The Objectives and Design Philosophy of the real-time computer project at the
Queen Elizabeth Medical Centre

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1. The computer project at the Queen Elizabeth Medical Centre was set up in 1968 as part of a programme of such installations, sponsored and funded by the D.H.S.S. At that time the way forward was seen to lie in the concept of the large District General Hospital, with about 250 such complexes providing the main secondary care services across the country. The Queen Elizabeth hospital was earmarked for such development, the Maternity hospital had already been built, and plans were at an advanced stage for the creation of an outpatient department, accident, emergency and burns units, and more laboratories and operating theatres, as well as the building of geriatric, psychiatric and children's hospitals all on the same site. The computer system was to be at the heart of this complex, controlling and integrating the flow of information between the different units.

These plans were halted in 1974 and are unlikely to be revived. At the same time NHS reorganisation was aimed to bring together the primary and secondary arms of the Health Service into a single and more co-ordinated system. At first sight it might appear that the future expansion path for the project had been removed, but in fact the context had merely been changed. The need to control and integrate the flows of information is still there, but are no longer confined to the environment of the District General Hospital. The challenge now is to provide this service in the wider context of Area-based services, as envisaged by NHS reorganisation. Thus the future lies with Area-based computer systems, but for the present the project at the Queen Elizabeth hospital is still completing the development of applications that primarily serve the hospital.

2. Two main uses of information have been identified:-
   - Immediate use, requiring real-time access where computers are involved; this is where the use of the information forms part of the function of a department or the care of the patient on a day-to-day basis
   - Delayed use, requiring batch mode operation, providing for the longer term planning or management of hospital or health care resources, and meeting the needs of teaching and research.
3. In the same simplistic manner two main categories of user have been identified, though with considerable overlap:–
   - in a hospital context, the users requiring real-time access to information include doctors, nurses, ward clerks, laboratory staff, clerical staff in the Records office and in service departments etc.
   - those concerned with batch systems and their output include administrators, medical and nursing management, statistics, heads of departments and teaching and research personnel.

The Queen Elizabeth hospital project has been designed to cater for both types of use and classification of user. However, the problems of batch mode operation are fairly familiar, and the rest of this paper will concentrate on the real-time aspects of the overall system.

4. The Objectives of the project may be defined as follows:–
   - to create a system that operates reliably in real-time and is acceptable to the users
   - to speed information flows within the hospital and in particular patient information from service department to ward
   - to improve the quality of the information in terms of accuracy, legibility, ease of access and interpretation
   - to ensure confidentiality of patient records
   - to save staff time, thus improving the use of hospital and NHS resources
   - to provide a teaching and research facility
   - to evaluate the completed system.

These objectives have by-and-large been met, though the last one is the task of a separately funded team whose task is far from complete. In order to achieve these objectives certain design principles were established.

4.1 It seems a fundamental point that everyone who requires access to patient information as part of their job should have direct access personally to the computer, if that is where patient information is to be found. Within the Queen Elizabeth Medical Centre this applies to more than 2000 staff; if you are intending to have that number of potential users of the system then this dictates a whole series of further design principles, such as minimum training, therefore the system must be very simple to use, therefore it cannot depend upon the learning of mnemonic codes, and so on.

Not only are there over 2000 potential users, but it is a perpetually moving population. Most housemen stay only 6 months, and with a school of nursing on site a number of nurses move on once they have completed their qualifications. There are in practice normally about 1200 authorised users of the system at any one time, of whom half may have occasion to use the system in any week.