Abstract
The cardiac intensive care unit (CICU) at Great Ormond Street Hospital cares for children recovering from heart surgery or with severe heart failure. About 70% of admissions are planned admissions from theatre, the remainder being emergency admissions either from within the hospital or referred externally. Length of stay on the ward is very variable, ranging from less than a day to several months. Planned surgeries only take place on week days, with some days being particularly busy. These factors contribute to variability in demand for CICU and can lead to demand exceeding capacity. This results in surgeries that are cancelled on the same day, which is stressful for children and their families as well as clinical staff.

We worked with clinicians, nursing staff and the data manager at CICU to produce a software tool implemented in Microsoft Excel that provides a forecast for bed demand on CICU for the next week. Information about current patients, planned arrivals from surgery and daily rate of emergency arrivals is used to generate an overall probability distribution for demand for beds. Working closely with CICU staff meant that we were able to tailor the software to meet their needs. The tool has been used daily within the unit since handover in October 2012.

Operational research and mathematical modeling have a considerable amount to offer healthcare, but implementation is rarely straightforward. Many, individually small, factors can have a large impact on success. Often context-specific and ‘messy’ in nature, these are not necessarily reported in academic dissemination. Reflecting on the development process, we have identified a number of ways in which the tool would not have been fit for purpose, even if academically sound, without the regular dialogue between analysts and the ICU team.

Biography
Christina Pagel is a senior research fellow at the University College London Clinical Operational Research Unit and works on a diverse set of projects, including the UK childhood vaccination program, surgery for congenital heart disease, and strategies for saving newborn lives in the poorest regions of India. She holds a PhD in space physics from Imperial College in London and completed a post-doctoral position at Boston University. She finds the application of mathematics to healthcare and its delivery to be immensely interesting and fulfilling.