

Case Study

Occupancy Analytics: Peak Load Smoothing

What is Peak Load Smoothing and what is the significance of it?

- Peak Load Smoothing has been developed by The Conclude Consultancy as a means for controlling the peak energy demands in an acute hospital facility. The concept is important for three very important reasons:
 1. Engineering plant is sized according to peak loads of heating, cooling and ventilation. By controlling the peak loads (the time of day where the peak would otherwise occur) the size of the engineering plant can be optimised. Our studies have shown that by working with clinicians we can reduce the peak occupancy loads between 20-30%. It is here where there would be a direct impact on CAPEX (Capital expenditure).
 2. In the UK a policy of energy utility companies is to control the peak loads on the grid through a concept called Demand Reduction Control (DRC). The control is exercised through charging larger consumers with a peak energy tariff. The more that larger users, such as acute hospitals, can control their peak consumption, the lesser their exposure to these larger tariffs. Consequently Peak Load Smoothing can directly impact the cost of operation to the hospital. It is here where there would be a direct impact on OPEX (Operational expenditure).
 3. Peak periods place clinicians in a stressful environment. Peak energy loads on the department arise at a time of peak patient demand. Clinicians would prefer to manage an even workload throughout the day. However, Operational Policies that are designed to control a departments' activities are usually silent about how to avoid the peak patient demand. 'Joined-up' operational policies that set out to coordinate peak demand between connected departments on a patient pathway are one means of reducing stress in the system as well as a means for controlling concurrent peak energy demands. It is here where there would be a direct impact in staff satisfaction.

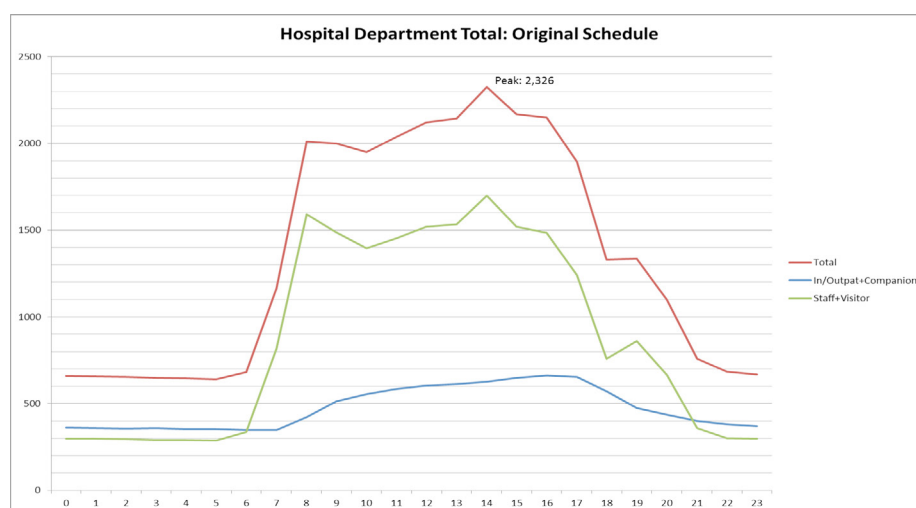


Figure 1 - Occupancy profile without Peak Load Smoothing

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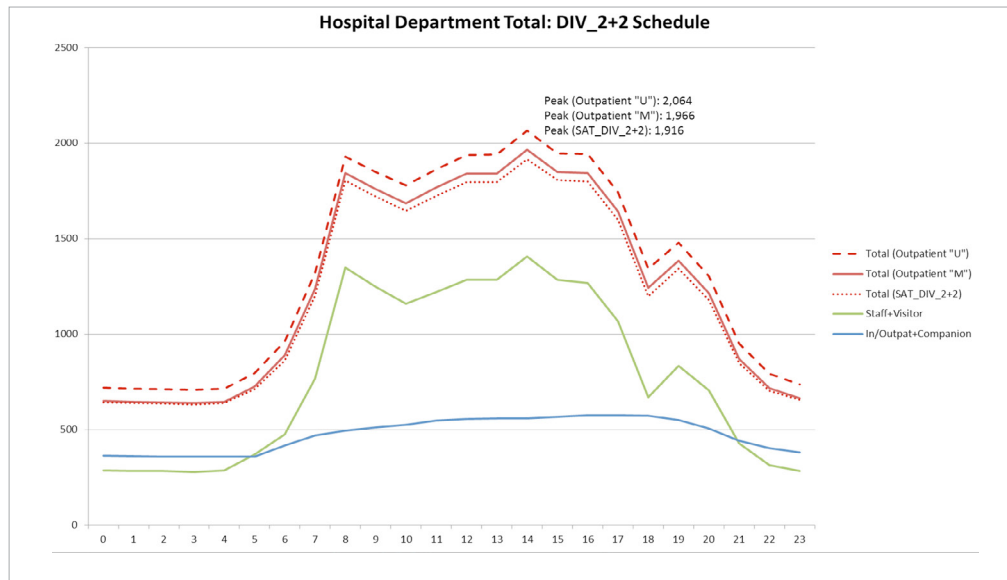


Figure 2 - Occupancy Profile with Peak Load Smoothing leading to (in this example a 23% reduction in peak occupancy)

How do you suggest that hospital management teams control peak loads?

- Peak Load smoothing is a technique which can realistically only take place once the clinical leadership teams understand how their working practices impact the peak patient loads in their department.

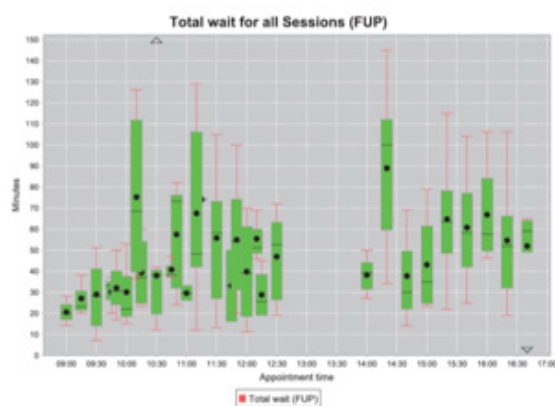


Figure 3 - Wait time results

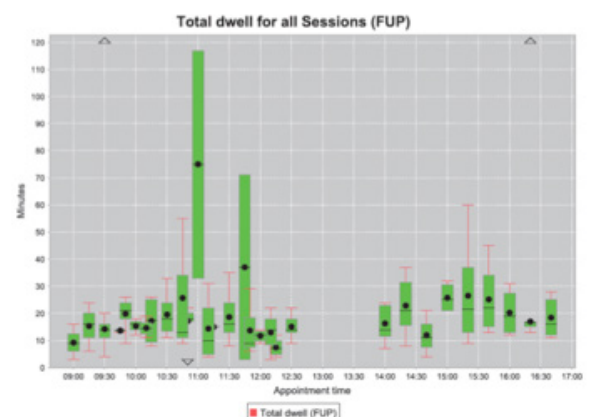


Figure 4 - Dwell time results

- Referring to Figure 3 and Figure 4 the graphs show the factors that determine when the peak patient load arises in an Outpatient department. The longer the duration that a patient waits for the more crowding there will be in the department. The more unpredictable the Dwell time (The duration that a patient is in process for), then the longer the longer the waiting time for patients.

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- If these processes involve the use of imaging equipment for example, then the more the sustained demand on that equipment over a shorter period of the day. The equipment can then cause surges in energy demand that results directly from the operational policies of that department.

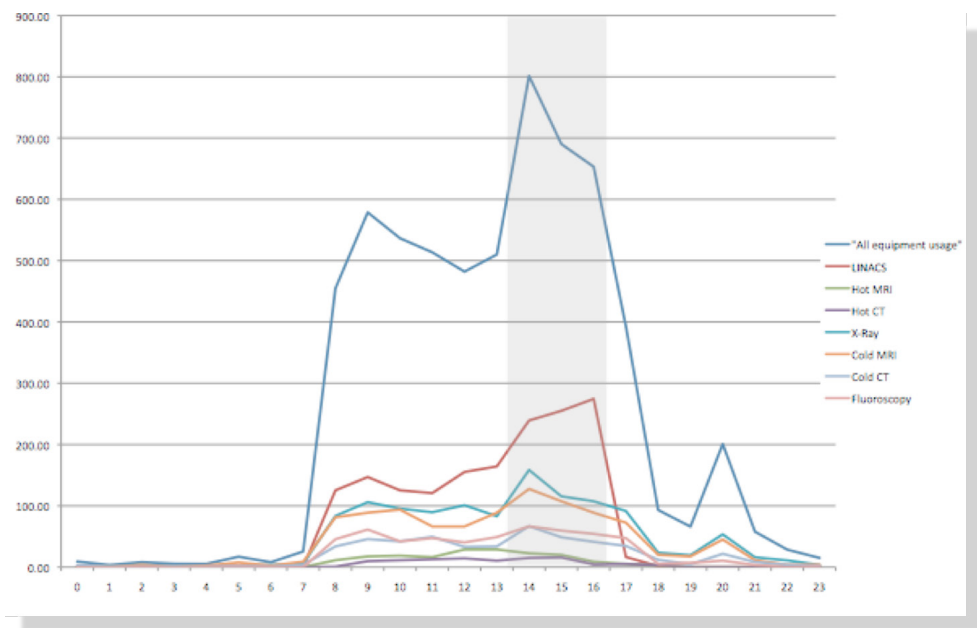


Figure 5 - Peak energy demand from Imaging Equipment

- Control of peak patient loads can be achieved through better-informed scheduling. This means both control of demand and sufficient pre-planning of each patient visit to ensure that all resources and consultant schedules are orchestrated to achieve smooth patient flow through the department.
- The Conclude Consultancy's Occupancy Analytics simulation enables the study of all of the factors that lead to peak energy loads. It enables the clinicians to ask 'what-if' type questions as they seek to improve the flow of patients through their department, and thus manage peak patient demand.

What evidence do you have that clinicians would wish to have such a dialogue?

- We have had great success in working with the clinical leadership teams in the hospitals that we have worked at. We have found that our evidence-based analysis is one that offers them new insights into issues that they did not know that they could control.
- Ultimately many clinicians that we work with care for the environment as much as they care for their patients¹. We have found little resistance to the strategies that we advance in peak load smoothing.

¹SEE ALSO <http://www.noharm.org/>

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- We have promoted the concept of peak load smoothing as one means by which departmental energy budgets could be established. We have signed agreements from departmental leadership teams expressing their willingness to work with us on these issues.


Agreement to the Low energy – low carbon policies for 3T's


If We the undersigned agree to the following:

- User intervention in the control of our departmental engineering systems. As an appropriate time in the future, we agree to participate in the development of a departmental operational policy that will establish roles and responsibilities for clinical user intervention in the control of these systems. We agree to work with the 3T's team to agree the specific working practices that will need to be adopted in the new facility.
- Establishment of a soft energy budget for our department. At an appropriate time in the future we agree to participate in the development of a departmental soft energy budget. We agree to work with the 3T's team to agree how such a budget would be implemented in the new facility.

Definitions:

- User intervention in the control of our departmental engineering systems: A means by which some of the environmental conditions serving specific areas within the department will be controlled directly by clinical users.
- Soft energy budgets: A method of informing each department of their energy performance compared to an agreed energy budget derived from the energy impacts of the agreed operational policies for their department.

Signature:  _____
 Role: IMAGING SERVICE MANAGER
 Date: 25-06-2013

Signature:  _____
 Role: Chief Space Services
 Date: 1/7/13

How could an acute hospital management team leverage such a service?

- Firstly we need to appeal to the 'hearts and minds' of the clinicians. Conclude would run a few workshops to raise awareness and open a dialogue. We would demonstrate the need for change and in doing so we would seek out current experiences and relate these to our strategies. Only after these workshops would we get a sense of the clinical leadership teams' appetite for this work.
- From this point there are three alternative approaches:
 - We could establish what clinical information system data exists within the departments to be studied such that we could run a trial simulation.
 - An alternative would be to conduct a simple survey to enable the study of current operational practices on peak loads. (Please refer to Survey Case Study). We would then run this data through our Occupancy Analytics Model to assess the potential for improvement.
 - A third option is where we would run a simulation based on what ideal practices could be (we refer to this as 'Could-be' analysis) and then compare the simulation results with current evidence.
- We would use the evidence from one or more of the above-mentioned studies to report on the potential for improvement. This evidence would be presented to the clinicians for discussion and we would then collectively assess the potential for developing a Peak Load Smoothing initiative within the acute hospital.