



**GIG**  
CYMRU  
**NHS**  
WALES

Bwrdd Iechyd Prifysgol  
Bae Abertawe  
Swansea Bay University  
Health Board



<b>Meeting Date</b>	<b>17<sup>th</sup> January 2023</b>	<b>Agenda Item</b>	<b>3.6</b>
<b>Report Title</b>	<b>Ventilation Systems</b>		
<b>Report Author</b>	Des Keighan – Assistant Director of Estates		
<b>Report Sponsor</b>	Darren Griffiths – Director of Finance and Performance		
<b>Presented by</b>	Des Keighan, Assistant Director of Operations - Estates		
<b>Freedom of Information</b>	Open		
<b>Purpose of the Report</b>	This paper provides an update on previous papers regarding proposals on the ventilation issues within the Health Board. The predominant focus of the report is around the Morryston site and how the Health Board is going to move forward with the provision of compliant air conditioning systems.		
<b>Key Issues</b>	<p>The paper updates the Committee on progress regarding the compliance with HTM (Health Technical Memorandum) with regard to the provision of air conditioning services for clinical areas.</p> <p>The previous papers highlighted options around how air change rates could be improved within the clinical areas and had suggested adopting Heat Recovery Units within the 6 bedded bays to provide improved air change rates.</p> <p>Since the original paper Capital colleagues have considered how these services can be provided within one of the existing wards on the Morryston site. The layout for the potential solution has been developed however, any replacement will have major implications to clinical services as in many instances one system serves a number of areas. In order to complete the work, we will need to take a number of wards out of operation whilst the work is completed. At the same time the Health Board is considering its long-term strategy for addressing backlog maintenance issues which includes the provision of a six/eight ward decant facility which would provide single bedded ventilated accommodation, whilst a systematic refurbishment programme is undertaken</p>		

	<p>Guidance is changing around the provision of ventilation in clinical areas and Health Boards are now being asked to consider methods of mitigating low ventilation change rates within clinical areas where there is no option to provide mechanical ventilation. The original guidance strictly prohibited the use of air scrubbers now health boards are being asked to consider how these could be utilised in clinical areas where increasing the ventilation change rate is not possible by other means.</p> <p>At the December 2022 Ventilation sub group of the Health and Safety Committee a decision was made to look to run some trials in early 2023 in clinical areas. These trials will look to see the effectiveness of the units on the particulate amounts in the air.</p> <p>In the longer term the Development Control Plan has now been developed for the Morriston and Singleton Hospital and capital Colleagues are starting to develop business cases this support the development of decant facilities at the Morriston site.</p>			
<b>Specific Action Required</b> <i>(please choose one only)</i>	<b>Information</b>	<b>Discussion</b>	<b>Assurance</b>	<b>Approval</b>
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Recommendations</b>	Members are asked to: <ul style="list-style-type: none"> <li>• <b>NOTE</b> the contents of the report</li> </ul>			

## **VENTILATION SYSTEMS**

### **1. INTRODUCTION**

This paper sets out the position regarding compliance with the new HTM 03-01 Specialised Ventilation for Healthcare premises. It identifies the limiting factors with regards the performance of the existing plant and outlines potential ways forward, providing a preferred solution and a timetabled action plan.

Further work had identified that areas in ICU (intensive care unit) did not comply and capital colleagues have implemented changes to existing systems to address this shortfall. However, what we do know is that for the ward areas within both the Singleton and Morriston Hospital sites for the large part, the air conditioning systems do not provide the recommended air change rates as laid out in the HTM 03-01. Generally, these break areas down to three general levels of air changes – either 3, 6 or 10.

### **2. BACKGROUND**

For ward areas annual verification of ventilation system has never been required. However, with the focus on ventilation systems as a result of the COVID19 pandemic, the Specialist Estates Services Notification 21/16 summarised the latest thinking. It highlighted the fact that the HTM 03-01 Specialist ventilation for healthcare premises Part A & B provides detailed guidance on specialist ventilation in healthcare premises such as theatres, endoscopy and isolation rooms.

Whilst this did not specifically address COVID as such, it does give clear guidance on suggested air change rates. We have previously reported on air change rates in theatre and critical care areas and these are in line with the guidance from the HTM. However, we have previously reported on the deficiencies in the more general clinical areas which will be highlighted further in the document.

The SEN 21/16 noted the COVID-19: infection prevention and control (IPC) document which set out the IPC advice for health and care organisations. It included key IPC control recommendations and included risk assessed patient pathway scenarios to help guide the implementation of measures to provide safe and effective care locally.

The World Health Organisation (WHO) Ensuring a Safe Environment for Patients and Staff in COVID-19 Health-Care facilities document provided further guidance on ventilation requirements to specific areas of the hospital. This guidance covered both natural and mechanically ventilated areas. It has to be recognised that in the nucleus wards in Morriston Hospital there is mechanical ventilation to the core areas but in the wards/patient rooms themselves they are naturally ventilated via openable windows.

The document suggested that for naturally ventilated areas air flow of at least 60 L/s/person or 6 air changes/hour (ACH) as in the HTM. While it could be argued that the window ventilation can achieve up to 6 air changes per hour, this is very

dependent on external conditions. Therefore, average air change rate for window ventilation is more likely to be in the region of 2-3 air changes per hour. It also needs to be considered that windows are less likely to be opened during cold ambient temperatures potentially reducing the air change rate further.

It also highlighted the importance to ensure that extracted air is safely diluted and maintained in accordance with manufacturers' recommendations which is the case for our systems as they are maintained to the frequencies outlined in the HTM.

For critical areas such as the Emergency department (ED) it cited air flow of at least 120 L/s/person or 12 Air Changes per Hour (ACH). A document released by the WHO "A Roadmap to improve and ensure good indoor ventilation in the context of COVID-19" suggested action points for both natural and mechanical ventilation systems. Based on this and the HSE (Health and Safety Executive) Guidance Ventilation and Air Conditioning during the Coronavirus (COVID-19) Pandemic the Health Board developed its plans for the way forward.

The HSE guidance highlighted why ventilation is important as it helps reduce the risk from aerosol transmission as the risk from aerosols is greater in areas that are poorly ventilated. However, it noted that although ventilation reduces the risk from aerosols, it has minimal impact on: droplet transmission (from people being in close contact) or contact transmission. It noted that ventilation is likely to be adequate to minimise the risk of COVID-19 aerosol transmission if the rooms are used within the occupancy limits specified in the building design, and that they have a sufficient fresh air supply to meet the current minimum building standard which is 10 l/s/per person.

Unfortunately, the design criteria have changed since the hospital was originally designed however, the air change rate stipulated by the HSE of 10 L/S per person is significantly lower than the rates stated in either the HTM or WHO documents. As these were specifically aimed at health care institutions which should look to meet these recommendations.

## **Context**

It is with this guidance in mind the Health Board needed to develop its forward plan. It is clear for the Morriston Hospital site that we are not meeting the air change rates stipulated in the guidance for the majority of the ward areas.

As already stated within the guidance documents they suggested that the air change rates for wards should be 6 air changes per hour. When the nucleus part of Morriston Hospital was built the design philosophy was that the windows provided the required air changes when supported by the air conditioning in the core areas. Recent reviews have shown there are variances in the air change rates achieved in the core areas from over 10 air changes to zero in others. Trying to address the air change rates is extremely difficult without affecting the environment on the ward.

The Health Board did undertake a number of reviews of the existing air change rates to see if we could identify whether we could rebalance the system to provide better air change rates within the ward areas. However, that review has shown that even with rebalancing the systems, there is insufficient capacity to meet the current recommended air change rates.

We have to consider other options such as potential for new openings (add/modify window or door dimensions). However, this is not practical as whilst it will increase the number of air changes it does not address the issue of the direction of the air flow. As it is also important that cross ventilation rather than single-sided ventilation is provided.

Opening the doors to all bays will improve air movement however that has to be considered against the increase to the risk of infection.

If the system does not allow increasing ventilation to the recommended minimum per person requirement, it is suggested we consider reducing the maximum room occupancy to meet the recommended L/S per person standard. If we assume that we need 60 l/sec/person to ventilate a 6 bedded ward, if you reduce occupancy we should then meet the WHO standard of litres per second of fresh air provided per person. However, it is appreciated that this, would have significant clinical implications and that it does not improve air change rates. It does however improve dilution and increase the percentage of fresh air provided per person.

If no other (short-term) strategy can be adopted, we could consider using a stand-alone air cleaner with HEPA filters. However, we would need to pay attention to the airflow direction (from clean to less clean areas) when positioning the unit. There is concern that these units have limitations as they do not clean the whole room but rather through short circuiting clean an area around them. Therefore, more than one may be needed in a six bedded ward also it is unclear how obstructions would affect their efficiency. They also only remove contaminants from the air and do not provide fresh air.

The recommendation is that these types of units should be close to the source(s) of infection which may in itself bring operational difficulties. Also stand-alone air cleaners should be operated continuously. Air cleaner capacity should at least cover the gap to dilute air borne contamination between the minimum requirement and the measured ventilation rate.

Latest guidance around the respiratory pathway is that where there are no suitable air conditioning organisations should consider the use of air scrubbers. Whereas previously recommendations had been not to utilise this form of unit. Health Boards are being encouraged to consider these where no alternative options are available the Health Board are going to undertake trials in the New Year to see the effectiveness of a scrubbers in clinical areas. The health board had already conducted some trials in the summer however these proved inconclusive. There were a number of issues around the effectiveness of the units especially where there was furniture in the room secondly the noise levels of the unit cause particular cause for concern. Further consideration needs to be taken into account is the electrical capacity within the Morriston site which is nearing capacity in some areas the sub six initiative will help ease some of the pressure on the substations.

## Forward Vision



From the previous papers the suggestion was to move to localised heat recovery units. Capital colleagues are working to look at how these can be provided within the existing clinical areas on the



Morrison Hospital site. The drawing opposite outlines potential design solutions that Capital colleagues have developed. However, any replacement will have major implications to clinical services as in many installations, one system serves a number of areas therefore the implication is that to complete the work we will need to take a number of wards out of operation whilst the work is completed which is not currently possible due to service needs. The lack of capital also means these plans are on hold.

The Health Board is looking at its long-term strategy for addressing backlog maintenance issues. As previously explained a number of the engineering systems do not simply serve a single ward or area, therefore, to do any work on the ventilation systems will require us to decant 4 wards. Whilst we refurbish the roof and engineering services this can be undertaken on 4 wards on a single level within a template, the ventilation systems may have to be completed with 4 wards which serve one half of the template, but this will depend on where they are located on the site. To address the major engineering backlog at the Morrison site we have already identified that we need to decant a minimum of 4 wards. As part of the programme to address our backlog the Health Board is looking to provide a decant facility at the bottom of the site and a new ED across the road from the existing one. The health board is coming to the conclusion of the development of both its Estates strategy and the development control plans for the two main acute sites these are set to be agreed this month. Technical meetings have already commenced about the development philosophy for the new Labs planned for the Morrison site.

The provision of the new decant facility would provide single bedded ventilated accommodation that comply with all current HTM guidance. Once these facilities are in place the Health Board will start a programme of refurbishment to bring its Estate up to the standards laid out within the WHTM's and HTM's.

## Conclusion

Whilst Capital colleagues have developed a heat recovery option, capital funding is currently not available to move forward with these proposals. The Health Board is developing its long term strategy to address its backlog maintenance issues with the provision of a 6 - 8 ward decant facility over the next 2-3 years which would allow us to have a phased approach to improve the air conditioning provision within the Morrison Hospital site, as the decant facility will be compliant with the latest standards and once we are able to refurbish the clinical areas within the nucleus template we will have a rolling programme of improvement in place. These plans will

be shared with the Board at its Development session on 9<sup>th</sup> January 2023 and will then be further explored with Welsh Government to assist with the formulation of a prioritised Wales National Plan. At this stage there is no guarantee of additional capital resource but the availability of this credible detailed assessment of need will directly inform such prioritisation discussions.

Installing air conditioning in all our facilities is challenging from a financial and logistical perspective and we have to adopt a long-term strategy to address the issues, which is what the Health Board is planning to do. This should be allied with the use of other systems such as air scrubbers to try and mitigate the negative impacts of no air change rates within clinical areas. Sadly, progress has not been made in undertaking trials of scrubbers in dental units due to the problems with case mix and availability of staff to undertake the testing therefore it is proposed to undertake testing clinical areas where we can guarantee a more consistent baseline for the testing.

### **3. FINANCIAL IMPLICATIONS**

At present there is no financial implication but there will need to be consideration of the capital developments in the context of the overall capital refresh plan.

### **4. RECOMMENDATION**

Members are asked to:

- **NOTE** the report

<b>Governance and Assurance</b>		
<b>Link to Enabling Objectives</b> <i>(please choose)</i>	<b>Supporting better health and wellbeing by actively promoting and empowering people to live well in resilient communities</b>	
	Partnerships for Improving Health and Wellbeing	<input type="checkbox"/>
	Co-Production and Health Literacy	<input type="checkbox"/>
	Digitally Enabled Health and Wellbeing	<input type="checkbox"/>
	<b>Deliver better care through excellent health and care services achieving the outcomes that matter most to people</b>	
	Best Value Outcomes and High Quality Care	<input type="checkbox"/>
	Partnerships for Care	<input type="checkbox"/>
	Excellent Staff	<input type="checkbox"/>
	Digitally Enabled Care	<input type="checkbox"/>
	Outstanding Research, Innovation, Education and Learning	<input type="checkbox"/>
<b>Health and Care Standards</b>		
<i>(please choose)</i>	Staying Healthy	<input type="checkbox"/>
	Safe Care	<input type="checkbox"/>
	Effective Care	<input type="checkbox"/>
	Dignified Care	<input type="checkbox"/>
	Timely Care	<input type="checkbox"/>
	Individual Care	<input type="checkbox"/>
	Staff and Resources	<input type="checkbox"/>
<b>Quality, Safety and Patient Experience</b>		
Theatre air conditioning systems are validated for their effectiveness under the requirements of the Welsh Health Technical Memoranda. Whilst these are not statutory requirements they are considered to be industry best practice.		
<b>Financial Implications</b>		
Testing is undertaken as part of our normal operations for Theatre areas, however, additional testing is being undertaken of clinical areas to provide additional assurance and this is expected not to exceed £10K and will be absorbed within the revenue budget.		
<b>Legal Implications (including equality and diversity assessment)</b>		
N/A		
<b>Staffing Implications</b>		
N/A		
<b>Long Term Implications (including the impact of the Well-being of Future Generations (Wales) Act 2015)</b>		
The paper sets updates the committee on how the Health Board are addressing ventilation issues in the long term.		
<b>Report History</b>	This is the first time this updated report has been presented to the Health & Safety Committee	
<b>Appendices</b>	n/a	