

WHY SHOULD UNDERGRADUATES BE TAUGHT ASEPTIC DISPENSING?

By DAVID ALLISON, BSc, PhD



Single occupancy aseptic booths with close circuit television monitoring are used by pharmacy undergraduates at the University of Manchester

Now most aseptic manipulations in hospitals are carried out by pharmacy technicians, less emphasis on teaching aseptic dispensing to pharmacy undergraduates might be expected. This, however, is not the case at Manchester University, as this article explains

Pharmacy technicians, not pharmacists, now carry out the majority of aseptic manipulations in UK hospitals. Indeed, it is becoming increasingly common for technicians to be responsible for the day-to-day management of the technical aspects of aseptic operations. Similar arrangements are also common in industrial settings. It might therefore be expected that less emphasis will be placed on teaching aseptic dispensing skills to pharmacy undergraduates. This is not, however, the case at the University of Manchester School of Pharmacy, where almost half a million pounds has been invested in installing a “functioning” clean room suite and a non-functioning clean room demonstration unit (CRDU). This article describes the facilities and how they are used by students. It also explains the advantages to pharmacy undergraduates of being taught aseptic dispensing in this way.

FACILITIES AND USE

The aseptic suite comprises a changing area complete with clothing lockers, step-over barrier, wall mounted alcohol-wash dispenser, door interlocks and viewing window, along with four separate single

occupancy aseptic booths. Each of these is air conditioned to the correct standards and houses a fully functional horizontal lamina flow cabinet (HLF). Interlocking pass-through hatches link these booths to a preparation area.

The floor covering in the aseptic suite is coloured black, grey and white to correspond with the functions and classification of the different areas. Each of the different areas has an intercom allowing communication with a central control unit in the outside tutorial area. In addition, each of the aseptic booths contains a close circuit television (CCTV) camera, which is shielded to comply with clean room regulations and can be angled to all aspects of the booth. There is also a central control unit from where the trainer can either watch operations in each booth individually or all at once using the split screen facility. Each student can be videoed while working in the HLF and the recording replayed at a later date to provide feedback.

The CRDU is a full sized clean-room, incorporating door interlocks, air conditioning, centralised services pendant, HLF cabinet, intercoms and pass-through hatches. All corners are radiused and the unit is finished in a vinyl coat and equipped with audio-visual and IT facilities. It is, however, “non-functioning” as a clean-room because two walls have been removed and certain equipment sectioned to allow viewing directly from an adjacent tutorial area. Ceiling grills are cut away to show the filters. The

HLF cabinet has a viewing panel in one side and lights fitted to enable viewing into the fan and plenum chambers, which have ports for smoke addition and streamers to demonstrate air turbulence. In addition, some clean room defects (such as redundant ledges, ill-fitting air filters and protruding gas taps) have deliberately been introduced to the area in order to help understanding.

Fitted outside the main area is a control panel with Magnahelic gauges that indicate the pressure differentials across and between rooms and across the HLF filters. The CRDU has also been equipped with a class II vertical laminar airflow cabinet to demonstrate the extra requirements of cytotoxic and radiopharmaceutical dispensing. This cabinet is normally stored outside the clean room and is only brought into the unit for tutorials dealing with special handling techniques, air filtration and flow and safety cabinets.

There are no isolators in either the aseptic room or the CRDU, although a slide-show and other information about them is covered in tutorial sessions.

The teaching of clean room technology and aseptic dispensing is included as part of the pharmaceutical microbiology core course taught to all third year MPharm students. In the CRDU, students take part in “hands on” tutorials, designed around a lecture programme. The theoretical aspects of aseptic dispensing are assessed in an examination. In the aseptic suite, practical skills are evaluated by requiring students to “gown

Dr Allison is senior lecturer in pharmaceutical microbiology at the University of Manchester School of Pharmacy and is contactable at david.allison@man.ac.uk

up” and complete a broth transference test to regional standards, with performance being monitored throughout using the CCTV cameras.

— ADVANTAGES

In common with several other aspects of the pharmacy undergraduate course, only a few students will use the aseptic dispensing skills they learn at university later on in their working lives. As mentioned above, for aseptic dispensing, there is the added issue that pharmacists are carrying out fewer manipulations themselves. However, hospital pharmacists (and those working in the pharmaceutical industry) charged with supervising clean room operations and organising the daily work of others clearly need to have experience of what they are asking others to do, in order to supervise and manage effectively. In addition, hospital pharmacists are expected to be able to work competently in clean rooms, should they be required to do so while on-call.

With this in mind, the approach taken by the University of Manchester School of Pharmacy has been to give undergraduate students a realistic idea of what it is like to work in a small aseptic unit, similar to those typically found in hospitals. This differs from the more traditional approach of concentrat-

ing on teaching students handling skills in an “imperfect” aseptic environment, for example, by using facilities designed to allow large numbers of students to be taught simultaneously. The consequence of the more traditional approach is that areas will at best resemble industrial scale aseptic production units and at worst contravene the accepted rules of clean and aseptic room operation, design and maintenance. This can hinder a true understanding of the principles involved in aseptic work.

It is, of course, recognised that however realistic a teaching environment tries to be, the skills taught within schools of pharmacy rarely suffice in practice and may even give the pharmacist a false level of confidence. Thus, pre-registration trainees and pharmacists taking up employment in new situations are given rigorous retraining for their aseptic dispensing role. However, the fundamental rules governing the design, installation and operation of clean and aseptic rooms apply generally and we therefore feel that our approach to redirect the emphasis towards producing a high level of understanding of the principles of clean room design, operation, maintenance and use is justified. Having experienced such an approach, it is hoped that the new graduate will be able to readily adapt to any system of operating procedures and will also be better

able to organise and supervise work from a position of authority. It is also hoped that they will be able to transfer some of the techniques learnt to isolators, which are where the majority of aseptic manipulations actually take place.

These methods can also be used to teach the fundamentals of dispensing cytotoxic drugs and radiopharmaceuticals, both of which embody many of the principles of aseptic dispensing, but with additional modifications necessary for protecting the operator from the hazards involved.

— CONCLUSION

The facilities installed at the University of Manchester School of Pharmacy allow undergraduates to gain a realistic impression of working in an aseptic unit (albeit without gaining practical experience of isolator use).

Students occupy a single booth and the working area is not compromised by either fellow students or the trainer. This allows the students to experience directly the difficulties of dressing for clean room operation, behaving appropriately for the classification of area and performing an aseptic manipulation in laminar airflow. Together, the CRDU and aseptic suite provide an ideal facility for education and training in aseptic handling techniques.