



## ADVISORY COMMITTEE ON DANGEROUS PATHOGENS

### Management and control of serious viral infections

#### Issue

1. This is an update on progress with the revision of the ACDP guidance "*Management and Control of Viral Haemorrhagic Fevers*". This paper provides an overview of potential containment strategies and details of the approach adopted by the two high security infectious disease units (HSIDUs) operating in the UK.

#### Control and containment strategies

##### **Negative pressure isolation facility and flexible film isolator:**

2. Protection of staff and the wider community, when managing patients with highly infectious diseases (e.g. viral haemorrhagic fever) in the UK has traditionally involved adopting a control and containment strategy that has used a combination of negative pressure isolation room and flexible film isolator (Trexler). Nursing staff are afforded a high degree of protection by use of this system in which they are physically separated from the patient by a flexible film barrier. Physical separation minimises the potential for any contamination of staff, equipment or room. Negative pressure is created within the envelope and air is HEPA filtered before egress. A considerable number of patients have been nursed in these circumstances and there is a high level of confidence amongst the community that this system affords a high level of protection for staff.
3. On the downside, there have been concerns that the Trexler is not only unpleasant accommodation for the patient but may also compromise the ability to give the patient the full range of medical support (e.g. during multiple organ failure). Furthermore, concerns have been raised with respect to the

future supply of Trexler units. There is an ongoing dialogue and search for future suppliers for this containment barrier.

**Negative pressure isolation facility and personal protective equipment:**

4. An alternative approach used widely in other parts of Europe is to afford community and staff protection via a negative pressure isolation room in combination with personal protective equipment (PPE). The PPE used in these situations varies across different units with no standardised approach.
  
5. The Control of Substances Hazardous to Health Regulations (2002) as amended directs employers to control exposure to biological agents at source using a hierarchical approach (eliminate, substitute, engineer and PPE) which itself must be appropriate to the activity. Certain medical interventions carried out to improve the outcome for the patient may be impeded by the use of the Trexler engineering control. In such a situation, an alternative approach could be adopted provided it afforded an adequate level of protection to employees. For example use of an appropriate combination of PPE in addition to the room ventilation system and procedural controls may provide a suitable alternative. However, this approach does raise its own issues specific to the unique combination of PPE used. Such issues include:
  - the type of PPE i.e. single use or re-usable and its effectiveness;
  - effectiveness of disinfection procedure for re-useable PPE and its validation;
  - procedure for donning and removing protective clothing;
  - training and susceptibility to human error;
  - storage and maintenance etc.

**Positively pressurised ventilated lobby (PPVL) and PPE:**

6. Currently under evaluation, the positively pressurised ventilated lobby (PPVL) is a new containment concept presented as a unified approach to resolve issues inherent in a range of isolation methods and is a proposed alternative to the negative pressure room. The proposal is to provide a side room with a positively ventilated lobby and en-suite facilities with extract ventilation. The lobby is pressurised to 10 Pascals, the patients' room remains effectively neutral and the en-suite is negative to the patients' room. As an additional

option extract could be provided in the isolation room at a rate that ensures the en-suite facility is always at a lower pressure than the isolation room. The goal of this approach is to optimise the ability to provide patient care and provide adequate protection for staff. It is understood that staff would still adorn PPE for patient management. Once again the use of PPE raises additional issues for resolution. Currently, testing and validation of the PPVL system is on-going with comparison to negative pressure isolation rooms.

**UK approaches and future proofing for HSIDUs**

7. There are currently two national specialist centres for the management of patients infected with high hazard pathogens in the UK. One based at the Royal Free Hospital, London and the other at Newcastle General Hospital. Currently a new facility is under construction at the Royal Victoria Infirmary, Newcastle-upon-Tyne to replace the existing facility at Newcastle General. The current approach to containment and control at the two HSIDUs is analogous and elects to use a negative pressure isolation room with Trexler. However, divergence is evident in their ability to future proof their alternative containment and control strategies.

**HSIDU Royal Free:**

8. The HSIDU was previously located at Coppetts Wood, but has been recently relocated to a purpose-designed ward at the Royal Free Hospital. This ward is sealed and separated from other public and ward areas, and has dedicated filtered air supply and outlets. The ward has provision for two special isolation beds enclosed within Trexlers and designed to provide care up to intensive care standards.
9. The Royal Free HSIDU is currently operational. Future proofing (i.e. where a Trexler is no longer available or necessary) would involve moving to a strategy of a negative pressure room and staff wearing protective suits and/or other PPE. There would be significant cost implications and physical restrictions in altering the ventilation system to accommodate a PPVL approach.

**HSIDU Newcastle:**

10. The unit is currently located at the Newcastle General Hospital but is planned to move to the Royal Victoria Infirmary in early 2010. The proposal is to build

a single storey stand alone 350m<sup>2</sup> unit. The proposed site will provide patient accommodation comprising two isolation bedrooms designed to containment level (CL) 4 standards. Ensuite toilets and showers will also be provided. Each room is intended to function independently of each other. There is a designed work flow for staff that proceeds through a entry/change area, clean lobby, isolation room with ensuite, contaminated lobby, decontamination shower, clean disrobe back to change area. This is overlaid with a negative pressure cascade from exterior to interior of the unit. CL4 designed effluent tanks are situated in the basement for treatment of liquid waste. The design of this facility will ensure that it can accommodate a PPVL approach and provide adequate facilities for decontamination of PPE.

### **Goal setting legislation**

11. The Health & Safety at Work etc Act 1974 establishes for all employers general duties for health, safety and welfare. Its goal setting approach is based on the conclusion of the Roben's report that those who created the risks were best able to manage them. Consequently legislation is framed in terms, which sets overall goals rather than detailed prescriptive requirements, the latter leaving less room for flexibility in implementation. Recognising the goal setting nature of the Control of Substances Hazardous to Health Regulations 2002 (as amended) as the key piece of legislation pertaining to management of patients infected with hazard group 4 pathogens, it is incumbent that the revised guidance affords the opportunity to implement the range of approaches to containment and control which will ensure adequate protection of staff but also facilitate optimal patient care.

### **Progress to date**

12. Several working groups (clinical management, diagnostic laboratory) and face to face (air transport) meetings have usefully informed the way forward for specific aspects of the guidance. To take the drafting of the guidance forward, specific resource has also been allocated. It is anticipated that a final draft of the guidance will be presented to ACDP in Autumn 2009.
13. Currently the range of containment and control approaches used in the UK and internationally are being reviewed. This is supplemented by setting up on-going communication and dialogue with the two UK HSIDUs, particularly in respect of the design of the proposed Newcastle facility. An inaugural

meeting of the HSIDUs and the ACDP Secretariat was held in May 2008 (Annex 1). The aim of this meeting was to facilitate exchange of information on current and future working practices within the HSIDUs and initiate dialogue, outside of the working group, on key areas of the guidance. It is intended that this group meets regularly (quarterly basis) either in Newcastle or London to discuss emerging issues and exchange ideas of relevance to the HSIDUs.

**Action**

14. There are no specific actions for Members, other than to note the proposed flexible approaches to containment underpinned by safe working practices.