HILTRON

International Healthcare Consultants

FACILITY PLANNING

A Patient focussed cost efficient approach

Objectives

A computer assisted planning process focused on patient needs and offering cost effective analysis of all aspects of project requirements

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A fresh view on hospital project planning and briefing

1 Executive Summary

1.1 Whilst there has been considerable progress in building design software which has enabled more rapid visualisation of projects there still remains a lack of viable tools to accurately forecast budgetary requirements for healthcare projects before extensive costs are incurred in the design process.

1.2 Many briefing tools have made use of generalised patterns of design as a short cut to more in depth consideration of needs and projected costs. These patterns often offered templates of whole departments which could be cut and pasted into an initial design solution. However they have always been very generic and often created a less concise or inappropriate solution, for instance forcing a project into a 10 bed ward when 5 or 15 beds were really required. In the past there have been consultancies who claimed to be able to schedule a complete hospital in 48 hours using this data as a basis. The result was often considerably over sized and unacceptably expensive in capital and revenue expenditure, and in particular failed to recognise local customs and practices as the various patterns were developed for use in other countries.

1.3 There has also been a lack of consideration of other methodologies now available. Most health services make use of computers and in particular medical coding systems and software, using a variety of analytical systems to track the use of medical procedures, their use of resources and provide statistics on such things as outcomes.

1.4 Heath services have become increasingly expensive, to a level that challenges budgets of even major countries. We think there is a need for a computer based tool which will use all available techniques and data to realistically the needs and costs of a project before thought processes are channelled by a formal architectural design process, which inevitably starts to limit room for manoeuvre as soon as the first drawings are created.

1.5 Software is only a tool to manipulate data. We have created extensive web based database structures on the “Cloud” (Microsoft Azure WebApi) and have ensured that these have an open structure allowing knowledge to be shared and supplemented, particularly by associated architects and manufacturers. Our own software solution is based on the language C# but other developers may wish to use other solutions such as Java

1.6 Using open data enables the project data and information produced to be taken forward into the formal design process and beyond. One of our primary aims has been that the data should be useful even after the construction phase has been completed.

2 Principles of design briefing

2.1 Our design and briefing philosophy is based on an understanding of the care and treatment required by patients in the area which the project is to serve. This requires thorough analysis and documentation of local disease profiles (epidemiology) but also consideration of other local or national factors such as likely prevalence of accidental injury (is the project near a major road or airport?). It is also important to look at other local or national facilities and the general planning for optimisation of specialised services.

2.2 Having established the type and likely numbers of various patient types we link these to the medical procedures which they are statistically likely to require and allow for a probability factor. For this process we use any current computer national medical coding, or recommend a suitable system such as that used in the USA and UK. These codes are extensive and detailed and can be used to imply the medical specialists required to carry them out, and also space planning and equipment and many other needs. Our system allows for development and extension of the coding to allow for local practices.

2.3 Hence from the expected patient numbers we can develop an estimate of a wide range of other needs, such as medical staff numbers, space and equipment needs, catering, office space, laundry etc. etc.

3 Patterns and Data

3.1 The major role of a consultancy such as Hiltron in the process described is to specify and provide template data for all of the processes required.

3.2 We make extensive use of design patterns, but in contrast to previous systems ours are scheduled and drawn at a micro scale and allow for interchangeability, particularly allowing for local preferences and requirements. These design patterns link to the required medical codes.

3.3 Various academic works, for instance by Alexander et al[1], have identified that a pattern should enumerate in a pattern dictionary the problems addressed, how this solution addresses those problems and particular advantages and disadvantages. In our database we also include examples of associated parameters such as design area, service, energy and other requirements. The pattern should also indicate the need for other supporting patterns, for instance a 1 bed ward pattern should show not only the ward, en-suite etc. but the need for a sluice, treatment room. In our system these needs are further qualified by the quantum of time taken by the main pattern in the sub-pattern.

4 Medical Coding

4.1 Medical procedure coding structures are used in various formats in different countries but one which enjoys considerable international support is SNOMED. This has been generally accepted in the USA and has suggested advantages as detailed in a presentation by Dr Roger A Cote[2]

4.2 Coding is used for a variety of statistical analysis and is also used in many countries as a basis for costing in private and insurance based medicine. It is usually structured to allow easy manipulation by computers.

4.3 We have ensured that our system can accept a variety of coding structures, even those derived at a local level. However it is essential that the granularity of the codes is sufficient to enable unique identification of the resources required to support the indicated procedure. For instance it would not be sufficient to list a procedure requiring the use of an operating theatre without inferring the type of table, specialist medical staff, specialist equipment etc. required.

5 Scheduling of Resources

5.1 Having identified the anticipated patient numbers and the probability of necessary treatment and procedures for each patient type it becomes possible to associate required support from staff, medical and other and other, and physical resources such as technical spaces and equipment.

5.2 Each of the identified resources will in turn generate the need for other support. For instance the medical staff may well need an office and a range of other services such as catering, laundry and car parking.

5.3 The essence of our briefing system is that example data allows semi-automatic completion of projected requirements once the initial patient numbers have been entered based on international experience. However it would be unduly optimistic to assume that there will be no variation in requirements at a local level and so each of the base parameters can be adjusted for individual projects.

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[1] Alexander, Christopher (1977). A Pattern Language: Towns, Buildings, Construction. Oxford University Press, USA. p. 1216. ISBN 0-19-501919-9.

[2] Roger A. Côté (1986). "Architecture of SNOMED". Proceedings of the Annual Symposium on Computer Application in Medical Care: 74–80. PMC 2245000