By Sue Jarvis, BPharm, MRPharmS

Patient safety is a major concern for all pharmacists, but some clinical areas are known to carry a greater degree of patient risk than others. Reducing errors and improving safety is particularly challenging when treating children. Similar challenges exist in critical care. Accordingly, it stands to reason that risk reduction has become a focus in paediatric critical care (see Box 1).1

A complex picture
The risk of a medication error occurring in a paediatric intensive care unit (PICU) is often greater than in other clinical areas because of the complexity of the necessary dose calculations and the manipulations required to prepare doses. This complexity is further compounded by the use of off-label and unlicensed drugs. Moreover, in critical care, medicines are usually administered intravenously, often continuously, and so the problems of compatibilities and fluid volumes also need to be considered.

Promoting safety
The role of a paediatric critical care pharmacist is to ensure safe medication for all patients, whether they are 2kg neonates or teenagers weighing 100kg. As a consultant pharmacist in this area I have developed my role further by being involved proactively in clinical care and undertaking research, audit and education to improve the experience for both staff and patients. Although development of services and treatments is essential, underpinning this must be a commitment to monitoring for, and reducing, medication-related errors.

As for most consultant pharmacists, the focus for a large part of my work is the provision of clinical care. As such, most of my mornings are spent on the PICU at Bristol Royal Hospital for Children discussing patients on the multidisciplinary ward round, as well as reviewing treatment, monitoring organ function and ensuring medicines can be administered in a safe and effective manner.

However, this provides pharmacy support for the PICU only a small portion of the time. And so I have worked to develop systems to improve patient safety when no specialist pharmacist is available, or when junior pharmacists are responding to “out-of-hours” requests. I have also been involved with providing support to our referring hospitals, which are spread across a large geographical area (from Truro to Swindon and into South Wales). Protocols, medicines compatibility charts and dose calculators have been developed and linked to the transport team website for easy access. The systems have been tested through the use of simulated scenarios, using interactive mannequins.

Measuring safety
When I was appointed to the full-time post of paediatric critical care
pharmacist in 1998 (I became a consultant pharmacist in 2009), we began a series of audits and interventions with the aim to reduce medication-related errors and support good prescribing.

In 1999 we started collecting data about prescribing and administration errors. At this time prescribing occurred on traditional drug charts, which were handwritten and required the medical staff to remember formulae and doses for both continuous infusions and boluses. After the first audit we reviewed the method of prescribing and, in 2000, we introduced a new system consisting of pre-printed drug labels and infusion charts as a step towards electronic prescribing.

Changes have to be continually reviewed and this audit was repeated in 2005 and 2010. The 2010 audit identified an increase in near-miss and no-harm errors and so the next intervention was to introduce a “Drugs matter” education programme for nursing and medical staff. Working with the clinical effectiveness and paediatric governance groups we introduced a programme of lectures to ensure that all members of staff were aware of their responsibilities regarding the safe prescribing and administration of drugs in the PICU. We also designed posters that were displayed in staff areas to reinforce this message. We hope that a recent reaudit will show an improvement.

When looking at audit data we realised that we had no way of benchmarking our results — we had no data from other paediatric critical care units or general wards. So, in October 2011, to get a crude estimate of our error rate we looked at the number of prescriptions, excluding “stat” doses, and the number of errors. We found that 1,112 items were prescribed, with 47 errors — an error rate of 4.2%. This compares favourably with data from the EQUIP study, which showed an overall rate of 8.9% (although the study did not include paediatric critical care areas).

**Implementing lasting change**

Audit and monitoring are obviously only a small part of improving medicines management in paediatric critical care. Another important aspect is introducing changes in practice to improve safety for all paediatric critical care areas, not only within the PICU but across all the wards and hospitals that interface with the unit.

Expert practice and education are aspects of the consultant role that ensure development of good working relationships with all members of the critical care team. Sharing this experience and knowledge through national bodies such as the Paediatric Intensive Care Society and the Neonatal and Paediatric Pharmacists Group (see Box 2) has led to the adoption of standards for the provision of pharmacy services for PICUs. Such standards place the pharmacist as an integral part of the team.

Defining competence has become an increasingly important focus for all pharmacy specialists. In 2008 the NPPG gave financial support for the production of an open-access online teaching pack “Clinical pharmacy for critical care” written and edited by members of its PICU special interest group and covering the topics defined in the standards for pharmacists working in PICUs.

**The ongoing challenge**

Paediatric critical care is an exciting area in which to work, and one that I find rewarding as a member of the clinical team.

Increasing patient safety presents one of my biggest professional challenges as I try to balance the introduction of safeguards to improve medication safety while minimising processes that are a burden to clinical staff in what is, often, a busy, stressful environment.

**Box 2: Professional support**

Alongside the development of paediatric critical care as a specialism there was also momentum in the paediatric pharmacy community, which culminated in the formation of the Neonatal and Paediatric Pharmacists Group (NPPG) in 1994. The NPPG provides a forum for networking between paediatric and neonatal pharmacists (who, otherwise, often work in isolation).

A paediatric intensive care special interest group (SIG) was also established within the NPPG. One advantage of a small specialism is the close ties that develop between colleagues; the SIG is flourishing as a vehicle for promoting and maintaining such professional relationships. It is also providing opportunities to investigate differences and similarities between paediatric intensive care units across the UK. For example, the group is about to launch a study using standard data collection forms across all the units to compare prescribing systems.

With the introduction of electronic prescribing this will be a great opportunity to evaluate these systems and the introduction of new technology to wards. In order to make this work relevant, we will work with the Paediatric Intensive Care Society’s risk SIG, which includes pharmacy, nursing and medical staff from across the UK.

**References**