



Chief Ambulance Services Commissioner's Report

Emergency Medical Retrieval and Transfer Service - Service Review

Phase 2



**GIG
CYMRU
NHS
WALES**

Pwyllgor Gwasanaethau
Ambiwlans Brys

Emergency Ambulance
Services Committee

CONTENTS

Commissioner's Summary	2	Reference Period	33
Technical Note	6	Weather	34
Emergency Ambulance Services Committee	7	Flooding	36
Background to the Service Review	8	Options Development	37
EMRTS Cymru and Wales Air Ambulance History	9	Modelled Options	39
EMRTS Cymru	10	Modelling Outputs	40
Helicopter Emergency Medical Services (HEMS)	11	Decision Making and Next Steps	42
Adult Critical Care Transfer Services (ACCTS)	12		
Engagement - What we did	13		
Engagement - What we heard	15		
Historical data	16		
EMRTS activity in the context of 999 activity	17		
Current Base Operational Arrangements	18		
Base Workload	19		
Utilisation	21		
No Arrival Days	22		
Unmet Need	23		
Seasonal Variation	26		
Hourly and Daily Demand	27		
Population Coverage	28		
Golden Hour	30		
Response time	31		



Commissioner's Summary



"This report, provides a summary overview of the work my team and I have undertaken for the Emergency Medical Retrieval and Transfer Service (EMRTS) Service Review as directed by the Emergency Ambulance Services Committee (EASC) in response to an initial EMRTS Service Development Proposal received on 8 November 2022.

As I explained in Phase 1, my report for Phase 2 does not present a proposed or preferred option. During Phase 2, I am now sharing the results of the work that has been done from the Phase 1 feedback and seeking comments on these developed options. Your Phase 2 feedback, along with the evaluation process using the 'factors', will help me arrive at a preferred and recommended option that I will take to EASC for decision.

The Review is independent of the assumptions, comparisons and modelling included within the original Proposal and aims to make sure that the patients who need this important critical care service can have access to it no matter where they live in Wales or when they need it.

My report is accompanied by several detailed factual and technical documents that provide further information and these are highlighted throughout this document. This is a complex service with many variables therefore every effort has made been to present information as clearly as possible.

In Phase 1, I asked:

- Have we thought about the right ways to make the EMRTS better?
- For comments on the proposed factors to help us evaluate options
- For comments on the weightings of the proposed factors;
- For comments on the proposed model options that could be developed and
- For additional ideas about other options that could be developed.

From these questions, your feedback told me that there were several key points that I needed to focus on when developing options for consideration, namely:

- Potential impact on response
- Using the most appropriate data for modelling
- Considering weather impacts
- Considering population variances
- Considering rural needs compared to urban needs
- Keeping the proposed 'factors' to help us evaluate the options
- Adjusting the proposed weightings on 'factors' for the options evaluation process
- Suggestions for other options to be developed.

I committed at the outset to conduct a full and transparent engagement process, emphasising repeatedly that no decision has already been made. I want to reaffirm that this remains the case within this report and the supporting documents, you will see how Phase 1 feedback has shaped how options have been developed.

It was consistently suggested that the weighting of 'Clinical Skills & Sustainability' factor should be increased from the proposed 15, and that Value for Money should be lower than proposed 20; this has been done.

Within my report and accompanying supporting documents you will find:

- Historical information on response activity and time
- New modelling that accounts for service developments, demand changes and weather
- Geographical and population review
- Modelled scenarios including suggestions put forward in Phase 1.

During Phase 1 I set out 3 broad headings for the modelling that would be undertaken, for this report these were further refined into the following 6 scenarios:

- **Scenario 1:** Status Quo – Keeping things as they are now.
- **Scenario 2:** Existing Bases / Existing Capacity – Testing different shift times 14:00 – 02:00 and 20:00 – 08:00 for crews at the existing bases.
- **Scenario 3:** Consolidated Base / Existing Capacity – Merging two bases into one at a centralised location and testing different shift times 08:00 – 20:00, 14:00 – 02:00 and 20:00 – 08:00 for crews at this base.
- **Scenario 4:** Consolidated Base / Additional Capacity – Taking the best variation for scenario 3, and adding an extra car crew in a different location and testing different shift times 08:00 – 20:00, 14:00 – 02:00 and 20:00 – 08:00 for this crew.
- **Scenario 5:** Status Quo / Additional Capacity – Taking the status quo and adding an extra crew to some bases and testing different shift times 14:00 – 02:00 and 20:00 – 08:00.
- **Scenario 6:** Existing Bases / Additional Capacity – Taking the best variation for scenario 2, and adding an extra car crew in a different location and testing different shift times 08:00 – 20:00, 14:00 – 02:00 and 20:00 – 08:00 for this crew.

Under each scenario a number of variations were developed, these are set out under the modelled options in my report. Throughout Phase 1, feedback also surfaced about the wider health system in rural areas including road ambulances, primary and secondary care and social care. These emerging themes were presented to EASC on 18 July 2023.

As has been the case throughout this engagement, all information and documents setting this out in more detail are published on the EASC website: <https://easc.nhs.wales/>

Phase 1 was very helpful and valuable to me, listening to public and stakeholders I have acknowledged the anxieties that have been conveyed to me and fully appreciate the regard in which this vital service is held. This is a service delivered by people, for the people of Wales.

The passion for the air ambulance service has been palpable and there is a shared goal – for us all to make a great service even better for our communities across the nation. I firmly believe we can achieve this.

To this endeavour, I would like to thank everyone who has participated in sharing their feedback during Phase 1 and thank you for your continued interest and contributions in Phase 2.”



Stephen Harrhy

Chief Ambulance Services Commissioner

Technical Note

Personal Identifiable Information

Personal data is defined in the UK GDPR as:

“‘personal data’ means any information relating to an identified or identifiable natural person (‘data subject’); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person”.

All statistical activities and outputs are subject to the UK Statistics Authority Code of Practice for Official Statistics, the Statistics and Registration Services Act 2007, the Data Protection Act 2018 and the General Data Protection Regulation (GDPR) (2016/679). The GDPR and the Data Protection Act 2018 replaced the 1998 Act from 25 May 2018.

Statistical Disclosure Control

When producing analysis, we need to balance accuracy and timeliness of publication with disclosure control to reduce the risk of identifying individuals from the outputs.

The following steps will be applied to reduce the risk of identifying individuals from small numbers.

- If a total is between 0 and 5 (inclusive)
 - no breakdown will be displayed and the figure displayed as ‘*’

Data has been sourced from the Welsh Ambulance Services NHS Trust Qlik Business Intelligence platform. Information provided in this report was cross checked with this platform on the 6th of October 2023.



Emergency Ambulance Services Committee

The Emergency Ambulance Services Committee (EASC) is a Joint Committee of health boards in Wales that is required by law to be responsible for planning and securing sufficient ambulance services (commissioning) for the population of Wales.

The services commissioned by EASC are:

- Emergency Ambulance Services - provided by the Welsh Ambulance Services NHS Trust (WAST)
- Non-Emergency Patient Transport Services (NEPTS) - provided by the Welsh Ambulance Services NHS Trust
- Emergency Medical Retrieval and Transfer Service (EMRTS) - provided in partnership by EMRTS Cymru and the Wales Air Ambulance Charity
- Adult Critical Care Transfer Service (ACCTS) – provided by the Emergency Medical Retrieval and Transfer Service

EASC is hosted by Cwm Taf Morgannwg University Health Board.

Further detail on EASC can be found on the following website:
www.easc.nhs.wales/the-committee



Background to the Service Review

In November 2022, EASC received an EMRTS Service Development Proposal.

The Proposal, based on data modelling, suggested re-configuring the operational arrangements providing the service more effectively, potentially being able to do more within the existing resource by changing the way in which the service was operationally organised. Specifically, the Proposal identified moving operations from Caernarfon and Welshpool bases into a proposed combined base located in mid-North Wales adjacent to the A55.

This proposal is available on the following link:

<https://easc.nhs.wales/engagement/sdp/supporting-documents/>.

At this meeting, EASC members raised challenges, as well as noted queries and concerns raised by members of the public, politicians, Community Health Council members (now Llais as of 1 April 2023) and community groups in relation to this proposed change affecting Caernarfon and Welshpool bases specifically.

Subsequently, EASC required the Chief Ambulance Services Commissioner (CASC) and the wider EASC Team to undertake an impartial review of the service.

The EMRTS Service Review was therefore enacted by the CASC. It is independent of the assumptions, comparisons and modelling included within the original EMRTS Service Development Proposal.

EMRTS Cymru and Wales

Air Ambulance History

Wales Air Ambulance Charity (WAAC) was incorporated on 19 June 2000, and launched on St. David's Day, 2001. The objective of the WAAC at that stage was to provide a paramedic-led air response with the aim of rapidly transferring patients to hospital by air.

The service was first operated from Swansea Airport on the establishment of the WAAC with the first aircraft initially working as an 8 hours per day, 5 days per week service then expanding to a 7 day service in July 2002.

A paramedic was based at the North Wales Police helicopter base in Rhuddlan from April 2001 as an interim measure until the second aircraft was established at Caernarfon (Dinas Dinlle) Airport in July 2003.

The service at Welshpool Airport was established in June 2006, with the offer from the aircraft provider of a helicopter for a short period. This third aircraft initially worked as a 5-day service to cover the busy holiday period and then was made a permanent service in January 2007.

In 2015, the Emergency Medical Retrieval and Transfer Service (EMRTS) was established. The new service created a partnership between the WAAC, Welsh Government and NHS Wales, to provide an air and road response that would ensure advanced decision-making and critical care for life and limb threatening emergencies at scene and then transfer for time critical specialist care.

In 2016, Wales Air Ambulance moved from the isolated location of Swansea Airport to a purpose-built facility in Dafen, near Llanelli. This move also gave the service access to a better road network, in particular the M4, which was valuable for emergency responses via RRV. 2018 saw the Charity take over the long-term lease for Cardiff Heliport, which became home to the Charity's fourth aircraft.

Currently at night, EMRTS operate from a single base in Cardiff.

For more information please see:

Supporting Document 1 - History of the EMRTS Service and Wales Air Ambulance Charity - provides a detailed description of the transitions of the service from its initial establishment in 2001 to the service available today and its relationship to EASC.

Emergency Medical Retrieval and Transfer Service

The EMRTS Service is a clinically led service, commissioned by EASC, and is hosted by Swansea Bay University Health Board.

The service provides a highly trained critical care team comprising consultants (from an emergency medicine, anaesthesia, and intensive care background) and critical care practitioners (CCP) (who are advanced-trained paramedics and nurses). The service has two main areas of activity:

- Pre-hospital critical care for all age groups (i.e., interventions/decisions that are outside standard paramedic practice).
- Undertaking time-critical, life or limb-threatening adult and paediatric transfers from peripheral centres for patients requiring specialist intervention at the receiving hospital.

What the Service <u>IS</u>	What the Service is <u>NOT</u>
IS a highly specialised critical care response bringing hospital level care to the patient	NOT designed to meet ambulance response times
IS a service that is designed to improve the outcomes of patient experiencing life or limb threatening illness or injury	NOT designed to be a safety net for areas of Wales that do not have access to a local hospital
IS a Doctor/CCP or CCP/CCP crew with access to a helicopter or a rapid response vehicle	NOT one crew for helicopters and one crew for rapid response vehicles, nor a Doctor on each base.
IS a service for the whole of Wales, meaning any resource at any base can respond to any part of Wales	NOT a service providing defined geographical response e.g. there is no mid-Wales air ambulance service
IS designed to bring specialist critical care expertise to the scene and start life-saving treatment sooner	NOT a fast ambulance that gets you to hospital quickly or to bring a patient to a hospital within a 'golden hour'

Helicopter Emergency Medical Services (HEMS)

The EMRTS Service undertake flights under two types of operation:

- **Helicopter Emergency Medical Services (HEMS)** – this type of flight allows for specific Civil Aviation Authority (CAA) dispensations (risk alleviations) to be granted in recognition of an emergency situation
- **Air Ambulance** – this type of flight is considered a normal transport task and so does not attract any of the risk alleviations present in HEMS flights i.e. a non-emergency routine long-distance transport / repatriation.

To provide a road ambulance analogy:

- If called to an emergency: an ambulance would proceed at great speed, sounding its siren and proceeding against traffic lights - thus matching the risk of operation to the risk of a potential death (= HEMS flights)
- For a transfer of a patient (or equipment) where life and death (or consequential injury of ground transport) is not an issue: the journey would be conducted without sirens and within normal rules of motoring - once again matching the risk to the task (= air ambulance flights).

It is for the medical professional to decide between HEMS or air ambulance and not the pilot.



Adult Critical Care Transfer Services (ACCTS)

The ACCTS is separate service also provided by EMRTS.

This service, wholly funded by NHS Wales and commissioned by EASC, is a road based service that has access to 3 of its own specially designed ambulances.

An ACCTS crew typically consisting of a doctor, Retrieval Transfer Practitioner and a Critical Care Transfer Driver / Assistant employed by the ACCTS service.

The service operates a 12 hour daytime service in South Wales with the crew beginning their shift at Cardiff Heliport.

In North Wales, the service provides a 12 hour daytime service. The crew begin their shift at Ysbyty Gwynedd, Bangor.

For more information please visit: <https://emrts.nhs.wales/accts/>



Engagement - What We Did

The EMRTS Service Review's formal public engagement process began on 15 March 2023 and closed on 16 June 2023. Phase 1 was a 14-week engagement period, more than double the time recommended by the then Community Health Council (now Llais) for the initial 'listening' phase.

Whilst this is an all-Wales engagement to reflect the national remit of the service, much of the interest and concern emanated specifically from within Betsi Cadwaladr University Health Board and Powys Teaching Health Board areas and therefore the face-to-face engagement sessions focused on this footprint, reflecting the increased concerns of localised positions and perspectives.

The offer to meet with anyone, or any group, that may be interested in hosting a specific event has remained in place since the engagement began. Additional sessions have been accommodated and built into the timetable as they have been confirmed.

There were 33 public engagement sessions within Phase 1, comprising:

- 8 in-person drop-ins
- 11 virtual/online public meetings
- 14 in-person public meetings.

For more information please see:

Supporting Document 2 - Engagement - What We Did and What We Heard providing a detailed description of the engagement undertaken in Phase 1.



Engagement - What We Heard

There was good quality dialogue in all sessions, this has been very helpful and valuable to the CASC as the impartial and independent facilitator leading this all-Wales engagement process.

The tone and sentiment within engagement sessions was appreciative of the time and space given for the public to air their concerns and points on this matter. This was noted and the CASC was committed to listening and considering how to develop options for this Review.

The focus of the engagement has been on the EMRTS Service Review and how to continuously improve the air ambulance service that is provided in partnership by the Wales Air Ambulance Charity and EMRTS. However, there has been feedback regarding broader health and social care issues throughout the process which have been duly reported to EASC.

For this reason, the thematic analysis is set out as two general parts:

- A: Emergent Themes - EMRTS Service Review
- B: Emergent Themes - Broader Health and Care System

Phase 1 feedback highlighted several key points that needed to be focused on when developing options for consideration, namely:

- Potential impact on response
- Using the most appropriate data for modelling
- Considering weather impacts
- Considering population variances
- Considering rural needs compared to urban needs
- Keeping the proposed 'factors' to help us evaluate the options
- Adjusting the proposed weightings on 'factors' for the options evaluation process
- Suggestions for other options to be developed.

Phase 1 feedback has shaped how options have been developed:

- It was consistently suggested that the weighting of 'Clinical Skills & Sustainability' factor should be increased and that 'Value for Money' should be lower than the two original proposed weightings; this has been done
- Historical information on response activity and time has been produced / reviewed
- New modelling that accounts for service developments, demand changes and weather
- Geographical and population review
- Modelled scenarios including suggestions put forward in Phase 1.

For more information please see:

Supporting Document 2 - Engagement - What We Did and What We Heard providing a detailed description of the engagement undertaken in Phase 1

Supporting Document 3 - Picker Institute Report - Provides the findings of the independent analysis undertaken by the Picker institute as part of Phase 1



Historical Data

This section sets out the historical activity undertaken by the EMRTS Service.

For more information please see:

Supporting Document 4 - EMRTS Historical Data Information Pack



EMRTS activity in the context of 999 activity

The table below demonstrates the activity of EMRTS in the context of the wider demand on ambulance services in Wales. The table highlights the specialist nature of the EMRTS.

	2018	2019	2020	2021	2022
999 Calls (answered)	554,718	510,289	479,557	557,087	570,216
999 Incidents	471,568	480,441	445,633	478,374	448,994
999 Responded Incidents	347,603	348,470	333,008	317,472	257,527
EMRTS Responded Incidents	2,423	3,034	3,207	3,348	3,114
% EMRTS Responded Incidents	0.70%	0.87%	0.96%	1.05%	1.12%
999 Responses Arriving by Scene	437,325	444,041	409,281	407,200	360,444
EMRTS Responses Arriving at Scene	1,759	2,177	2,339	2,602	2,552
% EMRTS Responses Arriving at Scene (of total 999 incidents)	0.40%	0.49%	0.57%	0.64%	0.71%

Current Base Operational Arrangements

The table below demonstrates the current operational set up of the EMRTS Service. The service is provided **primarily** from 4 bases in Wales.

Base	Hours	Crew Mix	Resources
Welshpool	08:00 - 20:00	1x Consultant & 1x CCP or 2x CCP◇	Access to Helicopter and Rapid Response Vehicle
Caernarfon	08:00 - 20:00	1x Consultant & 1x CCP or 2x CCP◇	
Dafen	07:00 - 19:00	1x Consultant & 1x CCP	
Cardiff Day	08:00 - 20:00	2x CCP or 1x CCP & 1x HTP◇◇	
Cardiff Night	20:00 - 08:00	1x Consultant & 1x CCP	

◇ Agreed hybrid model with one Consultant and a CCP at the North or Mid Wales base and two CCPs at the other.

◇◇ HTP = Helicopter Transfer Practitioner.

In 2017, the hybrid response model was agreed as part of the work of the North Wales Air Ambulance Implementation Group in the establishment of the EMRTS base at Caernarfon Airport.

This model has now been introduced in South Wales with a Consultant and a CCP based at Dafen and a CCP-led resource from Cardiff Heliport.



Base Workload

The table below demonstrates the arrivals at scene by resources assigned to each base during 2022.

	Dafen	Welshpool	Caernarfon	Cardiff Day	Cardiff Night
Aneurin Bevan	88	14	*	255	131
Cardiff and Vale	39	*	*	269	143
Cwm Taf Morgannwg◇	103	*	*	135	102
Swansea Bay◇◇	161	*	*	32	60
Hywel Dda	194	28	6	49	42
Betsi Cadwaladr	*	138	292	*	13
Powys	28	129	7	32	15
Out of area	*	17	*	*	6

◇Renamed from Cwm Taf University Health Board on 1 April 2019 following the transfer of Bridgend County Borough from the former Abertawe Bro Morgannwg University Health Board (now Swansea Bay University Health Board).

◇◇Renamed from Abertawe Bro Morgannwg University Health Board on 1 April 2019 following the transfer of Bridgend County Borough to Cwm Taf University Health Board Board (now Cwm Taf Morgannwg University Health Board).

* Indicates fewer than 5 patients

For more information please see:

Supporting Document 4 - EMRTS Historical Data Information Pack

The table below provides the breakdown of air and road arrivals at scene for the assigned base of each resource type during 2022.

		Dafen	Welshpool	Caernarfon	Cardiff Day	Cardiff Night
Aneurin Bevan	Air	84	14	*	140	25
	Road	*	*	*	115	108
Cardiff and Vale	Air	35	*	*	38	*
	Road	*	*	*	231	139
Cwm Taf Morgannwg	Air	92	*	*	81	18
	Road	11	*	*	54	85
Swansea Bay	Air	86	*	*	20	23
	Road	75	*	*	12	47
Hywel Dda	Air	147	28	6	42	34
	Road	47	*	*	7	15
Betsi Cadwaladr	Air	*	125	248	*	13
	Road	*	13	44	*	*
Powys	Air	25	86	7	31	15
	Road	*	43	*	*	*
Out of Area	Air	*	13	*	*	6
	Road	*	*	*	*	*

* Indicates fewer than 5 patients

For more information please see:

Supporting Document 4 - EMRTS Historical Data Information Pack

Utilisation

The table below provides the utilisation rate for each base.

Utilisation is a measure how active a given resource is during the time it is available. For the purposes of providing an emergency response utilisation is a balance between availability of resources against the efficiency and effectiveness of service delivery:

- Too low utilisation and the service becomes inefficient, costly and potentially disengages staff
- Too high utilisation and the services becomes ineffective by not being available when patients need it.

The calculation below has been used: $\text{Utilisation} = \frac{\text{Total Minutes from Allocation to Clear}}{\text{Available Shift Minutes}}$

With the following assumptions included:

- A shift is assumed to be 12 hours, with no meal break, and therefore 720 minutes total
- Overruns are included in the activity.

'Overruns' are periods where a crew continues to be active beyond the end of their shift. Overruns have a number of adverse impacts, including staff wellbeing, reduced cover for following shifts, and on occasion can result in an aircraft being stranded at a site away from its home base.

	2018	2019	2020	2021	2022◇
Dafen	32%	44%	47%	51%	46%
Welshpool	20%	25%	19%	27%	25%
Caernarfon	15%	18%	16%	21%	22%
Cardiff Day EMRTS	N/A	N/A	N/A	N/A	52%
Cardiff Nights EMRTS	N/A	N/A	56%	39%	32%

◇ Cardiff day EMRTS Cymru Service stated 01/04/2022

No Arrival Days

The tables below provide the days in each of the previous 5 calendar years where resources assigned to each base did not arrive at the scene of a single incident.

Air or Road	2018	2019	2020	2021	2022
Caernarfon	125	126	156	137	146
Cardiff	217	186	26	17	7
Dafen	37	21	27	50	43
Welshpool	87	81	155	114	133

Air	2018	2019	2020	2021	2022
Caernarfon	159	147	191	181	172
Cardiff	285	308	313	167	127
Dafen	99	76	117	120	89
Welshpool	110	109	188	148	164

Road	2018	2019	2020	2021	2022
Caernarfon	313	308	317	307	321
Cardiff	275	234	34	48	41
Dafen	215	197	177	207	254
Welshpool	318	287	308	306	312

Unmet Need

An essential aspect of the EMRTS service is to have resource available when patients require them, and to minimise any occasion where an EMRTS resource is not available for a patient who could benefit from the service they provide.

Air or Road	2020	2021	2022
January	N/A	122	137
February	N/A	76	90
March	N/A	103	89
April	N/A	144	70
May	N/A◇	129	77
June	N/A◇	190	87
July	N/A◇	172	73
August	115	164	61
September	123	153	75
October	133	124	87
November	124	118	88
December	131	118	70

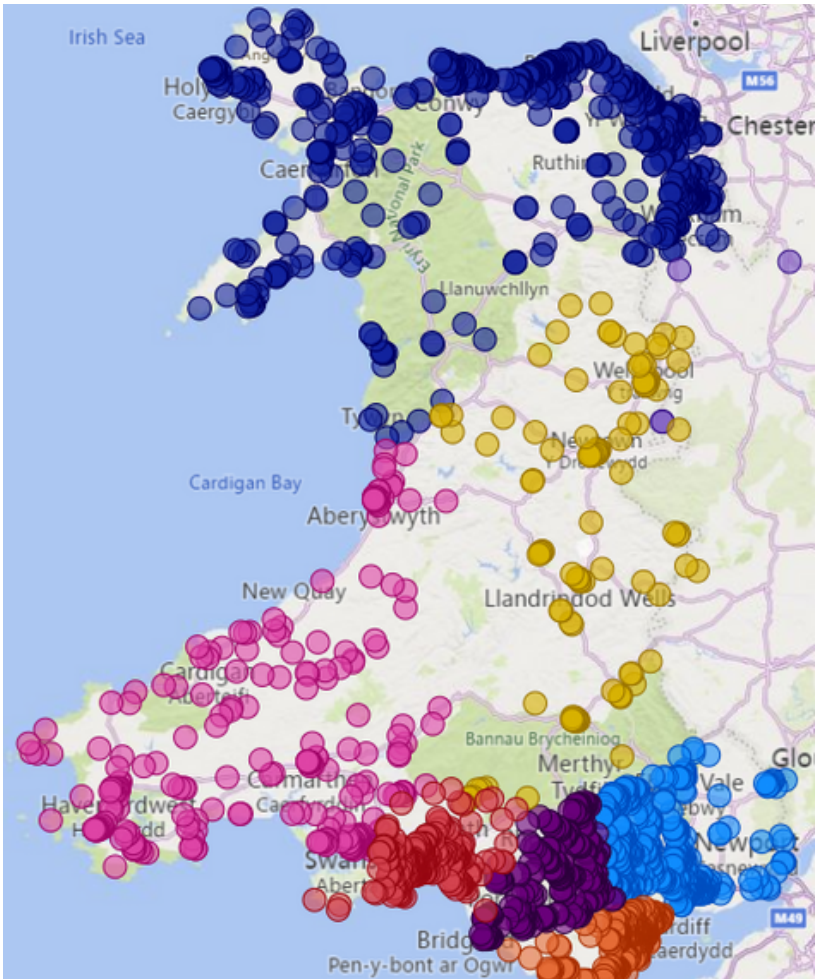
As part of the development of the service and the expansion of the EMRTS Critical Care Hub (ECCH) to 24/7 operations, real time / prospective data collection was started on 28/05/2020 complimenting other data sources. The above includes data up to and including 12/2022.

N/A = Not Available

◇ New collection embedding

Unmet Need

The map below shows the level of unmet need during 2022 by Local Health Board, the larger the bubbles the greater the unmet need



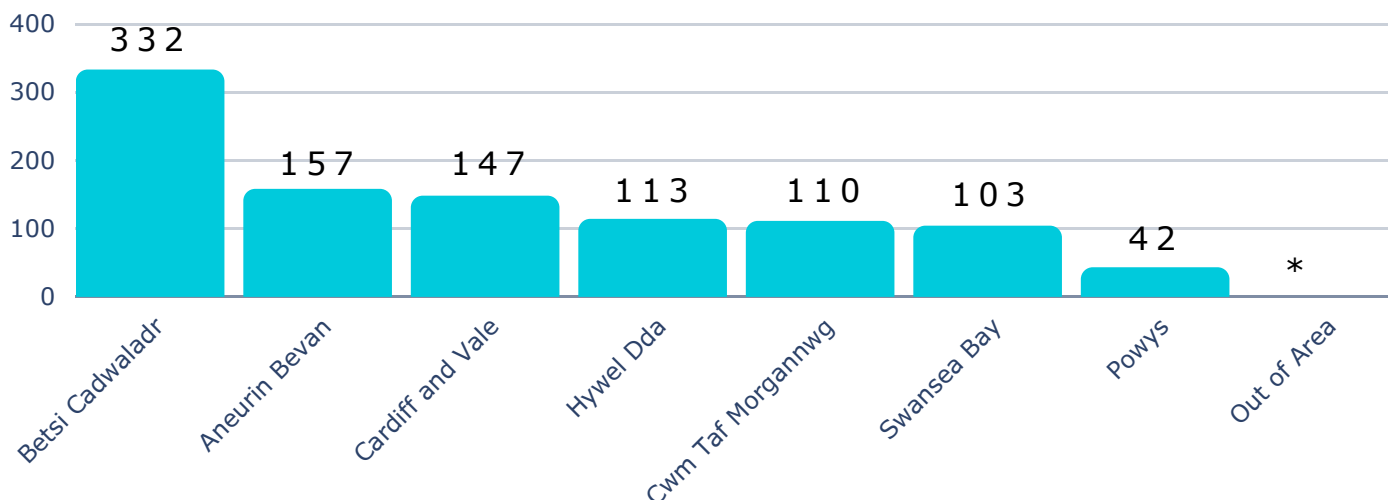
The table below shows the same unmet need as the map above but is split by hour of day and day of week.

Day of Week	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Sunday	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower
Monday	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower
Tuesday	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower
Wednesday	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower
Thursday	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower
Friday	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower
Saturday	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower	5 or lower

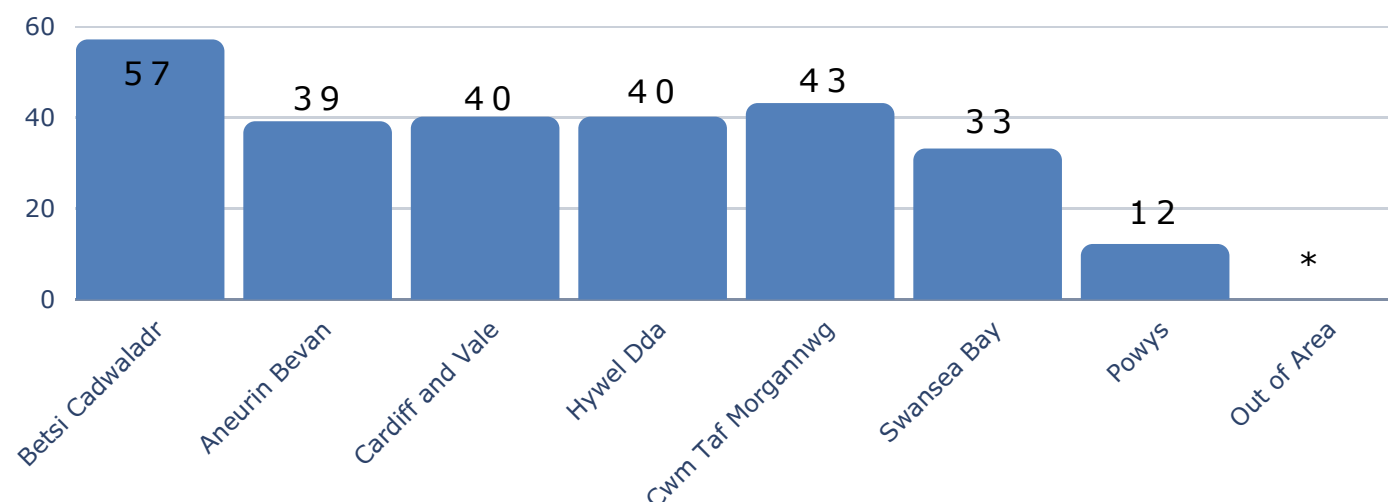
Key

5 or lower	6-15	16-30	31-45	46-60
------------	------	-------	-------	-------

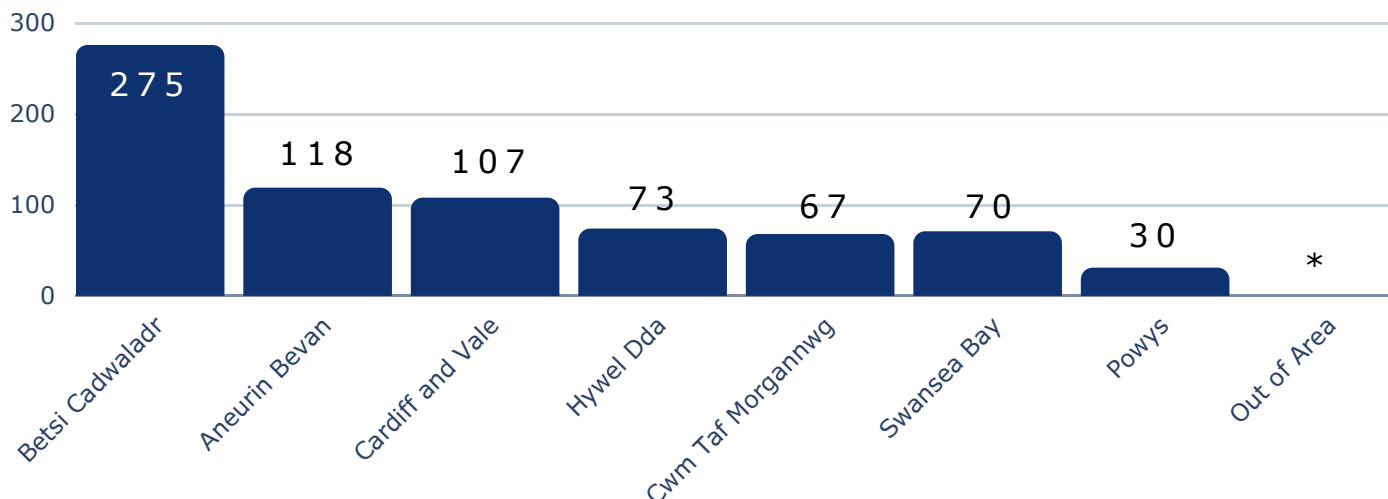
The graph below shows the level of unmet need by local health board



The graph below shows the level of day time (08:00 - 19:59) unmet need by local health board

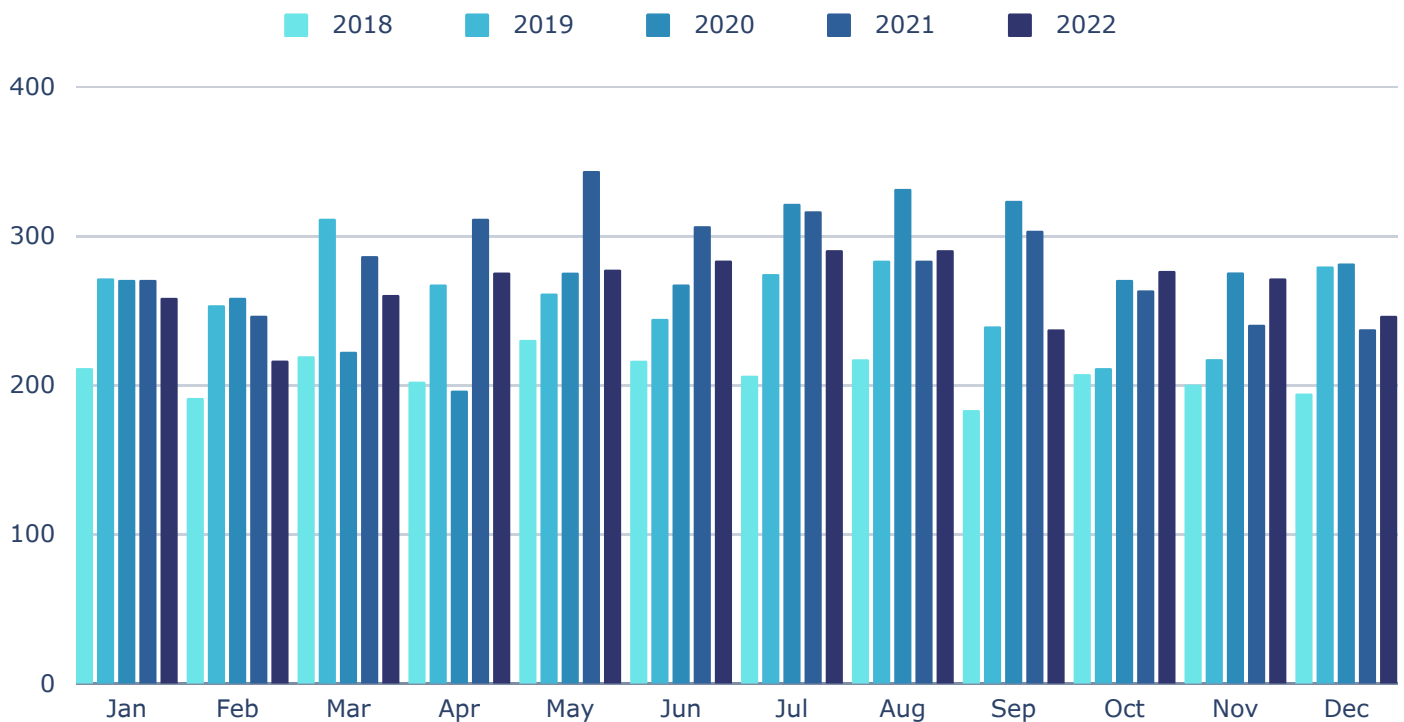
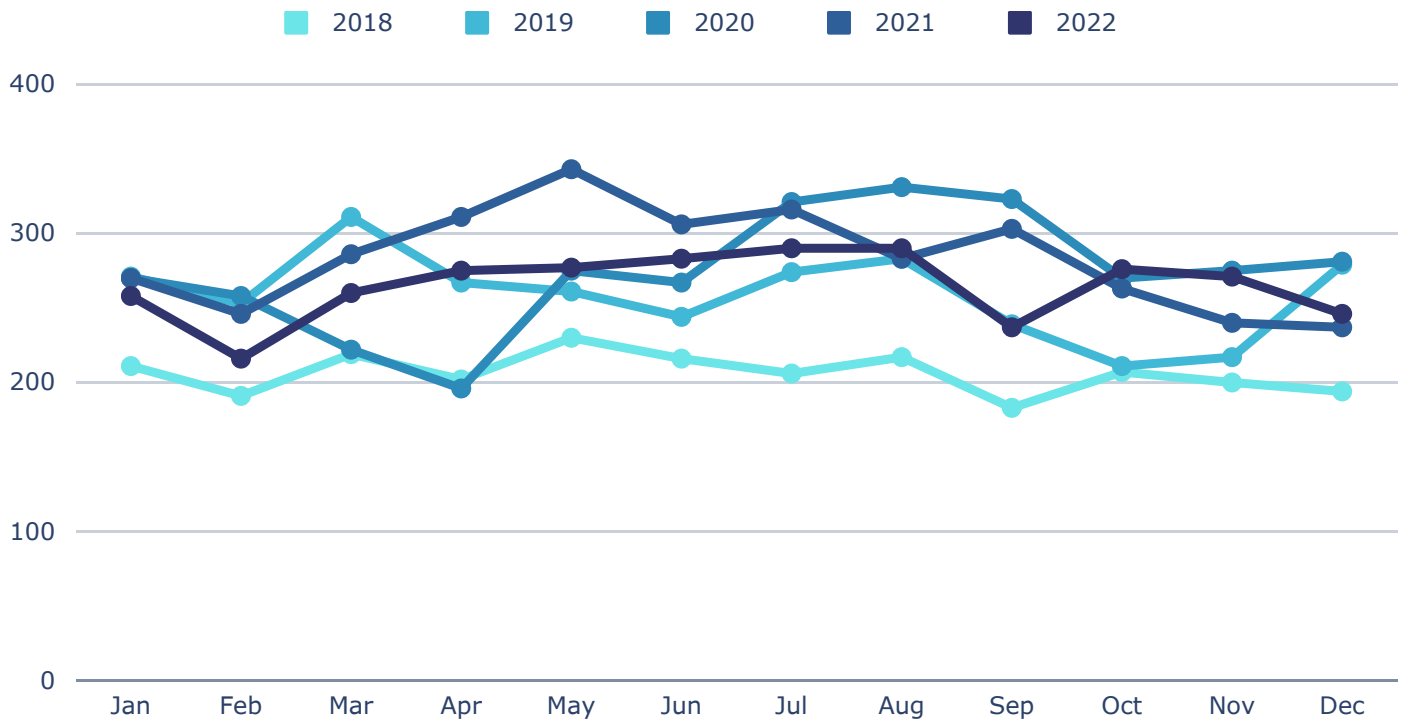


The graph below shows the level of night time (20:00 - 07:59) unmet need by local health board



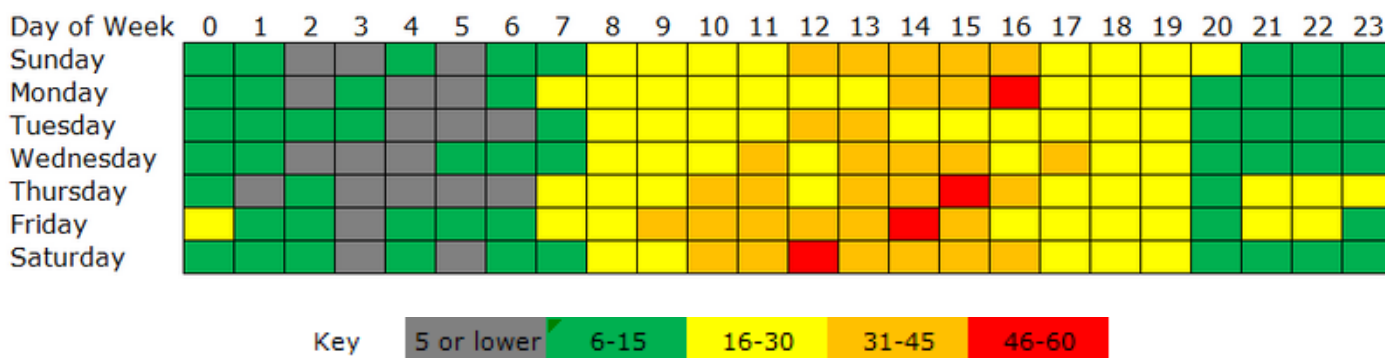
Seasonal Variation

The charts below provide the arrivals at scene by month for each of the preceding 5 calendar years.



Hourly and Daily Demand

The charts below provides the 2022 arrivals at scene by time of day and day of week



Population Coverage

The table below provides the population coverage by each base using 2022 population data provided by Environmental Systems Research Institute (ESRI) through ArcGIS Mapping and Analytical Software.

	30 Minute Air Response		60 Minute Air Response		90 Minute Air Response	
Dafen	2,408,162	76.8%	3,137,127	100%	3,137,127	100%
Welshpool	1,258,626	40.1%	3,137,127	100%	3,137,127	100%
Caernarfon	809,751	2.5%	3,137,127	100%	3,137,127	100%
Cardiff Day	2,187,688	69.7%	3,137,127	100%	3,137,127	100%
Cardiff Night	-	-	2,606,214	83.1%	3,137,127	100%

	30 Minute Road Response		60 Minute Road Response		90 Minute Road Response	
Dafen	491,114	15.7%	1,490,063	47.5%	2,330,024	74.3%
Welshpool	48,976	1.6%	279,306	8.9%	619,439	19.7%
Caernarfon	77,031	2.5%	279,307	8.9%	553,336	17.6%
Cardiff Day	860,339	27.4%	1,870,263	59.6%	2,129,128	67.9%
Cardiff Night	860,339	27.4%	1,870,263	59.6%	2,129,128	67.9%

Road responses were measured against a travel time of 30, 60, and 90 minutes from a base location at normal road speeds. Road response from Cardiff Heliport has been assumed to be consistent for both day and night shifts.

Air responses were measured differently as they do not follow a road based network. However, the same travel time of 30, 60, and 90 minutes parameters were used with a 6 minute deduction made to allow for start-up and ground operations for day flying and for 20 mins ground time for night flying. The actual flying time is therefore measured as 24, 54, and 84 minutes. Calculations have been based on an EC145 never exceeding a speed of 145 knots.

For more information please see:

Supporting Document 5 - Drive-time and Population Coverage provides detailed information and response time maps for each base.



Golden Hour

During the Phase 1 engagement a number of questions were raised around the historic concept of the “Golden Hour”.

The origins of the term is difficult to trace but is sometimes attributed to the experiences of Dr R A Crowley, a Trauma Surgeon in the mid-1970s. He advocated for the idea that trauma patients have better outcomes if they receive definitive care within 60 minutes.

There is little objective data to support Dr Crowley's thesis that emergency care is so time dependent that it affects either the survival rate or eventually the patient's quality of life◇.

Modern thinking is focused on getting the care the patient needs as quickly as possible rather than setting an arbitrary time limit. Some patients may have only minutes to survive without appropriate intervention, whereas some may survive their initial injuries but need specialised care and rehabilitation to achieve maximum post-injury function.

The most important thing is that the EMRTS service goes to the patient if that's what is needed. We know from the EMRTS Service Evaluation that patient outcomes improve for those treated at scene by the EMRTS Service.

◇ U.S. Department of Defense. The Origins of the “Golden Hour” of Medical Care and its Applicability to Combat Medicine. By Lieut. Colonel Joseph J. Hudak. Washington. Government Printing Office. 2017. 11-41



Response Time

Whilst speed of response is important when considering life and limb threatening illness or injury, EMRTS is not designed or commissioned to provide a primary response to these incidents, that role remains with WAST.

It must be recognised that EMRTS provide a specialised secondary response to these incidents and their response time should be considered in this context and cannot be measured against the traditional metric of ambulance response.

Road ambulance response time clock start and clock stop points are well defined. The clock time start regardless of the availability of an asset to respond.

- **Red**
 - Identification of chief complaint (Clock Start) to on Scene (Auto◇ or Manual)
- **Amber**
 - Final Medical Priority Dispatch System (MPDS) Disposition (Clock Start) to on scene (Auto◇ or Manual).

For EMRTS, clock start and stop times are less defined and could be applied to a number of unique episodes within the patient's care episode, but overall the definition of response time for EMRTS requires the allocation of an EMRTS resource, examples are provided below:

Clock Start:

- Identification of incident by the EMRTS Critical Care Hub
- Allocation of resource by EMRTS Critical Care Hub
- Take off /mobilisation of resource.

Clock Stop:

- Auto geo-fence (automatic applied when resource is within a set distance of the incident, this may include still being in the air)
- Manual input once landed
- Manual input once at the patient's location.

◇ Auto refers to a virtual geographic boundary, defined by Global Positioning System (GPS) technology, that enables vehicles to trigger an on-scene or at hospital status response when a vehicle enters a particular area.

There are a number of additional nuances that apply to EMRTS air response that would not usually apply to road-based ambulance resources, including:

- Daytime planning time of up to 6 minutes prior to take off
- Night-time planning time of up to 45 minutes prior to take off
- Aircraft landing locations can be significant distances from patient locations, requiring the crew to travel on foot or access secondary road-based transport to the patient's location.

The table below provides the proportions of each resource type that responded to each health board and the average response time for each health board in 2022

	Air / Road	Average Response Time
Aneurin Bevan	54% / 46%	43 minutes
Cardiff and Vale	17% / 83%	29 minutes
Cwm Taf Morgannwg	57% / 43%	41 minutes
Swansea Bay	50% / 50%	43 minutes
Hywel Dda	79% / 21%	52 minutes
Betsi Cadwaladr	87% / 13%	47 minutes
Powys	78% / 22%	49 minutes
Out of Area	85% / 15%	29 minutes

Reference Period

The Phase 1 public engagement highlighted concern around the time period of data used for the modelling of scenarios, with particular emphasis on the impact of the CoVID-19 pandemic period. Given this, and the additional operational and demand changes that have occurred with the provision of EMRTS, including the introduction of an additional daytime road response from Cardiff Heliport, it was decided to limit the data reference period to the most recent available and stable data since the introduction of this.

As such the data reference period used for the modelling ranged from the **1 June 2022 to 31 May 2023**.



Weather

In addition to the reference period adjustment, further weather information focusing on cloud base and visibility was incorporated into the modelling system. This information was provided by an external consultancy, using Met Office information. Adjustments were made to account for any height level discrepancy between weather stations and base locations.

The table below provides the % period of time where the model assumes aircraft unavailability due to cloud base or visibility limitations for each month of the year. Weather assumptions are limited to base location, no assumptions have been included for weather conditions at the location of incidents.

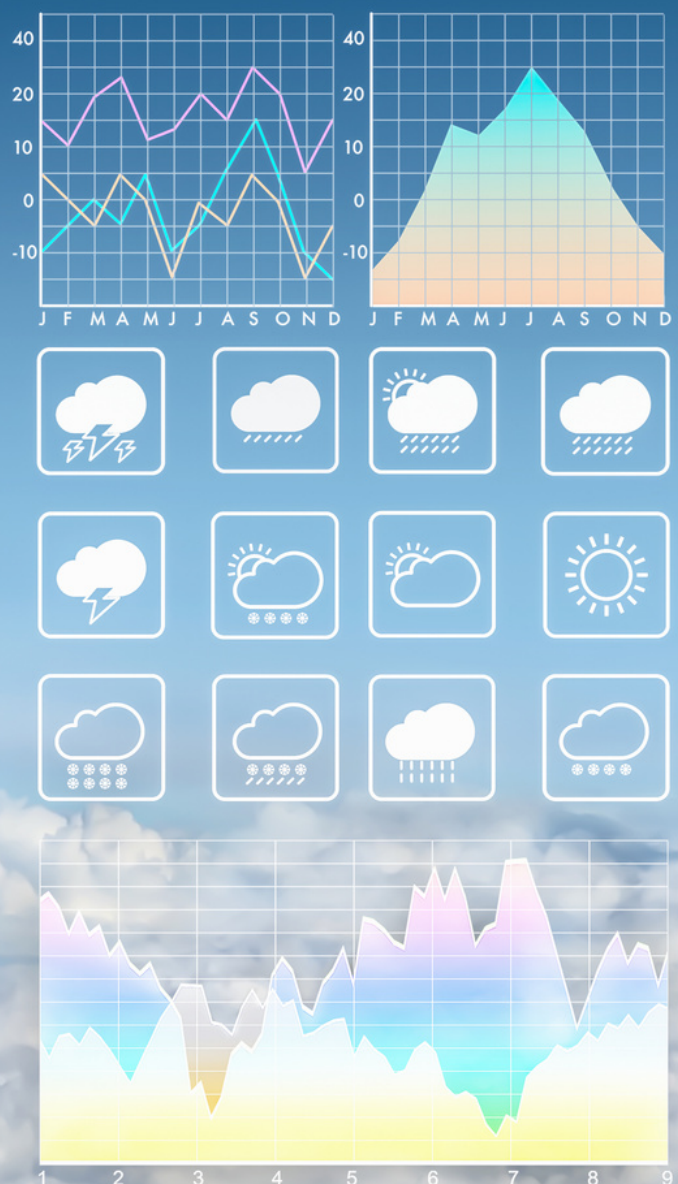
Base	Cardiff	Dafen	Welshpool	Caernarfon	Rhuddlan
Weather Station	St Athan	Pembrey Sands	Shawbury	Caernarfon	Rhyl No 2
Jun	5%	9%	3%	8%	6%
Jul	5%	9%	2%	10%	4%
Aug	5%	11%	2%	9%	4%
Sept	6%	11%	5%	8%	4%
Oct	5%	11%	3%	7%	2%
Nov	9%	10%	10%	7%	2%
Dec	15%	18%	11%	11%	4%
Jan	13%	15%	10%	9%	3%
Feb	6%	17%	4%	8%	3%
Mar	10%	12%	5%	7%	3%
Apr	5%	7%	3%	4%	2%
May	5%	6%	2%	4%	1%

Weather

NOTE: When the National Police Air Service (NPAS) was formed, it inherited 31 air bases. The number of bases were reduced as part of a programme to improve performance and to realise savings, this included the base at Rhuddlan. It has been confirmed that this efficiency programme was based on call volume and transit distance to achieve scene attendance within a metric not weather.

For more information please see:

Supporting Document 6 - Weather Analysis



Flooding

There is an additional complication for the Welshpool base related to flooding, caused by proximity to the River Severn. Since the start of 2021, the base has been vacated five times.

There is an additional complication for the Welshpool base related to flooding, caused by proximity to the River Severn. Since the start of 2021, the base has been vacated five times, with an average impact of 4 days per event.



Options Development

As part of the phase 1 public engagement 3 broad areas of proposed model options were discussed:

- Existing bases and changes to these
- Having a new base in the centre of North Wales (by closing other bases)
- Additional ideas or scenarios (to be informed by engagement process)

Following Phase 1 these broad themes were further refined into the following 6 scenarios:

- **Scenario 1:** Status Quo – Keeping things as they are now
- **Scenario 2:** Existing Bases / Existing Capacity – Testing different shift times 14:00 – 02:00 and 20:00 – 08:00 for crews at the existing bases.
- **Scenario 3:** Consolidated Base / Existing Capacity – Merging two bases into one at a centralised location and testing different shift times 08:00 – 20:00, 14:00 – 02:00 and 20:00 – 08:00 for crews at this base.
- **Scenario 4:** Consolidated Base / Additional Capacity – Taking the best variation for scenario 3, and adding an extra car crew in a different location and testing different shift times 08:00 – 20:00, 14:00 – 02:00 and 20:00 – 08:00 for this crew.
- **Scenario 5:** Status Quo / Additional Capacity – Taking the status quo and adding an extra crew to some bases and testing different shift times 14:00 – 02:00 and 20:00 – 08:00.
- **Scenario 6:** Existing Bases / Additional Capacity – Taking the best variation for scenario 2, and adding an extra car crew in a different location and testing different shift times 08:00 – 20:00, 14:00 – 02:00 and 20:00 – 08:00 for this crew

Under each scenario a number of variations were developed, these are set out under the modelled options.

As set out in the service history, in an effort to deliver a more effective service, operational changes to the bases in South Wales have already occurred, these have ensured appropriate base infrastructure and access to key road networks. As such no options have been modelled to change the operation of these bases as part of this review.

For more information please see:

Supporting Document 7 - Optima Modelling.



Modelled Options

The list below outlines the 20 variations of the 6 scenarios that were modelled. Variation 3B is unique in that it uses a location determined by coverage algorithms as the best location for a base, no assessment has been made of the practicalities of locating a base in this location. For practical purposes, the North Wales Police decommissioned helicopter base at Rhuddlan has been used for the consolidated base location.

Scenario 1: "Status quo":

- **Baseline.** This scenario is the Baseline

Scenario 2: Existing Bases, Existing Capacity:

- **2A) Welshpool 14-02.** Change the Welshpool shift to 14:00 - 02:00 hrs.
- **2B) Caernarfon 14-02.** Change the Caernarfon shift to 14:00 - 02:00 hrs.
- **2C) Welshpool & Caernarfon 14-02.** Change the Welshpool and Caernarfon shifts to 14:00 - 02:00 hrs.
- **2D) Welshpool 20-08.** Change the Welshpool shift to 20:00 - 08:00 hrs.
- **2E) Caernarfon 20-08.** Change the Caernarfon shift to 20:00 - 08:00 hrs.

Scenario 3: "Consolidated Base, Existing Capacity":

- **3A) Rhuddlan 2x 08-20.** Merge Welshpool (1 shift) and Caernarfon (1 shift) into Rhuddlan (2 shifts)
- **3B) Best Alternative.** Merge Welshpool and Caernarfon into the best alternative (2 shifts)
- **3C) Rhuddlan 08-20 + 20-08.** Merge Welshpool (1 shift) and Caernarfon (1 shift) into Rhuddlan and change the shift timings to 08:00 - 20:00 hrs. and 20:00 - 08:00 hrs.
- **3D) Rhuddlan 08-20 + 14-02.** Merge Welshpool (1 shift) and Caernarfon (1 shift) into Rhuddlan and change the shift timings to 08:00 - 20:00 hrs. and 14:00 - 02:00 hrs.

Scenario 4: "Additional Capacity to Scenario 3":

- **4A) Extra car 08-20.** Uses the best-performing variation of scenario 3, then adds a car-only shift (08:00 - 20:00 hrs.) to a new, well-covering location in the North Wales
- **4B) Extra car 14-02.** Similar to the previous, but make the car-only shift 14:00 - 02:00 hrs.
- **4C) Extra car 20-08.** Similar to the previous, but make the car-only shift 20:00 - 08:00 hrs.

Scenario 5: "Additional Capacity to Baseline":

- **5A) Welshpool add 20-08.** Add a 20:00 - 08:00 hrs. crew to Welshpool
- **5B) Welshpool add 14-02.** Add a 14:00 - 02:00 hrs. crew to Welshpool. During the shift overlap (14:00 - 20:00 hrs.), if the helicopter is already being used, then the second crew will use the car
- **5C) Caernarfon add 20-08.** Add a 20:00 - 08:00 hrs. crew to Caernarfon
- **5D) Caernarfon add 14-02.** Add a 14:00 - 02:00 hrs. crew to Caernarfon. During the shift overlap (14:00 - 20:00 hrs.), if the helicopter is already being used, then the second crew will use the car.

Scenario 6: "Additional Capacity to Scenario 2":

- **6A) Extra car 08-20.** Uses the best-performing variation of scenario 2, then adds a car-only shift (08:00 - 20:00 hrs.) to a new, well-covering location in the North Wales
- **6B) Extra car 14-02.** Similar to the previous, but make the car-only shift 14:00 - 02:00 hrs.
- **6C) Extra car 20-08.** Similar to the previous, but make the car-only shift 20:00 - 08:00 hrs.

Modelling Outputs

The table below summarises the outputs of each modelled variation, this should be read in conjunction with the full report in Supporting Document 6 – Optima Modelling. Within the full report further information has been provided for each of the best performing variations within each scenario.

Scenario	Disptches	Scene Arrivals	Additional to baseline	Residual Unmet Need	Response Duration (avg)	Vehicle Reflex Duration (avg)
1) Baseline	3,650	2,696	-	858	56:21	26:20
Scenario 2: Existing Bases, Existing Capacity. Best performing variation marked in light blue						
2A) Welshpool 14-02	3,739	2,785	89	769	55:13	25:59
2B) Caernarfon 14-02	3,748	2,793	97	760	55:25	26:36
2C) Welshpool and Caernarfon 14-02	3,684	2,730	34	824	55:50	25:12
2D) Welshpool 20-08	3,679	2,727	31	829	56:48	26:13
2E) Caernarfon 20-08	3,708	2,753	57	800	57:05	26:35
Scenario 3: Consolidated Base, Existing Capacity. Best performing variation marked in light blue						
3A) Rhuddlan 2x 08-20	3,661	2,707	11	847	56:36	26:09
3B) Best Alternate 2x 08-20	3,671	2,717	21	937	56:10	26:03
3C) Rhuddlan 08-20 + 20-08	3,767	2,812	116	741	53:58	24:43
3D) Rhuddlan 08-20 + 14-02	3,791	2,832	136	717	53:23	25:22

Scenario	Disptches	Scene Arrivals	Additional to baseline	Residual Unmet Need	Response Duration (avg)	Vehicle Reflex Duration (avg)
1) Baseline	3,650	2,696	-	858	56:21	26:20
Scenario 4: Additional Capacity to Scenario 3, Best performing variation marked in light blue						
4A) Extra Car 08-20	3,817	2,861	165	691	54:29	25:08
4B) Extra Car 14-02	3,843	2,888	192	665	53:02	24:34
4C) Extra Car 20-08	3,859	2,904	208	649	52:33	24:12
Scenario 5: Additional Capacity to Baseline. Best performing variation marked in light blue						
5A) Welshpool add 20-08	3,746	2,792	96	762	55:55	25:55
5B) Welshpool add 14-02	3,733	2,779	83	755	55:52	25:41
5C) Caernarfon add 20-08	3,755	2,801	105	753	55:19	25:30
5D) Caernarfon add 14-02	3,738	2,785	89	770	56:06	25:50
Scenario 6: Additional Capacity to Scenario 2. Best performing variation marked in light blue						
6A) Extra Car 08-20	3,777	2,823	127	731	54:06	25:55
6B) Extra Car 14-02	3,834	2,878	182	674	52:44	25:08
6C) Extra Car 20-08	3,875	2,901	205	651	51:47	24:50

Decision Making and Next Steps

This report presents the work that has been undertaken during and since Phase 1, it presents a range of new and additional information that the review team has been considering.

Phase 2 seeks public comment on the options developed from 9 October 2023 – 5 November 2023. The public and stakeholders can have their say by:

- Face to Face Public Meetings and Drop-In sessions: [Click to view timetable](#)
- Post: 'EMRTS Feedback', EASC/NCCU, Unit 1, Charnwood Court, Heol Billingsley, Nantgarw, Cardiff, CF15 7QZ
- E-mail: eascservicereviewqueries@wales.nhs.uk
- Online Query Form: <https://easc.nhs.wales/engagement/sdp/>
- Phone answer line: 01443 471520

As well using the 'factors' for the evaluation process (as detailed on page 14), Phase 2 feedback received will help the CASC arrive at a recommendation and preferred option.

After this, the recommended option will be taken to the Emergency Ambulance Services Committee for consideration and final decision, it is hoped by the end of the year.



Emergency Ambulance Services Committee
Unit 1, Charnwood Court
Billingsley Road
Nantgarw Park
Cardiff
CT15 7QZ

www.easc.nhs.wales



GIG
CYMRU
NHS
WALES

Pwyllgor Gwasanaethau
Ambiwlans Brys
Emergency Ambulance
Services Committee



Uned Gomisiynu Gydweithredol Genedlaethol
GWASANAETHAU DIGIDOL
DIGITAL SERVICES
National Collaborative Commissioning Unit