6.0%
Alternative Duties	2.2%	3.0%
Training	5.4%	3.0%
Maternity	2.2%	2.0%
Other	1.5%	1.0%
Abstraction Rate	35.1%	30.7%
Relief Rate	54.0%	44.3%

CCC Relief Rate Benchmark

Trust	Relief Rate
J	37.8%
K	43.7%
L	44.1%
Proposed	44.3%
M	47.7%
Analysed	54.0%

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H Demand Projections

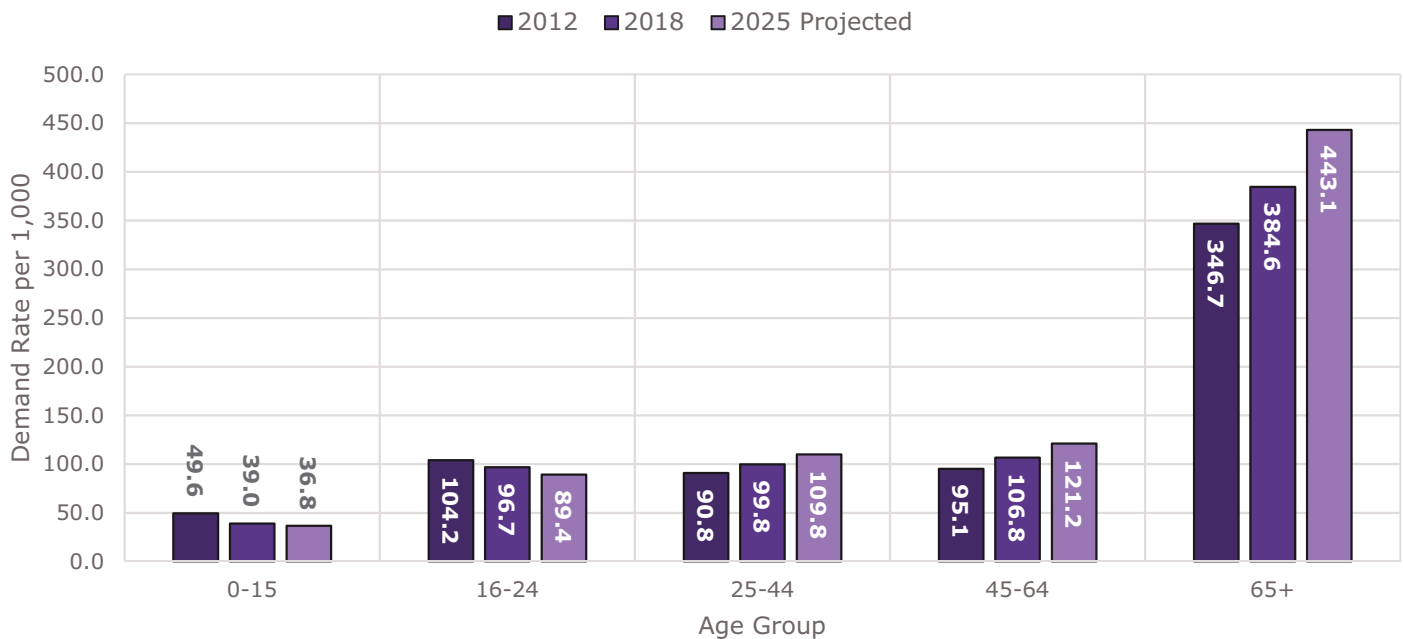
H1 Demand Rates and Population Projections

H2 Holt-Winters Forecasting

Demand Rates and Population Projections

H1

Historical and Projected Demand Rates per 1,000 (Male + Female, WAST-wide)



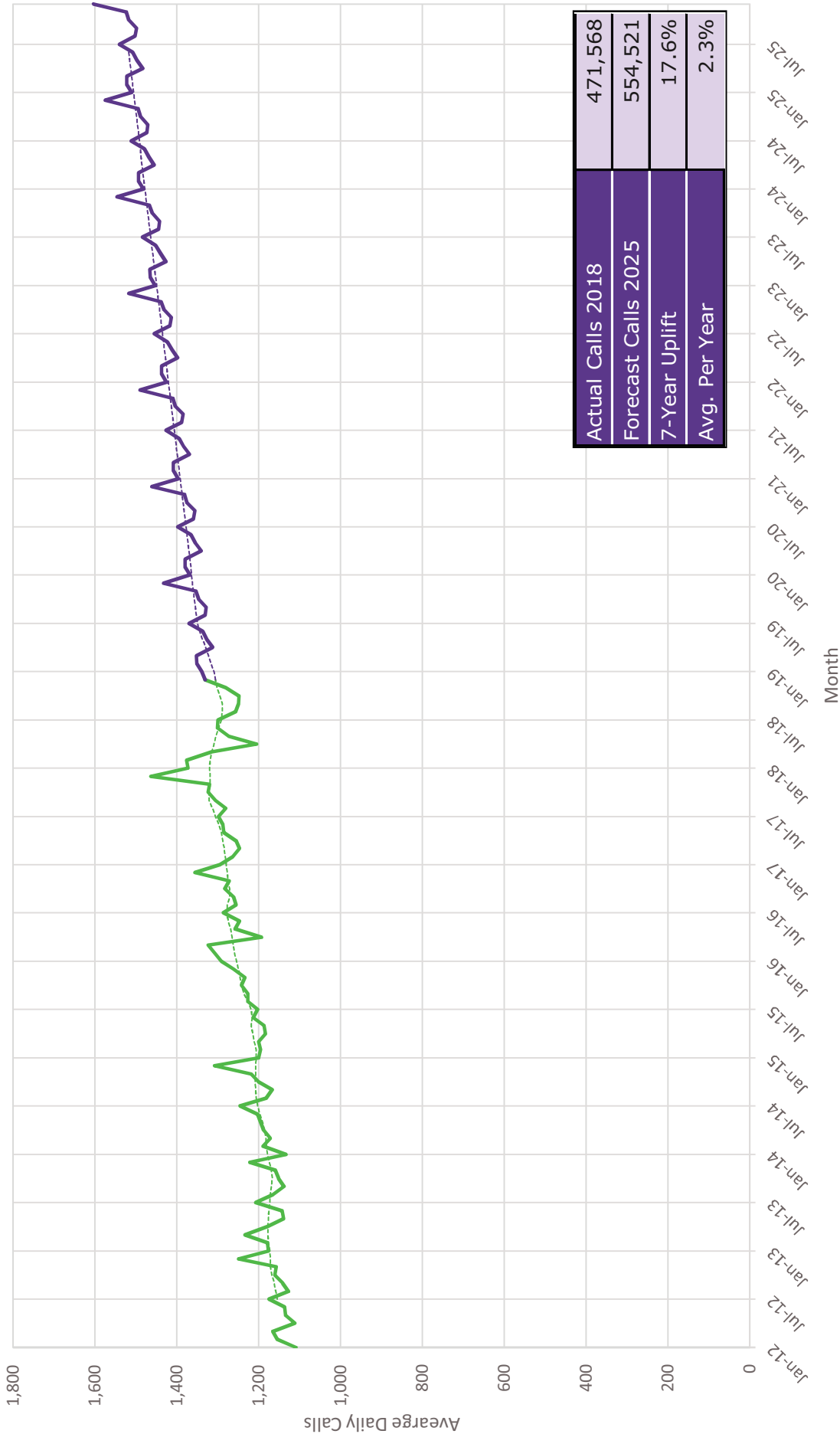
Percentage Change in Population by Age Group from 2018 to 2025

Health Board	Total Population				
	0-15	16-24	25-44	45-64	65+
Abertawe Bro Morgannwg	-0.5%	-5.9%	1.0%	-3.7%	13.7%
Aneurin Bevan	-2.0%	-4.6%	-1.4%	-5.3%	13.1%
Betsi Cadwaladr	1.2%	1.1%	2.3%	-6.0%	11.9%
Cardiff and Vale	7.7%	-1.1%	4.6%	-0.5%	17.1%
Cwm Taf	-0.4%	-1.7%	0.1%	-5.0%	10.0%
Hywel Dda	-2.4%	7.1%	4.4%	-9.5%	11.9%
Powys	-2.9%	-14.5%	-2.5%	-10.8%	13.8%
WAST Wide	0.6%	-1.7%	1.6%	-5.3%	13.0%

Change in Total Population by LHB from 2018 to 2025

Health Board	Population		Total % Change
	2018	2025	
Abertawe Bro Morgannwg	533,366	539,938	1.2%
Aneurin Bevan	590,396	590,373	0.0%
Betsi Cadwaladr	697,843	711,439	1.9%
Cardiff and Vale	495,675	521,078	5.1%
Cwm Taf	300,130	301,310	0.4%
Hywel Dda	385,293	391,051	1.5%
Powys	132,416	130,279	-1.6%
WAST Wide	3,135,119	3,185,467	1.6%

Holt-Winters Forecasting (Avg Daily Calls)



Actual Calls 2018	471,568
Forecast Calls 2025	554,521
7-Year Uplift	17.6%
Avg. Per Year	2.3%

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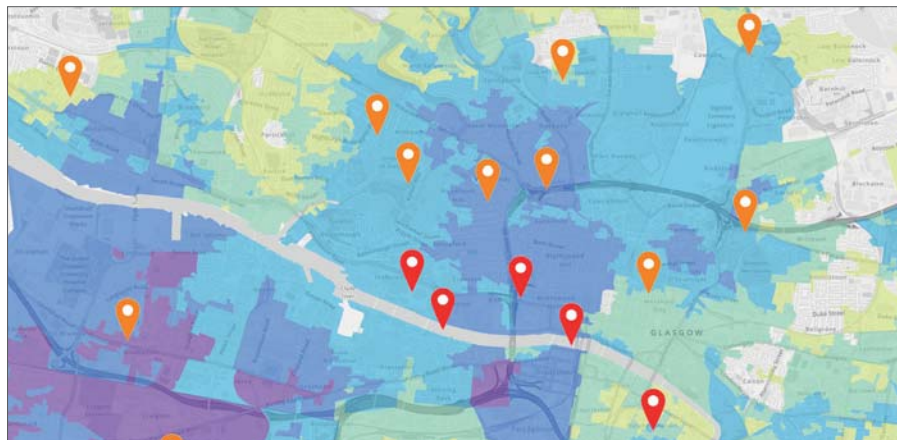
I Model Setup

I1 AmbSim Model

I2 Model Validation

AmbSim

ORH Ambulance Simulation Model



KEY BENEFITS

- Quickly identifies the impact of future changes on response performance and utilisation
- Quantifies seasonal vehicle and staffing requirements to meet national standards in future scenarios
- Examines impacts of changes in individual or multiple interrelated operational factors

Simulating potential changes and understanding their impacts

KEY FACTS

- Used in numerous studies worldwide
- Built on historical analysis
- Validated against known operations
- Risk-free environment for testing
- Evidence base for change

ABOUT AMBSIM

AmbSim is a simulation model that replicates the key characteristics of an ambulance service to predict future behaviour and performance under a variety of different scenarios. AmbSim is used by ORH consultants for ambulance service reviews, and in-house by services worldwide.

AMBSIM'S APPROACH

Demand is generated in AmbSim in accordance with historical data. Vehicles within the model respond to this demand according to their proximity and the desired dispatch protocols; dispatch rules can be based on any combination of categorisation systems, resource types and staff skills.

ORH analyses Automatic Vehicle Location data to understand variation in road speeds by time, location, road classification and vehicle type. These are fed into the model to ensure that travel times accurately replicate reality.

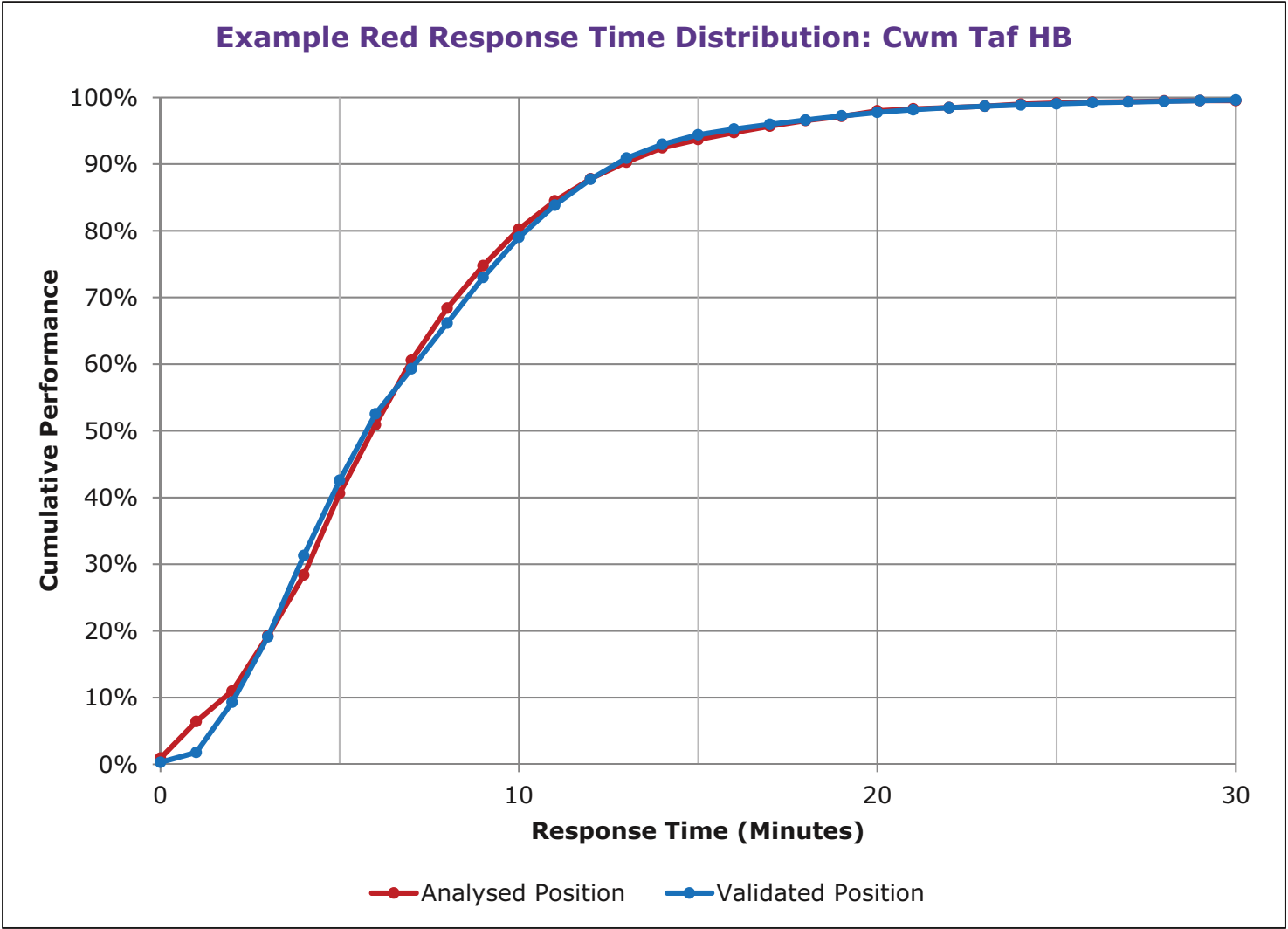
Resources within AmbSim can reflect both actual and planned rosters. This allows the user to identify required changes in resource levels/balance in specific detail.

Time components of the job cycle are based on historical analysis and differ by location, day, hour, category, and vehicle type. Along with demand and resourcing, the user can vary these parameters to assess different scenarios.

APPLICATION

AmbSim can be used to devise optimal operational models and resourcing by location, time, vehicle type and staff skill. Different demand levels and combinations of operational parameters can be incorporated to provide an evidence base for informed decision making. Inputs and parameters are flexible and can be updated to reflect changes that are within the control of the service and those that are external, such as hospital configuration.





Model Validation Performance

Health Board	Red	Red	Amber 1	Amber 2	Red	Amber 1	Amber 2
	8	Mean			90th Percentile		
Abertawe Bro Morgannwg University HB	76.4%	05:37	48:22	101:45	10:59	114:14	262:34
Aneurin Bevan HB	73.0%	06:07	49:52	104:37	12:07	110:45	258:18
Betsi Cadwaladr University HB	72.4%	06:14	31:32	66:53	13:26	67:22	159:19
Cardiff & Vale University HB	81.3%	05:18	43:15	113:07	09:44	95:33	281:28
Cwm Taf HB	72.5%	06:06	38:19	70:08	11:49	82:58	163:59
Hywel Dda HB	65.6%	06:45	32:01	54:51	15:08	70:19	124:52
Powys HB	65.9%	07:08	30:39	48:39	17:30	65:31	109:49
Wales-wide	73.7%	06:01	39:41	81:02	12:19	88:03	197:21

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J Operational Scenario Modelling

J1 December 2018

- J1a** Performance Summary
- J1b** Resourcing Summary

J2 December 2021 Position

J3 Optimal Estates Locations

- J3a** Central & West
- J3b** North
- J3c** South East

J4 2019/20 Handover Delays

- J4a** By Month and Facility
 - J4a-i Average Arrival to Handover
 - J4a-ii Handover Hours Lost
- J4b** Comparison and Rank by Facility
 - J4b-I Average Arrival to Handover
 - J4b-ii Handover Hours Lost
- J4c** Performance Impact of Handover Delays
- J4d** Staffing Requirement to Mitigate Handover Delays

J5 15-minute Arrival to Handover Time

- J5a** Performance Impact
- J5b** Resourcing Impact

Planned Resourcing Vs Modelling to Meet Agreed Response Parameters - December 18 Demand
Performance Summary

Planned Shifts - December 18 Demand

Health Board	Red	8			Red	Amber 1	Amber 2	Red	90th Percentile		
	8	Mean									
Abertawe Bro Morgannwg University HB	79.0%	05:15	56:19	127:19	10:19	137:02		10:19	137:02	381:01	
Aneurin Bevan HB	82.1%	04:54	36:01	74:48	09:38	76:57		09:38	76:57	168:47	
Betsi Cadwaladr University HB	77.2%	05:16	23:53	43:03	10:24	51:18		10:24	51:18	91:05	
Cardiff & Vale University HB	82.1%	05:16	32:24	86:11	09:27	68:22		09:27	68:22	197:50	
Cwm Taf HB	76.3%	05:36	28:07	49:50	10:42	58:09		10:42	58:09	105:05	
Hywel Dda HB	65.0%	06:49	41:13	86:25	15:08	96:19		15:08	96:19	258:59	
Powys HB	66.5%	06:55	39:09	81:11	16:44	89:13		16:44	89:13	247:07	
Wales-wide	77.3%	05:28	35:43	74:16	10:55	80:05		10:55	80:05	191:37	

Add to Planned Shifts - December 18 Demand

Health Board	Red	8			Red	Amber 1	Amber 2	Red	90th Percentile		
	8	Mean									
Abertawe Bro Morgannwg University HB	87.0%	04:09	19:34	27:44	08:08	40:25		08:08	40:25	46:35	
Aneurin Bevan HB	85.1%	04:30	20:02	29:28	08:51	38:57		08:51	38:57	44:07	
Betsi Cadwaladr University HB	80.9%	04:35	17:30	23:24	09:23	36:46		09:23	36:46	41:51	
Cardiff & Vale University HB	87.7%	04:43	15:41	29:07	08:02	28:16		08:02	28:16	41:22	
Cwm Taf HB	78.6%	05:20	16:28	20:14	10:09	30:51		10:09	30:51	27:33	
Hywel Dda HB	69.5%	06:00	16:04	17:35	13:30	32:29		13:30	32:29	28:29	
Powys HB	73.2%	05:34	15:02	15:22	14:10	31:17		14:10	31:17	24:58	
Wales-wide	82.1%	04:47	17:38	24:06	09:34	35:15		09:34	35:15	38:39	

Difference from Current Demand

Health Board	Red	8			Red	Amber 1	Amber 2	Red	90th Percentile		
	8	Mean									
Abertawe Bro Morgannwg University HB	8.0%	- 01:05	- 36:45	- 99:35	- 02:11	- 96:37		- 02:11	- 96:37	- 334:25	
Aneurin Bevan HB	3.0%	- 00:23	- 16:00	- 45:21	- 00:48	- 38:00		- 00:48	- 38:00	- 124:40	
Betsi Cadwaladr University HB	3.7%	- 00:41	- 06:24	- 19:39	- 01:01	- 14:32		- 01:01	- 14:32	- 49:14	
Cardiff & Vale University HB	5.6%	- 00:33	- 16:43	- 57:03	- 01:25	- 40:06		- 01:25	- 40:06	- 156:28	
Cwm Taf HB	2.3%	- 00:16	- 11:39	- 29:35	- 00:33	- 27:19		- 00:33	- 27:19	- 77:32	
Hywel Dda HB	4.5%	- 00:49	- 25:10	- 68:50	- 01:38	- 63:50		- 01:38	- 63:50	- 230:31	
Powys HB	6.7%	- 01:20	- 24:06	- 65:49	- 02:33	- 57:56		- 02:33	- 57:56	- 222:09	
Wales-wide	4.8%	- 00:41	- 18:05	- 50:09	- 01:21	- 44:50		- 01:21	- 44:50	- 152:58	

Planned Resourcing Vs Modelling to Meet Agreed Response Parameters - December 18 Demand

Resourcing Summary

Planned Resourcing

Model Area	Average Weekly Vehicle Hours					Staff Hours	FTE
	EA	RRV	UCS	APP	Overall		
Central & West	7,144	1,954	998	288	10,383	18,524	693
North	4,758	1,373	652	168	6,950	12,359	462
South East	5,395	3,998	1,233	229	10,855	17,483	653
Overall	17,296	7,324	2,882	685	28,187	48,366	1,808

Add to Planned Shifts - December 18 Demand

Model Area	Average Weekly Vehicle Hours					Staff Hours	FTE
	EA	RRV	UCS	APP	Overall		
Central & West	8,596	1,954	1,054	288	11,891	21,540	806
North	5,402	1,373	652	168	7,594	13,647	510
South East	6,347	3,998	1,233	229	11,807	19,387	723
Overall	20,344	7,324	2,938	685	31,291	54,574	2,039

Difference

Model Area	Average Weekly Vehicle Hours					Staff Hours	FTE
	EA	RRV	UCS	APP	Overall		
Central & West	1,452	0	56	0	1,508	3,016	113
North	644	0	0	0	644	1,288	48
South East	952	0	0	0	952	1,904	71
Overall	3,048	0	56	0	3,104	6,208	232

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Final December 21 Position

Performance and Utilisation Summary

2021 Position with Planned Shifts (10% H&T)

Health Board	Red	Red	Red	Amber 1	Amber 2	Red	Amber 1	Amber 2	Amber 1	Amber 2
	8	Mean			90th Percentile					
Abertawe Bro Morgannwg University LHB	77.6%	05:25	05:25	81:20	179:34	10:34	224:56	-	-	-
Aneurin Bevan LHB	81.1%	05:01	05:01	46:29	105:53	09:54	106:42	270:00	-	-
Betsi Cadwaladr University LHB	75.6%	05:34	05:34	29:57	69:48	11:12	64:43	173:31	-	-
Cardiff & Vale University LHB	80.3%	05:29	05:29	43:39	122:36	10:02	99:03	315:16	-	-
Cwm Taf LHB	75.2%	05:44	05:44	36:12	71:05	10:53	80:41	172:35	-	-
Hywel Dda LHB	64.0%	06:59	06:59	65:25	144:06	15:14	177:25	-	-	-
Powys LHB	65.4%	07:06	07:06	62:27	141:39	17:02	166:25	-	-	-
Wales-wide	76.0%	05:40	05:40	49:45	112:29	11:19	123:39	145:25	-	-

Utilisation				
CCC Area	EA	RRV	UCS	
Central & West	49.3%	33.2%	54.1%	
North	53.1%	31.8%	55.7%	
South East	61.3%	31.9%	62.3%	
Overall	54.1%	32.2%	58.0%	

Final 2021 Position with CTL RRVs (Re-roster planned + relief, 10% H&T)

Health Board	Red	Red	Red	Amber 1	Amber 2	Red	Amber 1	Amber 2	Amber 1	Amber 2
	8	Mean			90th Percentile					
Abertawe Bro Morgannwg University LHB	66.7%	06:56	06:56	61:23	171:31	14:11	150:50	-	-	-
Aneurin Bevan LHB	66.3%	06:56	06:56	30:21	64:14	14:25	62:37	144:42	-	-
Betsi Cadwaladr University LHB	69.0%	06:18	06:18	21:17	47:26	13:04	45:08	106:03	-	-
Cardiff & Vale University LHB	67.9%	06:45	06:45	26:47	70:11	13:20	54:36	161:47	-	-
Cwm Taf LHB	66.9%	06:43	06:43	24:14	42:59	13:19	49:17	91:09	-	-
Hywel Dda LHB	65.8%	07:12	07:12	48:04	123:55	16:26	111:37	-	-	-
Powys LHB	67.9%	06:26	06:26	42:48	118:54	15:57	102:13	-	-	-
Wales-wide	67.3%	06:46	06:46	34:55	85:27	14:06	78:26	80:44	-	-

Utilisation				
CCC Area	EA	RRV	UCS	
Central & West	49.1%	36.1%	52.2%	
North	50.6%	33.6%	50.5%	
South East	56.4%	38.1%	48.2%	
Overall	52.0%	36.4%	50.0%	

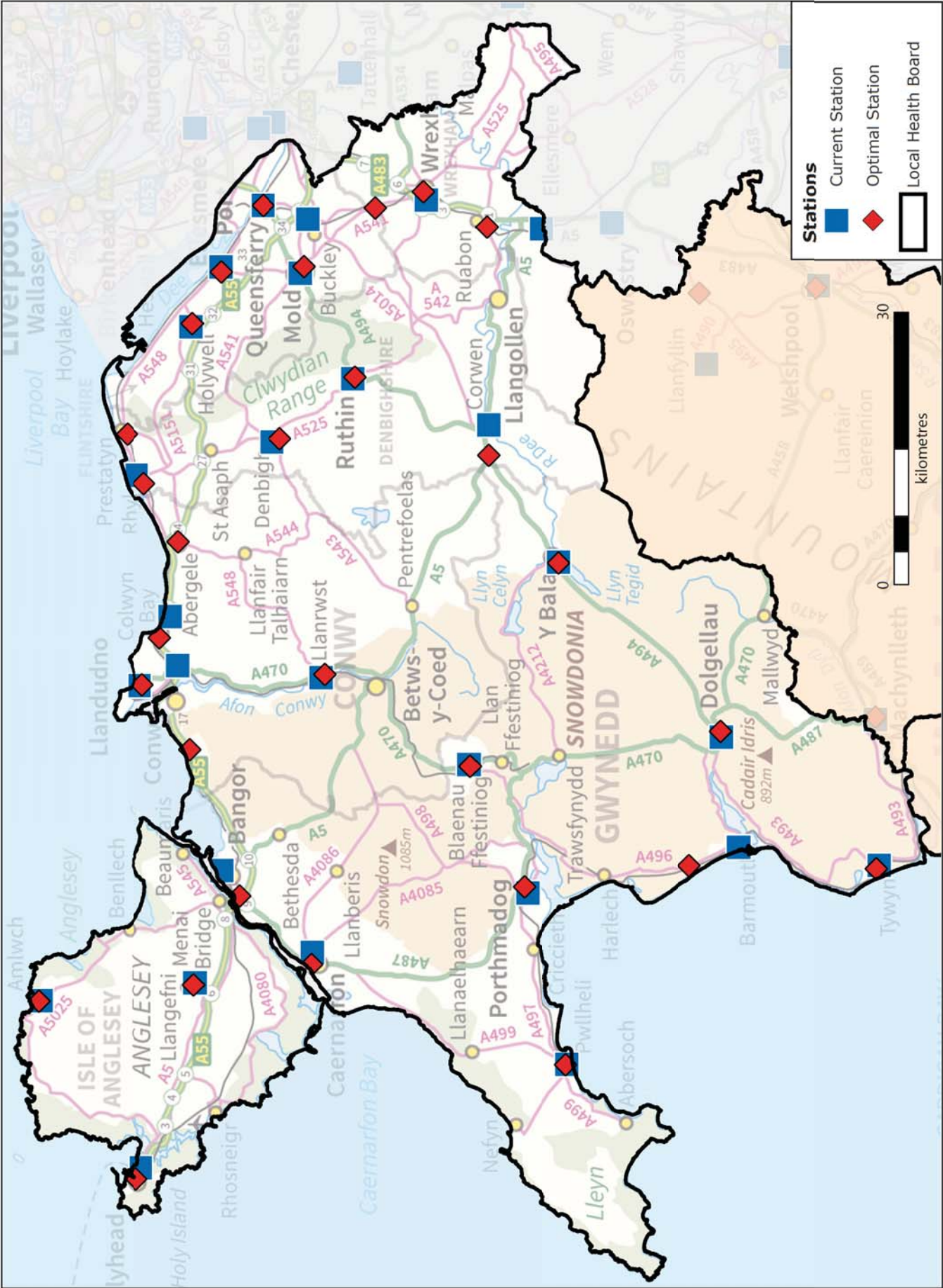
Difference

Health Board	Red	Red	Red	Amber 1	Amber 2	Red	Amber 1	Amber 2	Amber 1	Amber 2
	8	Mean			90th Percentile					
Abertawe Bro Morgannwg University LHB	-10.9%	01:30	01:30	- 19:57	- 08:04	03:37	- 74:06	-	-	-
Aneurin Bevan LHB	-14.8%	01:54	01:54	- 16:08	- 41:39	04:31	- 44:05	- 125:17	-	-
Betsi Cadwaladr University LHB	-6.6%	00:44	00:44	- 08:40	- 22:22	01:53	- 19:36	- 67:28	-	-
Cardiff & Vale University LHB	-12.4%	01:16	01:16	- 16:52	- 52:25	03:18	- 44:27	- 153:28	-	-
Cwm Taf LHB	-8.3%	00:59	00:59	- 11:58	- 28:06	02:25	- 31:25	- 81:26	-	-
Hywel Dda LHB	1.9%	00:13	00:13	- 17:21	- 20:11	01:12	- 65:48	-	-	-
Powys LHB	2.5%	- 00:40	- 00:40	- 19:39	- 22:45	- 01:05	- 64:12	-	-	-
Wales-wide	-8.7%	01:05	01:05	- 14:50	- 27:01	02:47	- 45:13	- 64:42	-	-

Optimal Station Locations: Central & West (Hywel Dda)

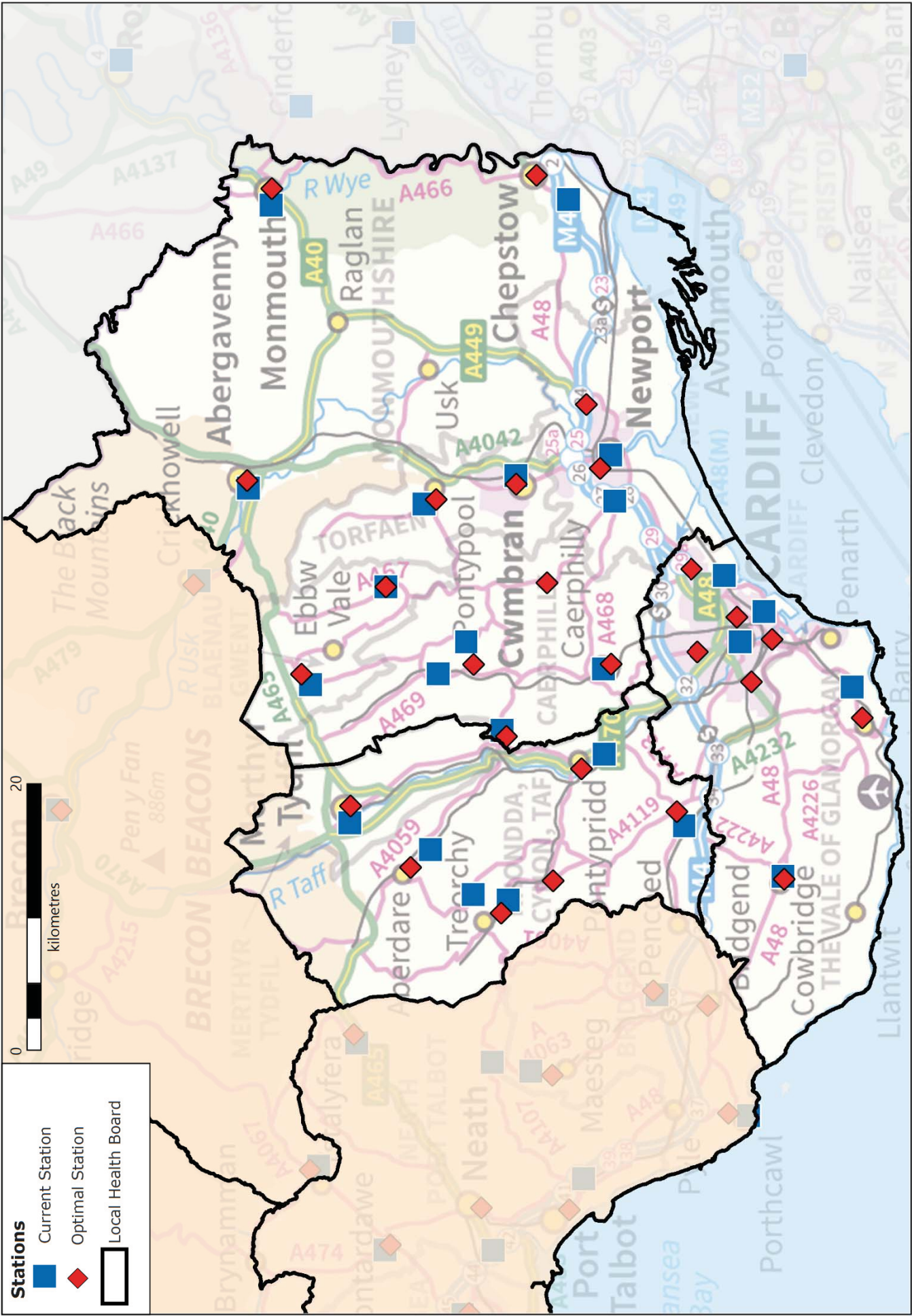


Optimal Station Locations: North



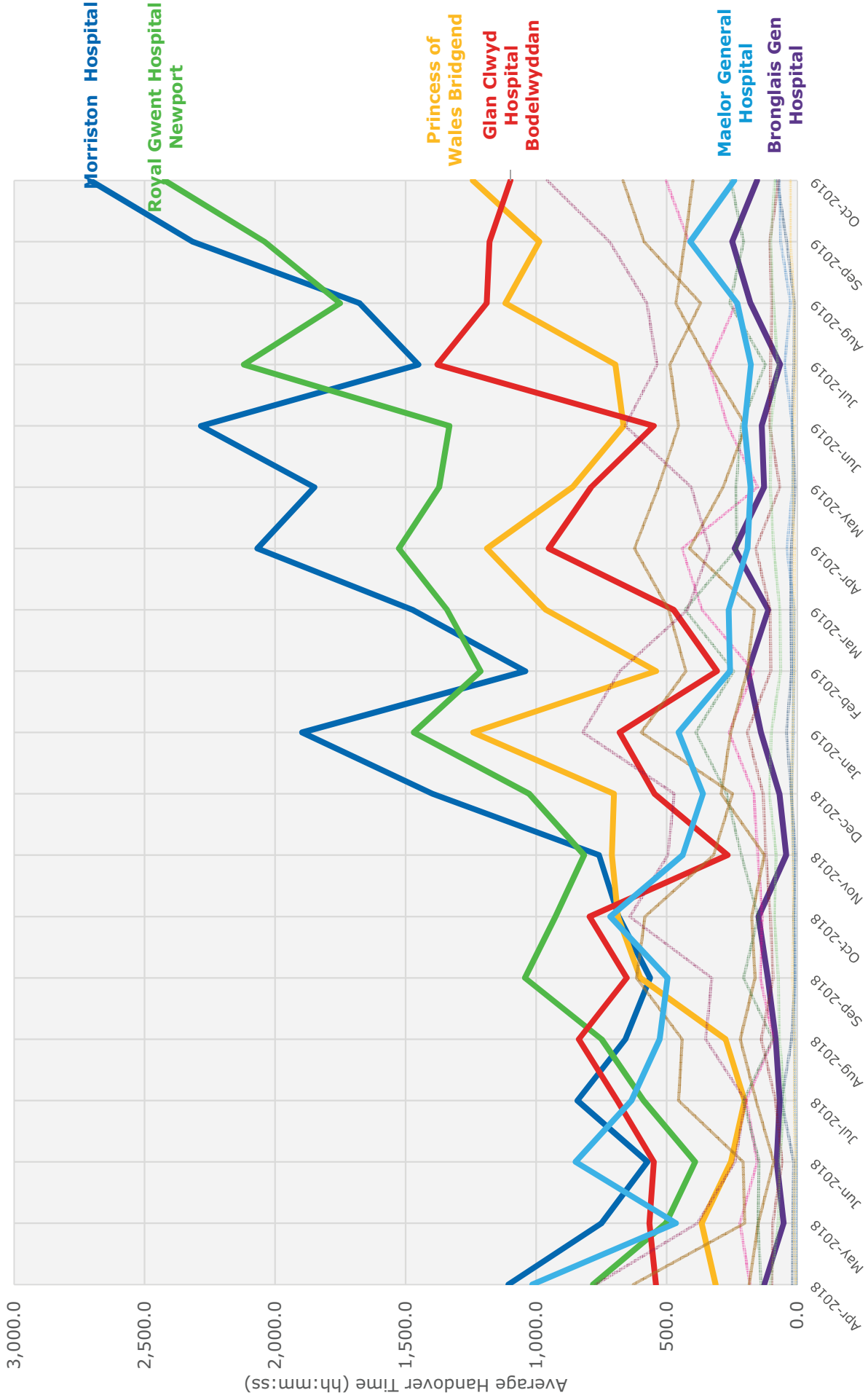
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Optimal Station Locations: South East





Handover Hours Lost by Month and Facility



2018/19 and 2019/20 Average Arrival to Handover Comparison**Average Handover Times**

Hospital	Average Arrival to Handover (mm:ss)			2018/19 to 2019/20 Difference
	2018/19	Apr-Oct 19	Projected 2019/20	
Morriston Hospital	44:25	81:59	98:29	54:04
Princess of Wales Bridgend	49:31	76:32	99:37	50:06
Royal Gwent Hospital Newport	41:42	67:52	70:57	29:14
Bronglais Gen Hospital	27:46	36:04	53:49	26:03
Glan Clwyd Hospital Bodelwyddan	33:47	48:24	44:21	10:33
Glangwili Hospital	24:22	32:24	34:18	09:56
Prince Phillip Hospital	17:58	27:08	27:08	09:10
Nevill Hall Hospital Abergavenny	23:58	32:32	30:06	06:08
Withybush Hospital	31:55	31:50	37:58	06:03
Ysbyty Gwynedd Hospital Bangor	32:10	36:03	35:36	03:26
Singleton Hospital	36:05	36:16	39:03	02:58
University Hospital of Wales	27:32	31:05	29:39	02:07
Prince Charles Hospital	15:29	16:57	17:08	01:39
Royal Glamorgan Hospital	15:39	15:47	15:51	00:12
Llandough Hospital	25:12	26:16	23:40	-01:32
Maelor General Hospital	37:30	24:29	20:47	-16:43
WAST Average	31:37	40:13	41:27	09:50

Ranking of Handover Times

Hospital	Rank (1 = longest handover time)	
	2018/19	Projected 2019/20
Morriston Hospital	2	2
Princess of Wales Bridgend	1	1
Royal Gwent Hospital Newport	3	3
Bronglais Gen Hospital	9	4
Glan Clwyd Hospital Bodelwyddan	6	5
Glangwili Hospital	12	9
Prince Phillip Hospital	14	12
Nevill Hall Hospital Abergavenny	13	10
Withybush Hospital	8	7
Ysbyty Gwynedd Hospital Bangor	7	8
Singleton Hospital	5	6
University Hospital of Wales	10	11
Prince Charles Hospital	16	15
Royal Glamorgan Hospital	15	16
Llandough Hospital	11	13
Maelor General Hospital	4	14

2018/19 and 2019/20 Handover Hours Lost Comparison**Handover Hours Lost**

Hospital	Annual Handover Hours Lost		2018/19 to 2019/20 Difference
	2018/19	Projected 2019/20	
Morriston Hospital	11,744.6	30,311.1	18,566.5
Princess of Wales Bridgend	6,852.4	29,527.6	22,675.3
Royal Gwent Hospital Newport	10,849.0	22,853.8	12,004.8
Bronglais Gen Hospital	1,218.3	3,662.6	2,444.2
Glan Clwyd Hospital Bodelwyddan	6,908.0	10,884.9	3,976.9
Glangwili Hospital	2,225.7	4,454.3	2,228.6
Prince Phillip Hospital	271.0	1,127.4	856.4
Nevill Hall Hospital Abergavenny	2,161.0	3,788.5	1,627.5
Withybush Hospital	2,637.0	3,492.3	855.3
Ysbyty Gwynedd Hospital Bangor	5,213.9	6,210.5	996.6
Singleton Hospital	1,313.0	1,388.0	75.0
University Hospital of Wales	5,800.0	6,572.8	772.8
Prince Charles Hospital	122.8	533.1	410.3
Royal Glamorgan Hospital	161.0	214.7	53.7
Llandough Hospital	939.0	846.0	-93.0
Maelor General Hospital	6,478.4	1,775.3	-4,703.1
WAST Total	64,895.1	127,642.9	62,747.9

Ranking of Handover Hours Lost

Hospital	Rank (1 = longest handover time)	
	2018/19	Projected 2019/20
Morriston Hospital	1	1
Princess of Wales Bridgend	4	2
Royal Gwent Hospital Newport	2	3
Bronglais Gen Hospital	12	9
Glan Clwyd Hospital Bodelwyddan	3	4
Glangwili Hospital	9	7
Prince Phillip Hospital	14	13
Nevill Hall Hospital Abergavenny	10	8
Withybush Hospital	8	10
Ysbyty Gwynedd Hospital Bangor	7	6
Singleton Hospital	11	12
University Hospital of Wales	6	5
Prince Charles Hospital	16	15
Royal Glamorgan Hospital	15	16
Llandough Hospital	13	14
Maelor General Hospital	5	11

Performance Impact of 19/20 Handover Delays

2024 Base Position (Re-roster, 10% H&T, Increased APP)

Health Board	Red	Red	Amber 1	Amber 2	Red	Amber 1	Amber 2
	8	Mean			90th Percentile		
Abertawe Bro Morgannwg University HB	82.9%	04:36	17:17	30:16	09:23	36:15	57:24
Aneurin Bevan HB	71.3%	06:07	18:27	36:05	12:55	37:03	63:24
Betsi Cadwaladr University HB	75.7%	05:22	17:48	34:41	11:16	37:06	70:12
Cardiff & Vale University HB	79.3%	05:21	17:41	42:18	10:32	34:22	76:15
Cwm Taf HB	67.3%	06:37	16:30	26:27	13:01	31:38	43:29
Hywel Dda HB	69.8%	06:07	15:46	19:25	14:04	31:56	32:39
Powys HB	71.8%	05:44	14:27	16:34	14:43	30:21	28:09
Wales-wide	75.4%	05:33	17:16	31:09	11:41	35:06	57:42

Final 2024 with 19/20 Handover Delays

Health Board	Red	Red	Amber 1	Amber 2	Red	Amber 1	Amber 2
	8	Mean			90th Percentile		
Abertawe Bro Morgannwg University HB	69.5%	06:20	39:29	119:49	12:53	90:58	349:01
Aneurin Bevan HB	66.7%	06:50	24:20	50:36	14:25	49:30	87:35
Betsi Cadwaladr University HB	75.3%	05:28	17:42	31:31	11:29	36:26	56:43
Cardiff & Vale University HB	76.1%	05:45	21:48	51:17	11:32	42:03	86:28
Cwm Taf HB	64.1%	07:03	20:19	36:16	13:55	40:24	56:49
Hywel Dda HB	63.6%	07:18	31:00	78:34	15:44	70:25	232:23
Powys HB	70.1%	06:08	27:54	70:24	15:25	68:25	216:45
Wales-wide	70.2%	06:19	25:28	59:25	13:10	54:51	143:09

Difference

Health Board	Red	Red	Amber 1	Amber 2	Red	Amber 1	Amber 2
	8	Mean			90th Percentile		
Abertawe Bro Morgannwg University HB	-13.4%	01:45	22:12	89:34	03:30	54:43	291:36
Aneurin Bevan HB	-4.6%	00:43	05:54	14:31	01:30	12:26	24:11
Betsi Cadwaladr University HB	-0.3%	00:06	- 00:07	- 03:11	00:13	- 00:40	- 13:29
Cardiff & Vale University HB	-3.2%	00:24	04:07	08:59	01:00	07:41	10:14
Cwm Taf HB	-3.2%	00:26	03:49	09:49	00:54	08:46	13:20
Hywel Dda HB	-6.2%	01:11	15:14	59:10	01:40	38:29	199:44
Powys HB	-1.7%	00:25	13:26	53:50	00:42	38:04	188:36
Wales-wide	-5.2%	00:45	08:12	28:17	01:29	19:45	85:27

Staffing Requirement to Mitigate 19/20 Handover Delay Impact

2024 Base Position (Re-roster, 10% H&T, Increased APP)

Model Area	EA	RRV	UCS	APP	Overall	Staff Hours	Staff Hours (no MB)	FTE
Central & West	9,572	510	1,108	504	11,694	22,374	21,368	835
North	5,656	300	680	644	7,280	13,616	12,980	507
South East	7,006	896	1,526	672	10,100	18,632	17,761	694
Overall	22,234	1,706	3,314	1,820	29,074	54,622	52,109	2,037

Final 2024 Position with 19/20 Handover Delays

Model Area	EA	RRV	UCS	APP	Overall	Staff Hours	Staff Hours (no MB)	FTE
Central & West	11,154	510	1,248	504	13,416	25,818	24,665	964
North	5,656	300	680	644	7,280	13,616	12,980	507
South East	7,580	896	1,596	672	10,744	19,920	18,993	742
Overall	24,390	1,706	3,524	1,820	31,440	59,354	56,638	2,214

Difference

Model Area	EA	RRV	UCS	APP	Overall	Staff Hours	Staff Hours (no MB)	FTE
Central & West	1,582	0	140	0	1,722	3,444	3,297	129
North	0	0	0	0	0	0	0	0
South East	574	0	70	0	644	1,288	1,232	48
Overall	2,156	0	210	0	2,366	4,732	4,529	177

FTE Requirement by Nearest Hospital

Hospital	FTE Required
Glangwili	12.6
Morriston	78.5
Prince Philip	12.6
Princess of Wales	12.6
Royal Glamorgan	5.2
Royal Gwent	43.0
Withybush	12.6
WAST	177.0

Performance Impact of 15-minute Average Arrival to Handover

2024 Base Position (Re-roster, 10% H&T, Increased APP)

Health Board	Red	Red	Amber 1	Amber 2	Red	Amber 1	Amber 2
	8	Mean			90th Percentile		
Abertawe Bro Morgannwg University HB	82.9%	04:36	17:17	30:16	09:23	36:15	57:24
Aneurin Bevan HB	71.3%	06:07	18:27	36:05	12:55	37:03	63:24
Betsi Cadwaladr University HB	75.7%	05:22	17:48	34:41	11:16	37:06	70:12
Cardiff & Vale University HB	79.3%	05:21	17:41	42:18	10:32	34:22	76:15
Cwm Taf HB	67.3%	06:37	16:30	26:27	13:01	31:38	43:29
Hywel Dda HB	69.8%	06:07	15:46	19:25	14:04	31:56	32:39
Powys HB	71.8%	05:44	14:27	16:34	14:43	30:21	28:09
Wales-wide	75.4%	05:33	17:16	31:09	11:41	35:06	57:42

Final 2024 with 15 minute Average Arrival to Handover

Health Board	Red	Red	Amber 1	Amber 2	Red	Amber 1	Amber 2
	8	Mean			90th Percentile		
Abertawe Bro Morgannwg University HB	87.1%	04:05	13:18	18:48	08:13	25:13	34:03
Aneurin Bevan HB	75.6%	05:37	14:43	23:48	11:46	28:32	39:26
Betsi Cadwaladr University HB	79.4%	04:44	14:06	21:26	09:54	27:44	41:27
Cardiff & Vale University HB	82.2%	05:01	13:16	23:35	09:33	24:22	35:27
Cwm Taf HB	66.4%	06:46	13:35	19:06	13:13	24:42	29:25
Hywel Dda HB	70.1%	06:04	13:17	13:06	13:49	25:24	21:40
Powys HB	72.2%	05:36	12:01	10:39	14:15	24:27	18:21
Wales-wide	78.2%	05:11	13:43	19:38	10:46	26:16	34:07

Difference

Health Board	Red	Red	Amber 1	Amber 2	Red	Amber 1	Amber 2
	8	Mean			90th Percentile		
Abertawe Bro Morgannwg University HB	4.2%	- 00:31	- 03:58	- 11:28	- 01:10	- 11:03	- 23:21
Aneurin Bevan HB	4.3%	- 00:30	- 03:44	- 12:17	- 01:09	- 08:31	- 23:59
Betsi Cadwaladr University HB	3.8%	- 00:38	- 03:42	- 13:15	- 01:22	- 09:21	- 28:45
Cardiff & Vale University HB	2.9%	- 00:20	- 04:25	- 18:42	- 00:59	- 10:00	- 40:48
Cwm Taf HB	-0.9%	00:08	- 02:55	- 07:22	00:12	- 06:57	- 14:04
Hywel Dda HB	0.4%	- 00:03	- 02:29	- 06:19	- 00:15	- 06:32	- 10:58
Powys HB	0.4%	- 00:08	- 02:26	- 05:55	- 00:28	- 05:54	- 09:47
Wales-wide	2.8%	- 00:23	- 03:33	- 11:30	- 00:55	- 08:50	- 23:36

Staffing Requirement to Mitigate 19/20 Handover Delay Impact

2024 Base Position (Re-roster, 10% H&T, Increased APP)

Model Area	EA	RRV	UCS	APP	Overall	Staff Hours	Staff Hours (no MB)	FTE
Central & West	9,572	510	1,108	504	11,694	22,374	21,368	835
North	5,656	300	680	644	7,280	13,616	12,980	507
South East	7,006	896	1,526	672	10,100	18,632	17,761	694
Overall	22,234	1,706	3,314	1,820	29,074	54,622	52,109	2,037

Final 2024 Position with 15-minute Average Arrival to Handover

Model Area	EA	RRV	UCS	APP	Overall	Staff Hours	Staff Hours (no MB)	FTE
Central & West	8,700	510	964	504	10,678	20,342	19,430	759
North	5,040	300	620	644	6,604	12,264	11,691	457
South East	6,382	896	1,386	672	9,336	17,104	16,305	637
Overall	20,122	1,706	2,970	1,820	26,618	49,710	47,426	1,854

Difference

Model Area	EA	RRV	UCS	APP	Overall	Staff Hours	Staff Hours (no MB)	FTE
Central & West	-872	0	-144	0	-1,016	-2,032	-1,938	-76
North	-616	0	-60	0	-676	-1,352	-1,289	-50
South East	-624	0	-140	0	-764	-1,528	-1,456	-57
Overall	-2,112	0	-344	0	-2,456	-4,912	-4,683	-183

FTE Requirement by Nearest Hospital

Hospital	FTE Required
Glan Clwyd	-25.2
Llandough	-9.3
Morrison	-49.4
Prince Philip	-9.3
Princess of Wales	-17.1
Royal Gwent	-35.6
University Hospital of Wales	-12.0
Wrexham Maelor	-25.2
WAST	-183.0

Please Treat as Confidential

K Planned Service Changes

K1 The Grange Hospital

K1a Performance Impact

K1b Resourcing Impact

K2 South East Vascular Reconfiguration: Patient Journeys

Performance Impact of The Grange Hospital

Re-Roster - December 24 Demand

Subdivision	Red	Red	Amber 1	Amber 2	Red	Amber 1	Amber 2	90th Percentile
	8	Mean						
Aneurin Bevan LHB	71.3%	06:07	18:27	36:05	12:55	37:03	63:24	
Cardiff & Vale University LHB	79.3%	05:21	17:41	42:18	10:32	34:22	76:15	
Cwm Taf LHB	67.3%	06:37	16:30	26:27	13:01	31:38	43:29	
South East	73.6%	05:56	17:48	35:32	11:56	35:16	62:27	

Utilisation		
EA	RRV	UCS
54.2%	37.7%	42.7%

The Grange Hospital

Subdivision	Red	Red	Amber 1	Amber 2	Red	Amber 1	Amber 2
	8	Mean			90th Percentile		
Aneurin Bevan LHB	56.7%	08:33	67:02	186:53	17:19	178:09	
Cardiff & Vale University LHB	76.9%	05:39	55:58	183:46	11:08	143:39	
Cwm Taf LHB	64.9%	06:54	50:47	143:58	13:31	126:46	
South East	64.1%	07:05	59:34	174:36	14:14	155:12	>8 hrs

Utilisation		
EA	RRV	UCS
63.8%	44.3%	60.7%

Difference

Subdivision	Red	Red	Amber 1	Amber 2	Red	Amber 1	Amber 2
	8	Mean			90th Percentile		
Aneurin Bevan LHB	-14.7%	02:26	48:35	150:48	04:24	141:06	
Cardiff & Vale University LHB	-2.4%	00:17	38:17	141:28	00:36	109:17	
Cwm Taf LHB	-2.4%	00:17	34:17	117:31	00:30	95:08	
Wales-wide	-9.5%	01:10	41:46	139:04	02:18	119:56	

Utilisation		
EA	RRV	UCS
9.6%	6.6%	18.0%

Resourcing Impact of The Grange Hospital

Re-Roster - December 24 Demand

Model Area	Average Weekly Vehicle Hours				Staff Hours	FTE
	EA	RRV	UCS	APP		
South East	7,468	896	1,526	0	18,884	704

The Grange Hospital

Model Area	Average Weekly Vehicle Hours				Staff Hours	FTE
	EA	RRV	UCS	APP		
South East	8,686	896	1,932	0	22,132	825

Difference

Model Area	Average Weekly Vehicle Hours				Staff Hours	FTE
	EA	RRV	UCS	APP		
South East	1,218	0	406	0	3,248	121

Please Treat as Confidential

South East Vascular Reconfiguration: Additional Patient Journeys

Origin	Destination	Vehicle Type	Annual Journeys
Royal Gwent	UHW	EMS	59
Royal Glamorgan	UHW	EMS	28
Royal Gwent	UHW	UCS	138
Royal Glamorgan	UHW	UCS	40
UHW	Royal Gwent	UCS	197
UHW	Royal Glamorgan	UCS	68
UHW	Llandough	UCS	228

Please Treat as Confidential

L Clinical Contact Centre Modelling

L1 Welfare Call Requirement

L2 Call Handler Staffing Requirement

L2a Without Efficiencies

L2b With Efficiencies

L3 CTA Staffing Requirements

L3a CSD - Maximize Current Codeset

L3b NHSD - Maximize Current Codeset

L3c CSD - Maximize Expanded Codeset

L4 Proposed Dispatch Areas

L5 Dispatch Desk Workload – Proposed Dispatch Desks

L6 Allocator Staffing Requirement

Please Treat as Confidential

Welsh Ambulance Services NHS Trust

Welfare Call Requirement

Final December 2024 Position

Category	Trigger (No Allocation Within)	Proportion of Incidents	Average Daily Calls
Red	8 minutes	2.2%	1.7
Amber	20 minutes	19.2%	166.1
Green	30 minutes	30.6%	22.8
HCP	1-4 hours	18.4%	19.4
Total	-	18.7%	210.0

Welsh Ambulance Services NHS Trust
Call Handler Staffing Requirement - No efficiencies
Final December 2024 Position

Central and West

Weekday	Hour																							Total	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
Monday	6	5	5	5	5	5	5	6	7	7	7	8	8	8	8	8	8	8	8	8	7	7	7	7	163
Tuesday	7	5	4	4	4	4	4	6	7	7	7	8	8	8	8	8	8	8	8	7	6	6	6	6	154
Wednesday	6	4	4	4	4	4	4	6	7	7	7	8	8	8	8	8	8	8	8	7	6	6	6	6	152
Thursday	6	4	4	4	4	4	4	6	7	7	7	8	8	8	8	8	8	8	8	7	6	6	6	6	152
Friday	6	4	4	4	4	4	4	6	7	7	7	8	8	8	8	8	8	8	8	7	6	6	6	6	152
Saturday	6	5	5	5	5	5	5	6	7	7	7	8	8	8	8	8	8	8	7	7	7	7	7	7	161
Sunday	7	6	6	6	6	6	6	6	7	7	8	8	8	8	8	8	8	7	7	6	6	6	6	6	163
Total	44	33	32	32	32	32	32	42	49	49	50	56	56	56	56	56	56	55	54	49	44	44	44	44	1,097

North

Weekday	Hour																							Total	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
Monday	5	4	3	3	3	3	3	4	5	6	6	7	7	7	7	6	7	7	7	8	6	6	6	5	130
Tuesday	4	4	3	3	3	3	3	3	4	6	6	7	7	7	7	6	6	5	5	6	6	6	6	5	121
Wednesday	4	4	3	3	3	3	3	3	4	6	6	7	7	7	7	6	6	5	5	6	6	6	6	5	121
Thursday	4	4	3	3	3	3	3	3	4	6	6	7	7	7	7	6	6	5	5	6	6	6	6	5	121
Friday	4	4	3	3	3	3	3	4	4	7	7	7	7	7	7	6	6	5	5	6	6	6	6	6	125
Saturday	6	6	4	4	4	4	4	4	6	7	7	7	7	7	7	6	6	5	5	6	6	6	6	6	136
Sunday	6	5	4	4	4	4	4	4	5	6	6	7	7	7	7	6	6	5	5	6	6	6	6	5	131
Total	33	31	23	23	23	23	23	24	32	44	44	49	49	49	49	42	43	37	37	44	42	42	42	37	884

South East

Weekday	Hour																							Total	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
Monday	8	6	5	5	5	5	5	4	6	8	9	10	11	11	11	11	11	10	10	10	9	8	8	8	194
Tuesday	8	6	5	5	5	5	5	4	6	8	9	9	10	10	10	10	10	10	10	10	9	8	8	8	188
Wednesday	8	6	5	5	5	5	5	4	6	8	9	9	10	10	10	10	10	10	10	10	9	8	8	8	188
Thursday	8	6	5	5	5	5	5	4	6	8	9	9	10	10	10	10	10	10	10	10	9	8	8	8	188
Friday	8	6	5	5	5	5	5	4	6	8	9	10	10	10	10	10	10	10	10	10	10	10	10	10	196
Saturday	10	8	6	6	6	6	6	4	6	8	9	10	10	10	10	10	10	10	10	10	10	10	10	10	205
Sunday	10	10	8	8	8	8	8	4	6	8	8	9	10	10	10	10	9	9	9	9	9	8	8	8	204
Total	60	48	39	39	39	39	39	28	42	56	61	66	71	71	71	71	71	70	69	69	65	60	60	60	1,362

Welsh Ambulance Services NHS Trust
Call Handler Staffing Requirement - With efficiencies
Final December 2024 Position

Central and West

Weekday	Hour																							Total	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
Monday	5	4	4	4	4	4	4	5	6	7	7	8	8	8	8	8	8	7	7	7	6	5	5	5	144
Tuesday	5	3	3	3	3	3	3	5	6	7	7	8	8	8	8	8	8	8	8	7	6	5	5	5	140
Wednesday	5	3	3	3	3	3	3	5	6	7	7	8	8	8	8	8	8	8	8	7	6	5	5	5	140
Thursday	5	3	3	3	3	3	3	5	6	7	7	8	8	8	8	8	8	8	8	7	6	5	5	5	140
Friday	5	3	3	3	3	3	3	5	6	7	7	8	8	8	8	8	8	8	8	7	6	5	5	5	140
Saturday	5	4	4	4	4	4	4	5	6	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6	139
Sunday	6	5	5	5	5	5	5	5	6	7	7	7	7	7	7	7	7	7	6	5	5	5	5	5	140
Total	36	25	25	25	25	25	25	35	42	49	49	54	54	54	54	54	54	52	51	46	41	36	36	36	983

North

Weekday	Hour																							Total	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
Monday	4	3	3	3	3	3	3	4	5	5	5	6	6	6	6	6	7	7	7	7	5	5	5	4	117
Tuesday	3	3	3	3	3	3	3	3	4	5	5	6	6	6	6	6	6	6	5	5	5	5	5	4	108
Wednesday	3	3	3	3	3	3	3	3	4	5	5	6	6	6	6	6	6	6	5	5	5	5	5	4	108
Thursday	3	3	3	3	3	3	3	3	4	5	5	6	6	6	6	6	6	6	5	5	5	5	5	4	108
Friday	3	3	3	3	3	3	3	4	4	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	112
Saturday	5	5	4	4	4	4	4	4	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	123
Sunday	5	4	4	4	4	4	4	4	5	5	5	6	6	6	6	6	6	6	5	5	5	5	5	4	118
Total	26	24	23	23	23	23	23	24	32	37	37	42	42	42	42	42	43	37	37	37	35	35	35	30	793

South East

Weekday	Hour																							Total	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
Monday	7	5	4	4	4	4	4	4	6	7	7	8	9	9	9	9	9	8	8	8	8	7	7	7	161
Tuesday	7	5	4	4	4	4	4	4	6	7	7	7	8	8	8	8	8	8	8	8	8	7	7	7	155
Wednesday	7	5	4	4	4	4	4	4	6	7	7	7	8	8	8	8	8	8	8	8	8	7	7	7	155
Thursday	7	5	4	4	4	4	4	4	6	7	7	7	8	8	8	8	8	8	8	8	8	7	7	7	155
Friday	7	5	4	4	4	4	4	4	6	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	161
Saturday	8	6	5	5	5	5	5	4	6	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	168
Sunday	8	8	7	7	7	7	7	4	6	7	7	7	8	8	8	8	7	7	7	7	7	7	7	7	170
Total	51	39	32	32	32	32	32	28	42	49	50	52	57	57	57	57	56	55	55	55	51	51	51	51	1,124

Welsh Ambulance Services NHS Trust
Clinical Support Desk (CSD) Staffing Requirement - Maximise current codeset (8% Hear and Treat)
Final December 2024 Position

Clinician	Hour																							Total	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
Weekday																									
Monday	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	48
Tuesday	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	48
Wednesday	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	48
Thursday	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	48
Friday	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	48
Saturday	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	48
Sunday	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	48
Total	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	336

Pharmacist	Hour																							Total	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
Monday	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
Tuesday	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
Wednesday	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
Thursday	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
Friday	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
Saturday	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
Sunday	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
Total	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	168

Mental Health Clinician		Hour																							Total	
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
Weekday																										
	Monday	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	44
	Tuesday	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	44
	Wednesday	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	44
	Thursday	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	44
	Friday	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	44
	Saturday	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	44
	Sunday	2	2	2	2	2	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	44
	Total	14	14	14	14	14	7	7	7	7	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	308

Welsh Ambulance Services NHS Trust
NHS Direct Wales (NHSD) Staffing Requirement - Maximise current codeset (8% Hear and Treat)
Final December 2024 Position

Clinician	Weekday	Hour																							Total	
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
	Monday	4	4	3	3	3	3	3	4	4	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	102
	Tuesday	4	4	3	3	3	3	3	4	4	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	102
	Wednesday	4	4	3	3	3	3	3	4	4	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	102
	Thursday	4	4	3	3	3	3	3	4	4	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	102
	Friday	4	4	3	3	3	3	3	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	106
	Saturday	5	5	3	3	3	3	3	4	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	108
	Sunday	5	5	3	3	3	3	3	4	4	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	104
	Total	30	30	21	21	21	21	21	28	28	35	35	35	35	35	35	35	35	35	35	35	30	30	30	30	726

Note: Secondary triage function only.

Please Treat as Confidential

Welsh Ambulance Services NHS Trust
Clinical Support Desk (CSD) Staffing Requirement - Maximise expanded codeset (10.2% Hear and Treat)
Final December 2024 Position

Clinician	Weekday	Hour																							Total	
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
	Monday	3	3	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	81
	Tuesday	3	3	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	81
	Wednesday	3	3	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	81
	Thursday	3	3	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	81
	Friday	3	3	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	82
	Saturday	4	4	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	90
	Sunday	4	4	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	89
	Total	23	23	16	16	16	16	16	16	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	23	585

Pharmacist	Weekday	Hour																							Total	
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
	Monday	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
	Tuesday	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
	Wednesday	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
	Thursday	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
	Friday	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
	Saturday	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
	Sunday	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24
	Total	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	168

Mental Health Clinician		Hour																							Total	
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
Weekday																										
	Monday	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	58
	Tuesday	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	58
	Wednesday	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	58
	Thursday	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	58
	Friday	3	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	58
	Saturday	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	64
	Sunday	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	64
	Total	21	21	16	16	16	16	16	14	14	14	14	14	14	14	14	14	21	21	21	21	21	21	21	21	418

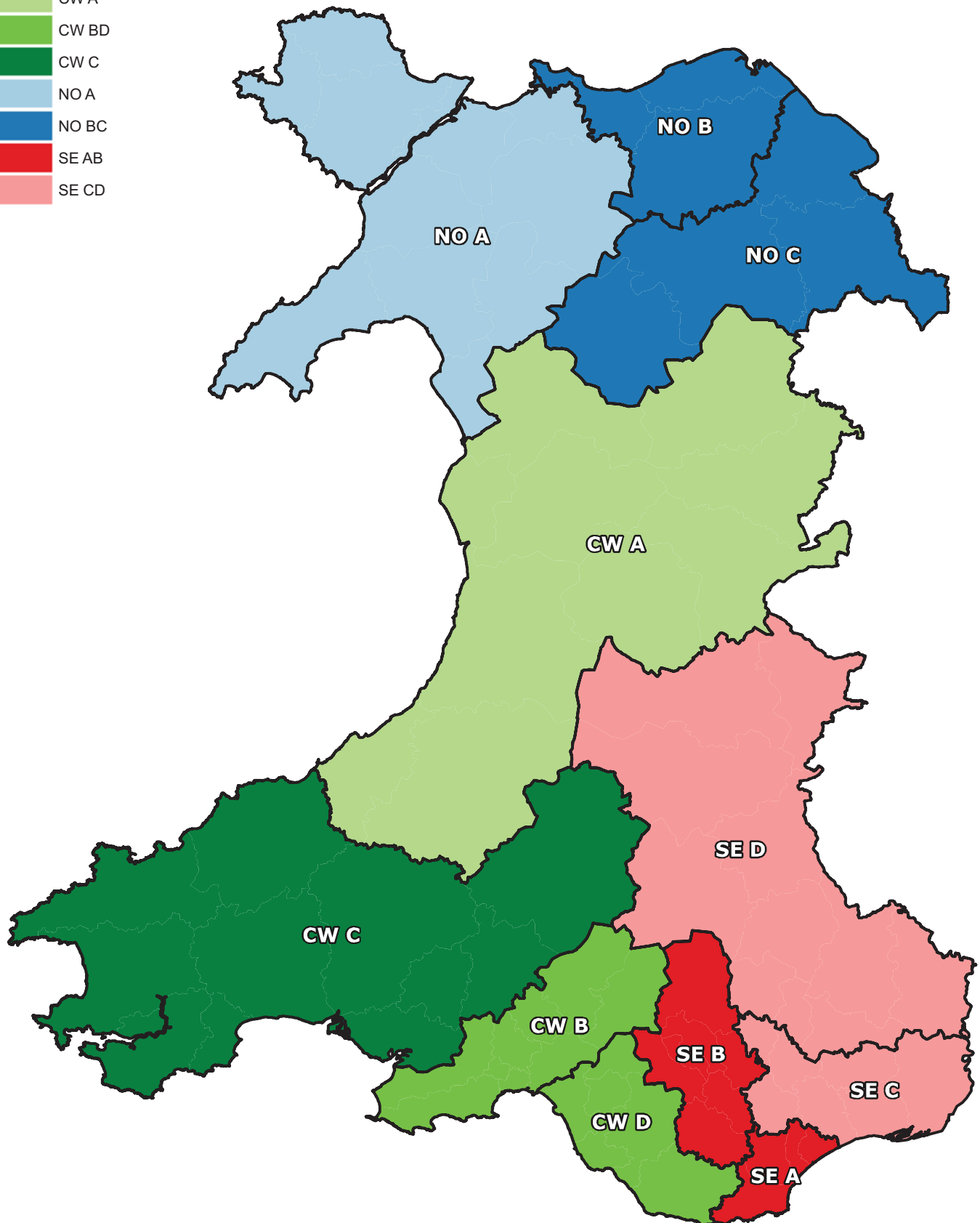
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Proposed Dispatch Areas

Final December 2024 Position

L4

 Dispatch Desks - Day/Evening

Dispatch Desks - Night



Welsh Ambulance Services NHS Trust

Dispatch Desk Workload by Proposed Dispatch Desk

Final December 2024 Position

Planned Vehicle Numbers

Dispatch Area	Average Planned Vehicles (EAs, RRVs & UCS)		
	Day (07:00-19:00)	Evening (19:00-02:00)	Night (02:00-07:00)
Central and West - A	14.7	13.3	8.2
Central and West - C	20.5	18.5	14.2
Central and West - B	17.1	18.0	19.5
Central and West - D	11.7	10.5	
North - A	14.0	12.2	10.2
North - B	10.9	10.3	12.7
North - C	13.1	13.6	
South East - A	15.3	12.4	16.6
South East - B	15.2	11.6	
South East - C	19.4	13.4	18.1
South East - D	13.0	12.1	
HCP - Central and West / North	16.9	-	-
HCP - South East	16.2	-	-
APP	13.6	11.2	-
Current Busiest Desk:	20.5	18.2	13.5
Current Quietest Desk:	8.5	9.9	7.5

Incident Workload

Dispatch Area	Average Hourly Assigned Incidents		
	Day (07:00-19:00)	Evening (19:00-02:00)	Night (02:00-07:00)
Central and West - A	2.6	2.2	1.2
Central and West - C	5.6	4.9	2.8
Central and West - B	5.0	4.4	4.3
Central and West - D	3.3	2.9	
North - A	3.7	3.3	1.9
North - B	3.9	3.5	4.1
North - C	4.3	3.8	
South East - A	5.2	4.9	5.2
South East - B	4.3	4.1	
South East - C	4.9	4.6	4.6
South East - D	3.6	3.2	
HCP - Central and West / North	4.5	-	-
HCP - South East	4.0	-	-
APP	6.0	4.6	-
Current Busiest Desk:	5.2	5.1	2.7
Current Quietest Desk:	3.0	2.6	1.4

Note: The number of responses per incident is reduced from 1.18 currently to 1.07 in 2024.

Please Treat as Confidential

Welsh Ambulance Services NHS Trust
Allocator Staffing Requirement
Final December 2024 Position

Central and West

Weekday	Hour																							Total	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
Monday	5	5	4	4	4	4	4	5	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	127
Tuesday	5	5	4	4	4	4	4	5	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	127
Wednesday	5	5	4	4	4	4	4	5	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	127
Thursday	5	5	4	4	4	4	4	5	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	127
Friday	5	5	4	4	4	4	4	5	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	127
Saturday	5	5	4	4	4	4	4	5	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	127
Sunday	5	5	4	4	4	4	4	5	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	127
Total	35	35	28	28	28	28	28	35	42	42	42	42	42	42	42	42	42	42	42	42	35	35	35	35	889

North

Weekday	Hour																							Total	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
Monday	4	4	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	91
Tuesday	4	4	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	91
Wednesday	4	4	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	91
Thursday	4	4	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	91
Friday	4	4	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	91
Saturday	4	4	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	91
Sunday	4	4	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	91
Total	28	28	21	21	21	21	21	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	637

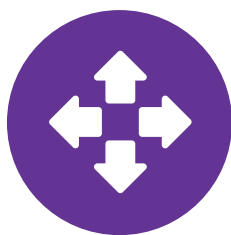
South East

Weekday	Hour																							Total	
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22		23
Monday	5	5	3	3	3	3	3	5	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	122
Tuesday	5	5	3	3	3	3	3	5	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	122
Wednesday	5	5	3	3	3	3	3	5	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	122
Thursday	5	5	3	3	3	3	3	5	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	122
Friday	5	5	3	3	3	3	3	5	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	122
Saturday	5	5	3	3	3	3	3	5	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	122
Sunday	5	5	3	3	3	3	3	5	6	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	122
Total	35	35	21	21	21	21	21	35	42	42	42	42	42	42	42	42	42	42	42	42	35	35	35	35	854

Note: Includes break cover positions (one 24/7 per CCC). Assumes the two HCP desks are located in South East and Central and West.



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