

**St Thomas' (Evelina) Paediatric Intensive Care Unit (PICU) Learning Objectives****1. What are the major reasons for admission to paediatric intensive care (PICU) in the UK, and how might this differ worldwide?**

PICU in general covers a wide variety of different specialities such as general surgery, oncology, respiratory, cardiology, metabolic medicine, renal, neurology, ENT and endocrinology to name a few. However all children admitted to PICU all have a few things in common. Their conditions are life threatening, requiring constant, close monitoring and medical interventions to help restore and maintain their normal body functions.

In the UK roughly 40% of admissions to PICU are planned (i.e. post surgery) and the remaining 60% are unplanned emergency care. The top indications for emergency admission are respiratory (50%), neurology (25%), cardiovascular (15%), and sepsis(10%). Of all the admissions, 65% will require invasive mechanical ventilation (e.g. endotracheal tube intubation) and 15% will require non-invasive ventilation (e.g. CPAP), meaning that roughly 80% of all PICU admissions will need ventilatory support, regardless of their underlying reason for admission. Although all patients admitted to PICU have a life threatening condition the average length of stay is under 2 days and in the UK it is rare for a child to die in PICU, with over 95% leaving this specialist care alive.

These statistics are comparable with most developed countries worldwide, but there are vast differences in the developing, resource poor countries. More than 98% of all child deaths worldwide occur in these developing countries, with most of the deaths being due to infection (particularly pneumonia), neonatal sepsis, and malaria, with malnutrition as a significant contributing factor. The majority of these deaths are unnecessary and preventable but due to a lack of primary health care and immunisation programmes they still occur.

**2. How are PICU health services delivered and managed in the UK and how does this compare worldwide?**

In the UK around 19,000 (1.4 per 100,000) children are admitted to PICUs each year and of these half the children are under one year old. Whilst in PICU these children are managed by paediatric intensivists in collaboration with the speciality team that the child is admitted under to provide comprehensive care for all children.

In an intensive care setting there is a strong emphasis on a multi-disciplinary approach to care, where the expertise of all members of the team is valued and utilised. These include intensive care doctors and nurses, physiotherapists, dieticians, pharmacists, play specialists and psychologists. This also applies in a broader sense to paediatric services in the UK through multi-disciplinary working

between social services, education authorities and the health care teams, to provide holistic care for all children.

There are vast differences between intensive care medicine in the developed and the developing world. As a whole intensive care units are resource intensive in terms of technology and the need for skilled health care professionals. As a result of this there are extremely high costs of operating intensive care units. Therefore where they do exist many of these facilities lack the appropriate equipment and medications, and this combined with a lack of trained physicians and nurses lead to poor outcomes in critically ill children when compared with that of developed countries.

However, despite this relatively cheap therapies such as IV fluids, oxygen, antibiotics and nutrition can make a huge difference and save children's lives in developing countries, and provision of these can make have a drastic positive impact on outcome.

### **3. Gain a better understanding of diseases/conditions that cause children to be admitted to PICU at the Evelina**

During my time in PICU at the Evelina I have been able to gain a valuable insight into the speciality of paediatric intensive care. Due to the large size of the unit (20 beds) I feel that this allowed me to see a wide variety of cases, giving a broad representation of the conditions that are managed and treated on the unit year round. From weeks 2-5 I made sure that I reviewed at least one patient each day, enabling me to identify many different learning points from my placement.

A large proportion of the patients on the ward were there for either respiratory or cardiovascular problems/support. As the Evelina hospital is one of the major paediatric cardiac centres in the UK many of the patients admitted are there after elective cardiac surgeries. Although this is an area that is taught during medical school, it is not often encountered on placements, so this gave me a great opportunity to learn more about congenital heart disease in its many different forms. I was also able to review 2-3 older patients who had been admitted with cardiomyopathy, one of whom was treated with extracorporeal membrane oxygenation (ECMO) which was also interesting to learn about.

The main respiratory conditions encountered in PICU were pneumonia, empyema, bronchiolitis, asthma and TB. There were also a number of patients with neurological conditions such as meningitis, hypoxic ischaemic encephalopathy and seizures. I reviewed a number of these cases and followed their treatment and progress on the unit.

I was also exposed to some of the rarer conditions which are encountered in intensive care medicine such as isovaleric aciduria and Pompe's disease (glycogen storage disease).

**4. To become more confident in managing paediatric and neonatal patients whilst improve my clinical examination skills, diagnostic skills and clinical decision making. Gain further experience in paediatrics to explore it as a potential career path**

Throughout the five weeks I spent on the unit I made sure that I saw a variety of different patients and under the direction of the doctors reviewed their histories, assessed them, discussed the treatments and the ongoing plan.

For each of these patients I saw I used an extension of the 'ABCDE' approach which was airway, breathing, circulation, disability and drugs, environment, fluids, gastro, haematology and infection. This made the process of examination and forming clinical decisions/plans much easier for me as it broke down the patients current condition into manageable sections, and allowed me to gain an in-depth assessment of their current status. I found this extremely useful as often there were many different complicating factors to their care and as a patients condition can change very rapidly in an intensive care setting this system ensures that nothing is overlooked, and that their progress can be easily mapped and tracked. This methodical approach to assessment is a skill that I feel will be transferable to all areas of medicine, as it gives you a good overview of any patient, covering all important systems.

I was also lucky enough to be able to spend some time with the South Thames Retrieval Service (STRS), which is a team consisting of PICU doctors and retrieval nurse practitioners that serves the South East of England and facilitates admissions to PICU from secondary care. This involves moving the patient in a high risk environment, so it is essential that the medical benefits of moving the patient outweigh the risks. This is achieved through thorough assessment and stabilisation of the patient, further highlighting the importance of taking a methodical approach to assessing patients, aiding you in forming good clinical decisions

One of the major things that I noticed on my placement at the Evelina was how essential effective team work is in providing optimal care for a critically ill child. Communication and collaboration with many different healthcare professionals and specialities means that high quality and efficient care can be provided.

Paediatrics is an area of medicine that I would like to eventually specialise in, and during my time at university I have tried to gain as much experience as possible in the field to explore whether this is the right path for me. These experiences over the past 5 weeks have been invaluable in doing that, giving me exposure to the field and the variety of opportunities within it. I would recommend this elective to anyone who is thinking about a career in paediatrics.