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### The Challenge of Capacity Planning: A Core Role for IT

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**Most European hospitals will have to expand their examination and treatment capacity in the future, as well as restructure core functions. Whether to remain competitive or for other reasons, it will be essential to maximise short and long-term performance. Healthcare IT can play a key role in providing data, monitoring and making recommendations on optimising capacity use. SINTEF Health Research has been doing capacity planning projects on national, regional and hospital trust levels for specialist health care services. This review draws on our experience in the role of capacity in relation to buildings and space in strategic hospital planning.**

Hospital expansion plans are usually a product of institutional dissatisfaction with a legacy of working conditions built up over several years. This is often due to ongoing changes in medical technology, models of care, demographics/epidemiology, and emerges from a lack of proactive planning. Investment projects for solving problems with cramped space, poor capacity and functionality, however, often derive from a process based upon clinicians' judgments of their own treatment capacity. Such projects may not always fit with paramount objectives.

We studied plans by a Norwegian teaching hospital for a 7000 sq. meter expansion, aimed at solving their need for more beds. The activity analysis showed that the hospital had a lower utilisation of beds, a higher amount of personnel per patient and per bed day, and a lower outpatient production than comparable hospitals.

The combined capacity/space analysis of the project showed a lower and unevenly distributed use of beds and available space between clinical (sub)specialties. This led to a sub-optimal use of hospital space. After an examination of possibilities for reshuffling the functional elements of the hospital, our study concluded that at present, there was no need for the expansion project.

To reach this conclusion, we did a complete analysis of the activity and physical capacity at the actual site. We found the number of beds had been reduced by approximately 150 units since 1991. Most of the released space was devoted to new activities without any master plan or strategy. As a result, overall hospital functionality during this period was reduced, physically and organisationally. When our project was executed, the bed units were too small. An average of 16 beds per unit correlated with sub-optimal costs and staffing. 9 inpatient units had less than 10 beds.

Free space within bed units had been converted to offices with very low actual utilisation over the day. Outpatient and daycare units had been established as small units within the inpatient units where space was available. Early on, this was an effective approach, but as non-inpatient activity grew, space became more cramped, and coordinated use of space and personnel more difficult.

By identifying all units, regrouping them into cost effective and coordinated solutions for beds, outpatient clinics and daycare units, we could free space for new demands. We also recalculated utilisation rates and showed there was room for more activity within the occupied space of all organisational units/departments.

We projected future activity demands and, to show causes and effects, also compared our findings with information from other hospitals (based on national level data for inpatients, day patients and outpatients). Capacity and space use was measured, and the results for all functions and rooms were organised in a special, selfdeveloped classification database.

To illustrate the lack of functional connections and their consequences for the overall hospital structure, we analysed drawings of all buildings

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and floors, identifying main functional space types with colour coded schema. Our concluding advice was to start a regrouping and reorganisation process within the hospital to save space, and more importantly, for the hospital to become more cost effective.

Functional capacity is related closely to efficiency, and organising workflow is the key to expanding capacity. On a hospital level, this may lead to an extensive rearranging of work. The ability of hospital administration to encourage better utilisation of the existing rooms may lead to improving results up to a given point.

After such a threshold is reached, creative rearranging of work may be the only answer to such problems. Existing ways of organising work should be questioned. The planning on hospital/trust level will always have to take the existing facility into account, in terms of activity, capacity and space.

While positive results may not be reached immediately, but every hospital should be capable of monitoring activity, capacity and space use.

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