Burton Hospitals NHS
NHS Foundation Trust

Medical Director: [redacted]

[redacted]

[redacted]

Queen's Hospital
Belvedere Road
Burton Upon Trent
Staffordshire
DE13 0RB

28 October 2013

Mr A Haigh
HM Senior Coroner
Coroner's Office
No. 1 Staffordshire Place
Stafford
ST16 2LP

Dear Mr Haigh

Rule 43 - Ronald Sidney Ellwood (deceased)

Thank you for your letter dated 3 September, addressed to Ms Ashley, which has been passed to me to respond.

In response to the request for information regarding the supply of fresh air in Critical Care areas in relation to the death of Mr Ronald Ellwood, I am replying as follows.

While the experience of fresh air will add to an individuals feeling of wellbeing, there are certain areas within a hospital where it is not recommended.

The guidance for the design and operation of air systems in health care establishments comes from: *Health Technical Memorandum 03-01: Specialised ventilation for healthcare premises. Part A - Design and validation from the Department of Health published 2007.*

The Health Technical Memorandum specifies that ventilation in Critical Care should be regarded as a critical system and as such requires annual verification of performance.

The difference between ventilation and air-conditioning is made clear within this document on *Page 5, 1.21 – 1.24.* The areas that full air-conditioning is required are indicated on *Page 9, 2.19.*

From this rationale "fresh air" from open windows for example, being introduced into an air-conditioned system will negate air-conditioning.

Air conditioning will have tolerances within which it works, e.g. on a very hot day in an area where there are large windows with sun beating on them, as is the case in critical care areas within Burton Hospitals, will put a strain on the system. These tolerances as defined in the document on *Page 83*, with 10 changes of air per hour maintaining a temperature of 18-25 Celsius (in practice this will be maintained at the uppermost levels as patients will have little coverings in Critical Care).

The rationale for using air conditioning in this area is highlighted on *Page 46, 7.5* and here lies the paradox of fresh air; in the days of rampant tuberculosis, as you will know fresh air treatment in sanatoria was the only management with any chance of

success. Fresh air was preferable to the infected environment of tuberculosis and Infectious Disease wards. Today by air changing so frequently, the risk of build up of air borne bacteria will be minimised. Open windows will allow fresh air in but may not remove pockets of infected air. The research indicates that fresh air will only penetrate a maximum of 6 metres into a space; please refer to *Page 8, 2.7. of Health Technical Memorandum 03-0.* In addition it should be noted that windows on the Critical Care Unit have limited opening of 10 cm in order to comply with Health and Safety legislation and penetration of any fresh air will be much more limited than for a fully open window.

The guidance does not indicate that microbiological testing is necessary.

However, there is no evidence to suggest that there is environmental air contamination in the Critical Care Unit either at present or since February 2013. The environment is surveyed when there is evidence of linked cases of the same organism occurring in more than one patient. This was last done on the 11th February 2013. It was found that there was minor contamination with a solitary species of bacteria specifically spread by direct and indirect contact rather than being related to air or the air conditioning.

A literature search has not revealed new guidance relating to the need to carry out survey routinely.

I am aware of no other nationally published/adopted evidence to suggest that windows should/could be open or closed. I would make the simple observation that opening the windows will detrimentally affect air conditioning.

The critical care unit has a full fresh air system with no recirculation of air. The air conditioning is a conventional system with heating and cooling and was installed when the hospital was built. The extract air and supply air being separate from each other.

The system is designed to operate with all windows closed so that the temperature can be controlled. In 2001 when the High Dependency Unit was added to the hospital, additional supplementary cooling was added to the critical care unit suite, again with 100% fresh air.

Set points for the system are set with a general supply temperature of the Air Handling Unit (AHU) of 18°C. When external temperature is below 18°C the extract air goes through a heat exchanger for energy savings. Reheat batteries are set to operate when the room temperature falls below 21°C. The supplementary cooling system is set to operate when temperature's rise over 23°C. The room temperature is controlled as average between two room thermostats within the critical care unit.

The AHU is served by a G4 Filter as per HTM 20/25 when designed as apposed to the current design guide (HTM 03) for F7 filters.

The systems are subjected to annual maintenance by the estates staff and this was last carried out in March 2013. The ventilation duct work and systems were cleaned and systems pressures and volumes were externally assessed by Total Environmental and Mechanical Services (TEAMS) in July 2010 and there is no requirement for alterations to the system before the next revalidation checks in 2015.

Following on from your letter the estates department has requested the filter manufacturer to carry out a survey of the ITU system to look at the possibility of

converting the AHU to accept the more efficient F7 filter, but this is likely to result in a decreased air flow to the areas served by this system and the Trust will take a view on this change when further technical information is available for consideration.

A refurbishment of the Air Conditioning Systems units within the hospital is currently planned to commence with the next years capital program. At this time the current environmental conditions within the hospital will be re-evaluated and the system designed to control the environment with the additional heat loads within the building, especially within the ITU unit where the advancement in medical equipment has substantially increased the heat loadings within ITU.

The Trust can demonstrate that the Critical Care Unit conforms to the applicable guidance and memorandum for specialised ventilation. By opening the windows, it makes this system less efficient and compromise air changes that may lead to increased environmental air contamination. The system is appropriately maintained and checked.

Although there may be a perception that the environment would be more comfortable with more fresh air it must be balanced by the fact that comfort for staff and relatives may come at a price that must be paid by the patient in terms of safety and exposure to additional organisms. For these reasons the Trust considers that it would be to the detriment rather than benefit of patients in the Critical Care Unit to compromise the specialised ventilation system by opening windows and so the Trust will continue to ensure that windows remain closed on the Critical Care Unit.

I greatly regret that [redacted] found the Critical Care environment unpleasant at a time of great personal stress and while we accept that no system can be perfect we believe that our air-conditioning system delivers the safest environment for our patients and hope this reassures yourself and [redacted]

If you require any further information please do not hesitate to contact me.

Yours sincerely

[redacted]

Medical Director