WARD PLANNING
A STUDY OF FUNCTIONAL REQUIREMENTS IN
ACUTE GENERAL WARDS

REPORT NO. 1

A REPORT BY THE
HOSPITAL DESIGN AND
EVALUATION UNIT
DEPARTMENT OF HEALTH
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Foreword

This report is the end-product of the first major study of the Hospital Design and Evaluation Unit. The conclusions are based upon personal observations by members of the Unit over 24-hour periods in various types of wards.

Emphasis is laid throughout on the relation of design to function and on the necessity of making major policy and planning decisions at an early stage in the preparation of the Architect's brief.

Boards it is hoped, will be more aware of their responsibilities in planning after reading this booklet. For doctors, nurses, administrators and others who must play an active part, it provides a guide which highlights the problems involved in planning a ward; for architects there is an analysis of ward activity which they may not always have appreciated.

These are recommendations, and no attempt is made to produce standard solutions or standard plans. Such tend to freeze thought and initiatives.

1 Introduction

Faced with a complex and expensive programme of hospital building the New Zealand Department of Health accepted that the best approach to the problems involved in hospital planning and development was by the establishment of full-time multi-disciplinary planning teams. Accordingly in September 1971 a Hospital Design and Evaluation Unit was established. The basic composition of the unit was a doctor, an architect, a nurse, and an administrator who have access to other professional advisers within or outside the Department. The unit's function was in brief, to help bring about more efficient hospital building, and it aims in time, to build up a storehouse of information where varied but not least will be its own studies of hospitals within New Zealand.

The unit's first major study offers guidelines for the planning of acute wards. This report is intended for doctors, nurses, administrators and other involved in writing briefs for new projects, architects and other members of design teams, and those concerned in commissioning and working in new wards.

Although this study is confined to acute general wards, many of the principles discussed are relevant to specialties which share the same basic requirements with the addition of other facilities as appropriate.

Before commencing ward studies the members of the Design and Evaluation Unit considered in detail work done on ward design overseas and its relevance to New Zealand conditions. It was obvious that a first-hand systematic study had to be done to determine the latter point to enable the team to speak with some authority on the subject.

A variety of wards was studied in detail in different types of hospitals throughout the country. Full-size mock-ups constructed for simulated studies of the function of certain key rooms, and members of the unit engaged in numerous discussions with ward and other hospital staff. The method of study is described in Section 6.

As this report is designed for reference as well as to be read through, a certain amount of repetition and cross reference is required. It is hoped that a balance has been struck so that neither will become tedious.

Sections 2, 3 and 4 deal with similar subject matter in quite different ways, and with different emphasis. Section 2 discusses policy decisions which must be made by the planning team, Section 3 elaborates the relationship between rooms, in particular nurse working rooms; it indicates the functional requirements of these rooms. Section 4 makes some suggestions for room lay-out as illustrations of principles discussed in previous sections, but it is emphasised that these are only suggestions. Section 5 deals with points of a general nature which do not readily fit in other part of the report.

In 1989 the unit undertook a revision of this report, both metracing dimensions and revising the text.

2 Policies Affecting Planning

Primary Considerations

Decisions on operational policies relating to future ward(s) must be reached at a very early stage. While the architect may be able to advise, the points discussed in this section are essentially those requiring decision by the hospital.

No ward can be considered in isolation. It is dependent upon other departments and agencies for its communications, supplies, removal of waste products etc. Patients and staff must depart to and arrive from other departments or the outside world. The effects of the extra load on supporting services must be carefully weighed, and upgrading considered where necessary. Many operational policies may be unalterable because of the necessity to use existing services. On the other hand, it is suggested that new projects give the opportunity to review supporting services in relation to the hospital as a whole.
The ward relationship with the remainder of the hospital may well be fixed by limitations of site or other buildings. The practicalities of planning will sometimes have a bearing on policy. It is wise therefore to involve the architect at an early stage.

It cannot be emphasised too strongly that all relevant policy matters which may affect planning, including those raised below, must be fully considered and determined before physical needs can be assessed.

Policy decisions once made should be properly recorded and every effort made to adhere to them. Should subsequent change become necessary however, this should be recorded and brought to the attention of all those involved.

Once policy is established in this way, a sound basis is available for the production of the further document usually known as the architectural or building brief. This amplifies the policy decisions, defines in detail operational requirements, functional relationships and work flows with related space, equipment and other features required in the completed scheme. It must be available before the architect commences design work.

It is not the function of the brief to pre-determine the general form of the building under consideration. This is a matter of architectural exploration during the planning process. Linear, deep; and other plan forms can promote efficient working conditions in wards but it should be noted that capital and running costs both rise as the height and the depth of the building increases. It is thus a complex matter to arrive at the form of building which will produce the best balance of efficiency and economy for a particular building on a particular site.

When the building is finally completed, the written policy statement will be of great assistance in the process of commissioning. Good hospital planning seeks to simplify rather than complicate, and to make it easier to do the right thing rather than the wrong. At the same time, staff may be habituated to a different method of working. It is of the first importance that all staff members should be fully acquainted with the operational concepts on which the design was based.

Size of Ward

The number of beds must be determined. It is generally accepted that the optimum number per ward is about 30. Lesser numbers tend to make the ward increasingly uneconomical in terms of staff, and of capital investment in building and equipment. Greater numbers become progressively more unmanageable.

This figure (30) has long been accepted by experienced ward sisters as appropriate to their responsibilities.

The same figure represents the optimum number of patients in relation to a compact group of ward service rooms. With significantly greater numbers, distances can become burdensome to staff and patients.

Special Care

It is common practice to group the more nurse-dependent patients (ie acute category 3) near the sister's office or nurse's station for close observation. If this category of patients from two or more wards on the same floor can be grouped in a central area between the wards, it facilitates the most effective use of nursing staff and justifies independent supporting service rooms.

The type of unit envisaged above is termed "special care" as distinct from "intensive care". (See Glossary 6.1)

Ward Floor

The advantages of combining wards to share certain facilities should be considered, eg it becomes more economic to employ a receptionist/clerk; some facilities such as consultants' offices, seminar rooms, certain types of storage, interview and overnight stay rooms for relatives may be shared with resultant benefit and economy.

The logical consequence of the above paragraphs is the concept of a ward floor, under the control of a nursing supervisor, and comprising say, two wards of 30 intermediate care beds and a special care unit of say, 12 beds, all three having their own service rooms but sharing certain facilities.

This type of lay-out is sufficiently flexible to accommodate the differing requirements of the various specialties. It is of course conditioned by site restrictions and other factors in particular cases.

Versatility

Wards must be planned for versatility in use. Maximum versatility means that a patient of any age, either sex, suffering from any condition can be admitted and treated in a ward without disturbing other patients. The accommodation of all patients in single rooms is not practicable but flexibility in the allocation of beds is related to the degree of division of bed areas and the extent to which each is self-contained. The more versatile the ward, the higher can be the bed occupancy rate and the more patient care can be delivered. The proportion of single rooms suggested in paragraph 2.6 with the remainder in four-bed rooms appears to give optimum versatility without losing compactness.
Bed Areas

Considerations of patient privacy, control of cross-infection, reduced disturbance by noise or lights at night, lead to a recommendation for rooms rather than bays. Doors confer privacy and quietness but are not cheap and cost must be balanced against usefulness. They are useful in excluding extraneous noises. (See 5)

Single rooms are necessary for patients requiring isolation or segregation. Requirements fluctuate but it is generally accepted that about 20 percent of beds in a ward should be in single rooms. It may vary with provision made elsewhere in the hospital, e.g., an isolation ward. Our studies confirm that too few single rooms reduce the ability of a ward to cope with changing medical, nursing, and patients needs, and changes patterns of morbidity.

Consideration must be give to the size of multi-bed rooms. These may vary from two to six beds. Larger rooms tend to approach the open ward with lack of privacy, create problems in lighting etc. Patient preference is almost impossible to judge; the average patient is not in a position to give comparisons; all surveys have shown the patients tend to prefer the accommodation they are in at the time; the arguments of doctors and nurses appear at times illogical and there is no real agreement.

Two-bed rooms: they are cheaper than single rooms, but provide less privacy and only marginally more privacy than three or four-beds rooms.

In terms of space two-bed rooms require more area per bed than four-bed rooms to provide equivalent working areas and facilities. Incompatibility between patients may pose problems for nursing staff and two-bed rooms are of course less versatile than singles although more so than four-beds rooms. While appreciating that in certain design situations a double room may be the best, it is not recommended that such accommodation should be specifically requested in a building brief.

Three-bed rooms: these are popular in some parts of the world but not in Britain, New Zealand or Australia. Like two-bed rooms they require more area per bed than four-bed rooms, and do not lend themselves to economical design.

If the beds are at right angles to the long axis of the room the problems of the six-bed room arise in terms of the "man in the middle", and lighting of the innermost bed.

In terms of privacy and flexibility there is little advantage over four-bed rooms and the possibility of incompatibility or a "two's company" situation arises.

Four-bed rooms: these appear to be the most satisfactory of the multi-bed rooms. Each patient has his own corner and a reasonable degree of privacy is provided. The rooms are not so deep as to cause problems with natural light and ventilation. Appropriate groups of patients can be affected more readily than with larger rooms.

Five-bed rooms: these present some of the difficulties of three and six-bed rooms, such as the "man in the middle", natural lighting and ventilation, and do no lend themselves to economic design. In some circumstances they may encourage the squeezing in of an extra bed.

Six-bed rooms: these have less privacy than smaller rooms. The middle patient looks to another, no matter which way he turns. It is difficult to provide sufficient natural light to the innermost bed without causing uncomfortable glare for the patients by the window. Ventilation may also pose problems. Flexibility as regards sex or disease distribution is reduced. The cost of certain services may actually increase, e.g., it may be decided to install oxygen and suction points plus power points between each pair of beds. In a four-bed room this means two outlets per four beds, in a six-bed room four outlets are required. On the other hand, six-bed rooms can be provided with sanitary facilities more economically than say four-bed rooms.

Although the six-bed room may result in a more compact plan some of the benefit of reduced corridor distance is lost in increased room depth while time consuming and disruptive movement of patients, beds and lockers tend to increase.

If it is accepted that a number of single rooms is required, there appears to be no valid reasons except possibly design difficulties for planning for two-bed rooms. The arguments in favour of four-bed rooms appear to be convincing unless specific site constraints oblige the inclusion of six-bed rooms for compactness.

With the above provisos therefore, we recommend in 30-bed wards the provision of six single and six four-bed rooms. The remainder of this report is based on this recommendation.

Sitting Space

Consideration should be given to the advantage of providing a small area of sitting space in multi-bed rooms. This need not significantly increase the total floor area of the ward as it can be partially offset by reducing the size of separate day room(s) provided. Many patients are allowed out of bed for short periods but are unable or unwilling to walk to the day room. Patients are often seen sitting by their bedsides while a large inhospitable day room is empty. Provision of chairs and a small table in multi-bed rooms encourages early ambulation, makes distribution easier as patients may eat in this area. allows day room(s) to be used for noisier activities such as television.
Day rooms are used by patients if comfortable, attractive and domestic in scale. A carpet, curtains and suitable lighting help create the desired contrast with the rest of the ward. Furniture and floor finishes of this kind are inappropriate for dining areas, and in any case there are other reasons against patients dining in day rooms. (See 2)

**Sanitary Facilities**

These include W.C. compartments, wash hand basins, bath and showers. An early decision is required on the degree of their dispersal through the ward. The provision of W.C., shower and wash hand basin attached to each bedroom is an ideal arrangement but costs may be prohibitive. Note that access to the W.C. must not be blocked by patients using other facilities.

**W.C. Compartment**

The W.C. is the most important facility from the patients’ point of view. Its location near patients’ bed areas encourages early ambulation, reduces demand for bed pans and urinals, saving nursing time and patient embarrassment and inhibition, and increases flexibility of the ward. Experience has show that patients appreciate having a W.C. compartment nearby.

This can be achieved most conveniently by providing direct access from the bedrooms. This situation also encourages patients to take an interest in the cleanliness of their W.C. compartment.

The above suggestion may require an increase in the conventional ratio of one W.C. to six patients but the extra cost appears to be warranted.

In single bedrooms in Special Care Areas, patients will be confined to bed, and W.C. facilities are not required. However, if this area is to be used on one particular floor for a small specialty, modification of design to include W.C. compartments will be needed. Multi-bedrooms in this area should have W.C. provision as for intermediate care patients.

**Wash Hand Basins**

The poor facilities for washing found in many hospitals limits their use. Ambulant patients should have access to facilities for washing in private, near every multi-bedroom. One washing cubicle to eight patients in multi-bedrooms is suggested as an adequate ratio but this will depend upon the particular ward plan.

The wash basin in single rooms meets these patients’ requirements.

**Bath/Shower**

There is rarely any urgency about bathing or showering. These activities can be spread out over the entire working day, if necessary. The nearer a patient is to a shower, the more likely he is to be able to reach it without assistance. The number, therefore, is related to the convenience of patients. There is much to be said for providing a shower and wash hand basin in the same cubicle in which case the ratio suggested for wash hand basins in paragraph 2.8 would be satisfactory for showers. At least one assisted shower should be provided in each ward.

The tendency towards showers rather than baths is to be encouraged from all points of view, but there are still a number of patients who prefer a bath, or who may be require one for medical reasons. One assisted bath should suffice for a ward, or possibly one for two wards if they are closely related.

**Treatment Room**

A conveniently located treatment room is a very useful facility although in practice it is not always used as intended. It must be decided what, if any purposes the room may be used for, in addition to patients’ treatments. Possible uses include admission procedures, teaching, clinical discussions etc. (See 3.3)

**Nurse Working Rooms**

The rationalisation of nurse working rooms requires very careful consideration. This is discussed in Section 3.

**Supporting Services**

**Catering**

A hospital policy decision must be made on all aspects of catering, as upon this depends the facilities at ward level. In many cases, existing hospital policy may have to be continued because of lack of space for centralisation; in others, the benefits of centralisation and implications of convenience foods must be assessed.

Several Department of Health publications have stressed that centralisation of cooking and plating of meals is efficient, economical and acceptable to the patient. Machine washing of dishes at a central point removes a noisy occupation from the ward, and reduces space requirements since storage space for crockery and cutlery is no longer required. Responsibility for crockery and cutlery and disposal of food waste is then transferred from the ward.
With a fully centralised service, the ward kitchen need only be a small pantry with facilities for keeping small items of food hot or cold and the making occasional beverages. Routine beverages may also be supplied from the main kitchen.

Ambulant patients can eat in their rooms, in a day room or possibly a cafeteria. Disadvantages of day rooms and cafeteria include the problem of patients on special diets and the case with which a patient may miss a meal. Experience shows that in many cases patients prefer the relative privacy of their own rooms.

Provisions for staff morning and afternoon teas must not be forgotten. The increasing trend over recent years towards central cafeteria services will no doubt continue if only for its time and space-saving attributes. The cafeteria must, however, be reasonably near the ward or staff will not use it. In a very large hospital this may mean more than one cafeteria.

Sterile Supplies

The general introduction of Central Sterile Supplies Departments and the abandonment of sterilisation in wards necessitates decisions on the type of supply, distribution and storage systems to be used.

Sanitisation

Decisions will be required on sanitisation policies on wash bowls, whether on ward or centrally, tooth mugs (disposable?) sputum mugs, etc., and on the related question of storage at bedside and/or elsewhere. Special facilities may be required for patients in isolation.

Pharmaceutical Supplies

Increasing attention has been paid in recent years to systems of drug distribution in hospital wards. The Health Services Research Unit report of January 1972 is one of many studies of distribution systems and although carried out in a Geriatric Hospital, its findings are applicable to acute wards. One of the results of recently introduced systems is a reduction of storage requirements for drugs at ward level. Planning for a new ward should therefore stimulate an examination of existing procedures before a decision as to quantity of storage is made. Legal requirements must be satisfied and the possibility of misuse by staff, pilfering or even assault to obtain drugs should be borne in mind. The smaller the stock the better and it is recommended that all drugs including those requiring cold storage be kept in a comprehensive preparation rooms. (See 3.2)

Linen and Blankets

Hospital policy on the methods and frequency of distribution of clean linen and blankets may have to be reviewed before storage needs can be determined. The automatic provision of separate linen rooms should not be accepted uncritically. (See 3.2)

Supply and Disposal Systems

Storage in ward areas uses expensive space. Excess storage tends to be filled whatever the need, and excess supplies tend to breed waste. On all counts it is more economic to store as much as possible off the ward. The necessitates an efficient and reliable supply system in which staff can have implicit confidence.

The advantages of an imprest system are well known, and this should, we believe, apply to most items regularly used on wards. Nursing staff should be relieved of unproductive clerical activity associated with intending for supplies.

It is for each hospital board to formulate a policy regarding methods and frequency of supply and delivery of all types of stores, not forgetting routine cover for weekends and holidays, and supply of emergency requirements. Whatever that policy may be, it will influence the ultimate room design.

Arrangements for removal of refuse etc from the ward likewise influence design. Disposal policy includes the method and frequency of removal of all material for destruction or reprocessing - food refuse, waste paper, used disposable equipment and dressings, items for resterilisation, soiled linen etc. Some space must be allocated for temporary storage on the ward - depending upon hospital policy - not forgetting weekends and holidays.

Equipment

A decision must be made on the quantity of re-usable equipment such as bed accessories to be stored in the ward, and how much can be kept in an equipment pool serving a group of wards. Parking space must be provided for toilet and wheelchairs, and perhaps a trolley or mobile X-ray machine.

Patients Clothes

With increasing early ambulation, there seems to be a tendency to encourage patients to wear their usual attire. To this end, there is much to be said for providing a wardrobe at the bedside within each single room or within the curtained area in a multi-bedroom and there is usually need for a store for suitcases, overcoats etc. Whatever hospital policy may be, special consideration of this subject is required for larger hospitals which have patients referred from a considerable distance.
Engineering Services

The level of piped and wired services required in a particular case varies. Suggestions on generally acceptable standards are noted for broad guidance later in this report.

Checklist of Policy Decisions to be Made

This list is not necessarily exhaustive. It is designed to remind planners of decisions which must be made at the time of writing the brief.

Subject

Decision

Size of ward

Number of beds
Grouping of wards to share some facilities
Special care areas - yes or no
Versatility
Proportion of single to multi-bed rooms
Bed areas
Size of multi-bedrooms
Sitting space
In day-room(s)
In bedrooms
Sanitary facilities
W.C.’s
Showers, baths
Wash hand basins
Position and number of these in relation to bed areas
Treatment room
Yes or no
Supporting services: Catering

Food service, dishwashing etc.
Dining areas for patients and provision for light refreshment for staff
Sterile supplies
Type and frequency of supply
Type of storage required
Sanitisation
Bedpans, urinals, - disposable
Wash bowls - on ward or central, storage
Pharmaceutical supplies
Control and administration
Line and blankets
Frequency of supply
Location
Supply and disposal systems
Method and frequency of distribution
Collection
Equipment (re-usable)
Quantity and type
Storage in ward and centrally
Patients’ property
Location and security
Piped and wired services
Number of outlets for piped gases and suction
Number of power points
Nursing policy as it affects planning of nurse work rooms
See Section 3

3 Room Relationships

This section should be read in conjunction with Section 4 Room Design.
Cycle of Nursing Activity

Observation of nurses working in different wards highlights a repeating pattern of activity.

* The nurse receives an instruction, verbally from sister or house surgeon by reading it in the report or by answering a patient's call bell.

* She must assemble equipment, eg wash bowl and linen, dressing pack and lotion.

* She undertakes the treatment or other activity at the bedside, in the treatment room, in the bathroom or elsewhere.

* She disposes of equipment used, or reprocesses it for future use.

* She records the activity if appropriate.

* This cycle of events simplified is: read, prepare, do, dispose, record. This is the characteristic pattern of nursing activity although every stage of the cycle is not always included.

Rational Arrangement and Function of Nurse Working Rooms

Nurses' Station, Sister's and House Surgeon's Offices

The ward sister and house surgeon share with the nurses a common interest in patient's records so their offices should be grouped adjacent to the nurses station and records. The nurses station is a constant point of reference for nurses and should be located in close association with the other nurse work areas and in a central relationship to patient rooms. It should not be sited at the entrance to the ward to facilitate the supervision of visitors to the detriment of its true function. If a ward clerk is not located in shared accommodation it may be desired to allow some space at the nurses' station within the ward.

Preparation Room (See Glossary 6)

In existing wards nurses may have to visit two, three or more rooms in the course of assembling equipment for use in one treatment, eg drugs may be stored in a 'medicine' room, a 'sterilising' room, in sister's office, in the kitchen refrigerator; clean and sterile supplies are stored in a combination of often widely separated rooms such as 'sterilising' room, 'clean utility' room, linen room. The nurses work will be simplified if all of these rooms can be combined to form one comprehensive preparation room in which all equipment can be assembled for nursing and medical procedures. This room should provide storage space for all clean and sterile supplies, lotions, linen and drugs, including narcotics.

Work benches are not required; trolleys which fulfil this function may be parked beneath wall cupboards. (See 4.2) A cupboard is required next to the preparation room for pillows, and blankets other than those received directly from the laundry.

(A separate equipment store is necessary to hold bulky items, eg bed cradles, cot-sides, see 2.13).

Disposal Room (see Glossary 6)

At the present time disposal of equipment after use too often takes place in the room where it was assembled which is unsatisfactory nursing practice. Safe technique will be encouraged if all used equipment is brought to a central point, a disposal room. This will also simplify its removal from the ward. In this room, items can be deposited in rubbish bags and in receptacles for returning to C.S.S.D., laundry and pharmacy. The trolley used should be cleaned here and returned to the preparation room.

If patients' wash bowls are to be processed by sanitiser at ward level, it can be located in this room.

This is an appropriate room for the arrangement of flowers; a separate flower room should not normally be required. The preparation and disposal rooms must be adjacent if they are to be correctly used.

Sluice Room

This must adjoin or be a distinct part of the disposal room as after a patient treatment there may be drainage fluid to be sluiced away. It has to provide a sluice sink and bedpan sanitiser or destructor, and also storage for re-usable or disposable bedpans and urinals, and facilities for urine testing.

Ward Kitchen

The relationship of this room to patient areas will depend on the policies discussed in paragraph 2.11.

Patient Areas

Bed Areas

In order to achieve minimum walking distances for nurses, patients' bedrooms must be near the nurse working rooms. This is an important factor leading to better observation and supervision of patients as the nurses go about their work. (See 45.3)

Accommodation not directly related to patient care, eg out-patient consulting rooms, should not intrude between the patient areas and the nurse working rooms.
Special Care

Special care requires both single and multi-bed rooms with ready access to nurse working rooms. These bedrooms should be planned to respond to fluctuating demands and should relate flexibly to the intermediate care areas. Where wards can be combined to share sufficient special care beds, separate nurse working rooms become justified.

Sanitary Facilities

The advantages of having the W.C. entrance opening off the bedroom is discussed in paragraph 2.8. Ideally, washing and showering facilities should be grouped with the W.C. compartment next to each bedroom but may be shared between two or more bedrooms. An assisted shower and an assisted bathroom should be provided. (See 2.8).

Treatment Room

This is a room set aside for the performance of certain medical and nursing activities which are best done away from the confines of the bed area. Privacy must be ensured. In order to encourage its use it must have a convenient relationship to the bed areas, especially the multi-bedrooms, and to the preparation and disposal rooms.

Hatches between the treatment room and nurse working rooms are awkward in use because in most cases only one person is involved who must move from room to room anyway. Furthermore, they destroy privacy and prejudice bacteriological control.

Sitting Space

The value of sitting space within multi-bedrooms together with a domestic scale day room(s) is discussed in paragraph 2.7.

4 ROOM DESIGN

These layouts have been developed in the light of studies in hospitals and simulations of working situations in full-size mock-ups. They are offered as illustrations of significant aspects to be considered rather than perfect solutions. The following notes and drawings should be read in conjunction with Sections 2, 3 and 5. Certain rooms such as equipment store and cleaners rooms are not described in this section.
It might be mentioned that during the studies leading up to this report many examples have been seen of excessively complicated and expensive arrangements of drawers and small cupboards which service only to encourage hoarding, and are ill-adapted to changing requirements.

**Linen Room**

Requirements will vary according to the supply systems from one or two parking bays of 1m² each to a room of up to 10m².

It is emphasised that the preparation and disposal rooms must be adjacent if both are to function properly.

**Disposal Room**

The function of the disposal room and its close relationship to the preparation room and sluice are discussed in paragraph 3.2. This room is a temporary holding point for various categories of used linen and instruments, pharmacy returns, and rubbish. The number of bins, buckets, and bags, etc., and the consequent size of the room, relates very closely to the frequency and reliability of the collection service. A room of 12m² should be adequate for a 30-bed ward given an efficient collection service.

Wash bowls may be sanitised, treatment trolleys and re-usable equipment will be cleaned here after use and vases will be filled and dead flowers disposed of, a sink and shelves being required for these purposes.
Sluice

The equipment and size of the sluice will depend upon policy as regards the use of disposable or non-disposable bed-pans, urinals and wash bowls and on the storage and treatment of these items. Where disposable items are used it is normally most practical to store them in the cartons as packed and delivered by the manufacturer. Racks may however be required for the frames unless these are kept at the bedside, and ready-use storage for bed-pan covers. Facilities are required for holding and testing urine.

There is a close relationship between the sluice and the disposal room, for the emptying of drainage receivers, and this facilitates the sharing of a wash hand basin between the two rooms. Indeed it may be preferred to accommodate disposal and sluice functions in separate sections of one room. Good ventilation is important. The layout of equipment should follow a logical sequence from "dirty" to "clean" activities to assist nurses and provide good technique.

Single Bedroom

A minimum room size of 3400 X 3400 is recommended. On the axis of the bed, the clear dimension of 3400 has been found to be necessary to allow space for staff and equipment which might be required for various procedures, such as the resuscitation of a patient, the manoeuvring of a mobile X-ray machine, or the transfer of the patient to a bed.

It is essential to allow sufficient space for those procedures which involve pulling the bed out to give access to the patient’s head. (The common dimension of about 3m on the axis of the bed was found to be too short, particularly for modern adjustable beds.)

The door to the room should be in the corner remote to the bed head and should be at least 1200, and preferably 1400 wide. The door could be of conventional 1-1/2 leaf variety or a sliding door may be used provided easy access to the track is available for cleaning and maintenance. An observation glazing strip should run the full length of the corridor wall including the door.

The most convenient position for the wash hand basin in a minimum-sized room is near the corner remote from the bed head close to the window wall. An increase over the minimum size gives greater freedom in the location of the basin.

It is assumed that the furniture in a single room will comprise a bed, possibly an over-bed table, a bedside locker which may be on either side of the bed, an armchair, an upright chair and/or a stool, a wardrobe, a wash hand basin and mirror. (The over-bed table can often be omitted by the use of a bedside locker designed with a suitable hinged or sliding flap.)
Multi-Bed Rooms

The optimum number of beds in a multi-bedroom is discussed in paragraph 2.6.

Two-bed: allow 8m$^2$ per bed plus an additional 2m$^2$ per room for access to the bed which is remote from the entrance.

Multi-bed: allow 8m$^2$ per bed in each bedroom.

Each bed with its associated wardrobe, bedside locker, chair, stool and over-bed table should be contained within a curtained cubicle. (It should be noted that a wardrobe within the cubicle is preferable to a group elsewhere in the room.) A cubicle 2.4m wide and 2.9m on the axis of the bed is sufficient for general, medical and surgical wards and is just adequate for orthopaedic wards. In many hospitals length and working space within the curtained cubicles has been sacrificed in the interests of maintaining a wide space between opposing bed curtains.

It is considered acceptable to leave a space of 750" between opposing bed curtains which is sufficient for a treatment trolley. In the rare event of having to take a "window" bed out between two curtained "corridor" beds the curtains can "give" sufficiently to allow the bed to pass. This produces a minimum size of 6500" between opposite bedhead walls, and, when the curtains are drawn back, leaves a space of approximately 2300 between opposite beds.

A four-bed room 6500 wide and 4800 deep is the minimum size into which four curtained bed cubicles can be fitted but this leaves little room for a wash hand basin and mirror and virtually none for armchairs required for the patients. It is suggested that a 1200 increase in the depth of the room provides some sitting space which has been seen in studies to be a useful asset in a multi-bedroom. This gives a room size of 6030 from window wall to corridor wall and 6500 between opposing bedhead walls.

Room Detail

If en suite sanitary facilities are provided, additional area for access is required in multi-bed rooms.

The standard measurement between bed centres (ie the width of each curtained cubicle) is 2400mm in two-bed and multi-bed rooms.

To allow the passage of beds, bedroom doors should allow a clear opening width of 1200mm when opening into a clear corridor width of 1800mm. An increased opening width is necessary if corridors are narrower.

Hinged doors of one and one half leaf or sliding doors are the most suitable.

Doors might not be required to multi-bed rooms.

The most satisfactory position for a fixed wardrobe is against the bed-head wall as far to the left of the patient as possible within the curtained cubicle. Recessed handles on lockers and wardrobe doors can be difficult to use.

The most convenient position for the wash hand basin in multi-bed rooms is a central location on the window wall; in single and conventional two-bed rooms a position near the corner remote from the bed-head and close to the window wall is preferred.

Bedhead Services

It is suggested that requirements be considered in relation to the following levels of provision.

Single bedrooms

* Bedhead panel: nurse call system
* Two 10-amp. power point
* Radio or TV earphones
* Bedhead light switch with cord extensions.
* Bedhead light
* Twin 10-amp. power points (additional to bedhead panel)
* Oxygen outlet
* Suction outlet
Multi-Bedrooms

* Bedhead panel per bed (as in single room above)
* Bedhead light
* Twin 10-amp. power points shared between every two beds (additional to those on the bedhead panel)
* Oxygen outlet
* Suction outlet shared between two beds

Bedhead Service Panel

This should be located to the patient's right. The usual wall fitting is remarkably difficult for a patient to reach, being behind the bed, but it is not easy to locate it more accessible for patient, and the nurse who commonly works on the patient's right, without running into problems in use and/or considerable expanse. Comprehensive hand sets have been found to be unhappy and vulnerable. The normal provision of a nurse-call button on an extension lead satisfactorily meets the one essential requirement of the immobile patient.

Bedhead Light

Bedhead lights of all kinds are constantly under development and care must be taken that the model selected clears orthopaedic frames and other bed attachments. They should be located on the centre line of the bed. The controls should be on the bedhead panel.

General Illumination

Sufficient lighting is required for general illumination, patient reading etc. For night attention a light source of reduced output is preferred at each bed. Night lights positioned low on walls, except in corridors, are not satisfactory.

Special Care Bedrooms

In cases where single and/or multi-bedrooms are allocated specifically for special care (eg a special care unit shared by two wards on one floor) the above recommendations would be varied as follows.

The sill level of corridor observation glazing should be lowered to 900 above the floor. It might be added that the glazing frequently thought necessary between adjacent special care bedrooms causes great difficulty in the proper location of bedhead services and in practice is less important than might have been thought.

Oxygen and suction outlets should be provided for each bed.

Isolation: if required, provide a single bedroom with en suite shower and W.C. plus a second entrance to the bedroom through a gawning lobby of 3m² with wash hand basin. Special conditions may apply to the ventilation of this suite.

W.C.

Provide one W.C. readily accessible to each multi-bed room, and one W.C. for four to six beds in single and two-bed rooms.

This is for use by able-bodied patients, and by those on walking aids or toilet chairs who need assistance.

There is a strong case for all W.C. compartments being big enough for assisted use, but not so big that it becomes difficult for a patient to reach grab rails.

It should be noted that this is where patients occasionally collapse or fail. Therefore wherever possible W.C. doors should open outwards. (See 5.6)

A wash hand basin should preferably be provided just outside the W.C. compartments rather than inside. (This wash hand basin is additional to those in cubicles referred to in paragraph 4.)
A W.C. sized to allow two assistants to help a patient transfer from chair positioned at right angles to the pan, or for paraplegic patients to use independently, may be provided. A W.C. in the bathroom can meet this requirement; otherwise one of the ward W.C.s should equate to the design described in NZS 4121.

Pans and pipework should be installed to allow toilet chairs to be positioned correctly over the pans.

The W.C. should be on the centre line of the compartment with a combination of vertical and horizontal grab rails both sides. The toilet roll and also the nurse call system should be located on the side wall by the front of the W.C. The grab rails should be located to suit the requirements of patients when sitting or standing. A coat hook should be fitted on the inside of the door. To help disabled patients the door should be self-closing with hinges or sliding with a gentle action. Handles affording a good grip should be fitted both sides of the door. Ventilation should receive careful consideration.

The advantage of relating W.C. compartments directly to each single and multi-bed room are discussed in paragraph 2. This should be achieved without prejudicing observation of patients from the corridor.

**Wash Hand Basin Cubicle**

Patients should have privacy in which to wash or carry out activities such as cleaning false teeth about which they might be sensitive. For this purpose a cubicle may be required, fitted with a curtain or door. It should be a minimum of 1000 wide and 900 deep from the lip of the basin to the curtain or door.

The requirements for each cubicle are: a shelf on each side of the basin, a mirror and light above, an electric razor socket, nurse call system located next the basin, two coat hooks, a stool and a rubbish bin. The basin should be fitted and the plumbing arranged to leave knee space for seated patients. The maximum water temperature should be controlled.

**Bathroom**

One bath in each ward may be required.

A room 3000 on the axis of the bath by 2300 wide gives sufficient space to manoeuvre patients on a wheelchair and assist them in the bath. The bath should project from the centre of one end wall and not boxed in so as to preclude the use of a patient lift. It should be fitted with hand grips which may incorporated in the edge of the bath. Portable steps and seat give the most versatile access for disabled patients. The nurse call system should be accessible from the bath. There should be a coathook and stool. Water temperature should be thermostatically controlled. The door should be openable from the outside. There should be a non-slip floor finish. The room should be warm.

It may be considered desirable to equip this room also with a wash hand basin and/or W.C. to increase its usefulness.
Showers

One shower for every six to eight beds, should be located for the convenience of patients. At least one shower should be in the same room as a W.C. and wash hand basin; alternatively, plan discreet access between adjacent shower and W.C. facilities.

A room of 1200mm by 1800mm, with no subdivision between wet and dry areas, will meet both assisted and unassisted patient use.

Allow a minimum fall of 1 in 80 from the entrance to a drainage channel at the opposite end of the room. If a shower waste is used in place of a channel, the wet area should have a minimum fall of 1 in 40 towards the outlet. Floor wastes and traps should be 50mm in diameter.

Horizontal non-slip handrails should be installed on the walls at 840mm from the floor.

Good ventilation is essential because of the intensity of use.

Unassisted

A cubicle 1800 x 900 is recommended closed by a door or an opaque curtain with a second curtain dividing the cubicle into two 900 sq. areas, wet and dry respectively. The shower fitting should be adjustable in height and directed diagonally into the wet area to avoid spillage into the dry area. Other requirements are: thermostatically controlled water temperature, shower controls accessible from the dry area without wetting the hands, a soap dish located under the taps, nurse call system beside the taps, and a tip-up seat fitted in the wet area (a circular shape being least likely to cause mishaps). In the dry area there should be a tip-up seat and a coat hook, both placed to avoid accidental wetting. There should be a non-slip floor finish and a hand rail extending through both areas. Good ventilation is important.

Assisted

This should consist of a cubicle 1500 deep x 1200 wide having a drained floor with no sill or other obstruction to wheelchair. It should be closed by an opaque curtain with a coat hook and shelf located just outside (in many cases in a dressing cubicle as illustrated). The shower fitting must be of the hand-held variety on a smooth, easily cleaned, flexible hose, the controls and soap dish being mid-way on one side of the compartment. Good ventilation is important. There should be a non-slip floor finish. The nurse call systems should be accessible from a wheelchair. Where assisted showers are provided they should be equipped with a stool and handrails.
Treatment Room

This room can be used for procedures with ambulant patients or those on a wheelchair or a bed. The area required is approximately that of a single room plus an area to park a plinth when not required. This amounts to a minimum size of 3500 x 3400. More than one door in a treatment room is not required as it reduces the effective room size and destroys privacy.

Furniture and equipment would comprise X-ray viewing box, piped oxygen and suction, an adjustable examination light, wash hand basin with lever-operated taps, a nurse call system, a plinth, and a chair. Good natural ventilation supplemented by an extract fan should be regarded as minimum provision.

Ward Kitchen/Pantry

The size and equipment of a ward kitchen depends on catering policies discussed in 2. If fully centralised catering is adopted it should be noted that the ward kitchen need only provide restricted facilities for casual beverages and possibly holding a hot meal for a patient.

A tea-bay of 1m² to 2m² may meet requirements, depending on the meal service system.

Dayrooms

One sitting room of 20m² should be provided in each ward.

Another sitting area might be wanted for smokers. This could be formed near the entrance to each ward or shared between adjacent wards as the design develops rather then from a specific allocation of space at the briefing stage.

Wheelchair Parking Bays

Toilet chairs and wheelchairs in daily use might be parked in cross corridors or alcoves, if available, as the design develops, or by specific allocation of bays of 1m² to 2m² each.

Cleaner's Room

A cleaner's sink installed at a low level with taps over it for filling buckets is usually required in each ward. This can be provided in a ventilated cupboard or similar space of 0.5m² if storage for equipment and trolley is available elsewhere. Otherwise a room of up to 3m² will be required.

Staff Facilities

Cloak Room and W.C.s: these will be required at the entrance to the ward or nearby. Consideration must be given to security requirements.

Tea Room: this provision will depend on local arrangements and the distance to the hospital cafeteria. A small room which is central to a group of wards could be suitable for this purpose.

Checklist for Schedule of Accommodation

This Schedule of Accommodation for a 30-bed acute general medical/surgical ward is presented as a checklist drawn from the above recommendations. It is not suggested that this is the only way of interpreting the recommendations. Factors determining room areas are detailed in the previous sections of this report.

Nurses's station
Sister's office
House surgeon's office
Preparation room (pillow and blanket cupboard adjacent)
Disposal room/Sluice (may be combined)
Equipment store
Patient's clothes and suitcase store
Parking for toilet and wheelchairs
Ward pantry and kitchen
1-bed room (W.C. attached) (6 No)
4-bed room, including sitting space (W.C. attached) (6 No)
Wash hand basin cubicles (1 per 8 patients)
Shower
Assisted shower
Bathroom
Treatment room
Dayroom
Public telephone booth
The following accommodation could be shared with another ward if planned as one ward floor. All of it would not be justified in an independent ward.

Ward Clerk / receptionist's station and waiting area
Supervising Sister's office
Consultants' office(s)
Interview/overnight stay room for relatives
Nurse's cloakroom
Staff toilets
Staff tea-room (unless central facilities are convenient)
Cleaner's room
General store cupboard
Teaching and research accommodation (if required)
(A kitchen or pantry can be shared if the two wards are closely integrated.)

A special care unit, shared between two wards, might comprise:

Nurses' station
Preparation room
Disposal/sluice room
Equipment store
1-bed room (4 No)
4-bed room (W.C. attached for optional intermediate care)

5 General Considerations

Fire

Attention is drawn to the standards for fire safety set by the Department, a basic principle of which is the division of patient areas to assist the containment of fire and smoke, and the provision of horizontal in preference to vertical escape routes to safe areas. See Code of Practice for Fire Protection in Hospitals.

Window Design

Excessive solar heat gain and glare are serious problems; orientation and/or sun control devices need careful consideration. This becomes increasingly difficult in deep rooms. Bedroom windows should allow patients sitting in chairs or in bed to see out comfortably, but should be designed to prevent injury, deliberate or accidental.

Observation

Effective patient care in divided wards requires a careful compromise between the needs of observation and privacy. It is important for nurses as they pursue their duties round the ward to be able to see patients readily, and this implies observation panels virtually the full width of patient rooms. This is also a great help to nurses when they are looking for each other. Furthermore it is re-assuring for patients to be able to see nurses going about their duties. On the other hand it is undesirable for patients to be placed in a position unduly exposed to all and sundry. Glazing from a sill level of 1300 above the floor to doorhead height has been found to offer a practical compromise. In special care areas where observation is more critical sill levels should be mattress height. It might be noted that corridor glazing to the nurse working rooms is also a convenience when this is practicable.

Nurse Call Systems

These should be fitted in any area used by patients - eg, bedrooms, day rooms, W.C.s, wash, shower and bathrooms, and treatment rooms. A low buzzer and a series of leading lights is required rather than relying solely on a central indicator panel which assumes the presence there of a nurse.

Noise

Noise can be especially disturbing to sick people in hospital wards where the materials used tend to make sound reverberate rather than dampen it down. Special attention should be directed at design stage to reducing and/or containing noise arising from impact, mechanical equipment and human activity. This factor may also dictate the choice of equipment at commissioning. Noise from the sluice room in particular can be reduced by the avoidance of steel clashing on steel. There is much to be said of closing doors to patients bedrooms at night rather than relying on doors to nurse working rooms containing the noise.
Doors

The need for all doors should be examined critically (witness the number of doors to nurse working rooms permanently jammed open). Those which are required should be high and wide enough for the passage of equipment. 1980 high by 1200 wide is a minimum size for openings for the passage of beds but mobile equipment may call for increased size. Regard should be paid to the obstruction caused by the swing of side hung doors and to their space requirements. In certain situations sliding doors or doors which fold flat through 180° may have advantages.

In small patient areas where a collapsed patient may prevent a door from opening inwards, hinged doors should either open out or be capable of being opened outwards when required. They should be able to be unlocked from the outside.

Doors should be so designed that they do not constitute a likely hazard to unseen persons in the line of door movement.

Circulation Areas

The mobility and greater size of modern hospital beds, particularly with various accessories, must be recognised in planning doors, rooms and circulation areas. 2300 is a minimum clear width to allow two modern hospital beds to pass. This may determine the width of corridors, particularly bearing in mind the space required to manoeuvre beds in and out of rooms. It excludes any allowance for handrails which may or may not be required.

A minimum clear width of 1800mm is recommended in corridors which will be used regularly by patients. This excludes any allowance for handrails.

The conventional low-level lights provide sufficient illumination in corridors during the night.

Handrails are relatively space consuming in small areas. Recommended minimum dimensions are for rails of 32mm diameter fixed 44mm clear of the finished wall to give some tolerance for possibly deformed hands.

As considerable weight can be put upon rails, fixing must be secure.

Protection from Damage

Effective buffers on mobile equipment are a better investment than attempts to render buildings damage-proof; however corners and door jambs still require protection.

Effective Room Sizes

Recommended dimensions should not be encroached upon by radiators, ducts and other intrusions for which additional space must be allowed.

When briefing many room sizes, it may be more appropriate to state minimum, and in some cases maximum, dimensions rather than room areas.

Storage

The amount of storage in ward areas must be assessed in terms of the anticipated pattern of supply. The type of storage should be made as flexible as possible to accommodate changing future usage, and as simple as possible in the interests of economy. Adjustable storage has many merits. Caution should be exercised in specifying storage requirements too tightly tailored to the presently known requirements.

Two or three cupboards, each taking up to 0.5m² of floor space, are required for pillows, paper goods and other back-up supplies.

An equipment room of up to 10m² is required for hardware such as bed accessories. A smaller size is recommended for holding a few essential pieces when the hospital or block of wards has a central equipment store.

A room of 4m² is generally required for holding patients' possessions.

Artificial Lighting

It is not proposed to lay down specific lighting levels, but attention is drawn to the following needs: -

General

There should be a gradation of lighting from patient's bedrooms to corridors and nurse work rooms so that nurses can go about their duties without preventing patients from sleeping or themselves being subjected to excessive contrast of light and dark.

Care should be taken to screen light sources including those in nurse work rooms and in corridors from direct patient view.

Lighting in Patient Bedrooms

As a basic level, nurses should be able to get a general impression of patients without necessarily going into rooms. The conventional low-level night lights do not give sufficient illumination at mattress level.
Borrowed light from masked corridor strip lighting has been used successfully where adjacent glazing conforms with the recommendation in paragraph 5, and the depth of patient bedrooms is not excessive.

In addition, general room lighting will be needed for normal evening use. This may be incorporated in bedhead fittings or be separately provided. It should be switched from the door.

**Lighting at Patient Beds**

The over-bed light gives normal illumination for patients to read, sew etc.

A light source of reduced output should be available at each bed for nurses to carry out regular checks of I.V. drips etc. with minimum disturbance to patients.

Brighter lighting for close examinations or emergency procedures may be provided from the bedhead light or by the use of a plug-in examination lamp.

**Wash Hand Basins**

Wash hand basins provided primarily for staff use should not have a plug overflow outlet, for bacteriological reasons. They should have horizontal elbow action taps with a mixing faucet which does not discharge directly above the outlet.

The word may be preceded by an adjective describing its use, eg bed-bay, wheelchair-bay.

**Cubicle**: a small space enclosed by partitions which frequently are not ceiling height.

**Nurse Work Rooms**

**Preparation Room**: a room used for storing clean and sterile supplies required for nursing and medical procedures, and for assembling them for use.

**Equipment Room**: a room for the storage of space-occupying equipment, eg bed accessories, which it is desired to keep within the ward.

**Disposal Room**: a room for the temporary holding of used items awaiting disposal, destruction or reprocessing, and for the cleaning of trolleys and equipment prior to returning to the Preparation or Equipment Room.

**Slitce Room**: a particular type of disposal room equipped for the disposal of body wastes.

**Treatment Room**: a room in ward used for the performance of certain medical and nursing activities which, in the absence of such a room would be performed at the bedside.

**Nurses' Station**: a point of reference. It is the place where nurses receive or read instructions, and record the results of their activities.

**Intensive Care**

**Patients**

Category 4 1-2% of total number of patients in acute wards of a hospital.

**Situation**

One unit for whole hospital (with some exception for highly specialised discipline).

**Admission and Discharge**

Usually medical decision.

**Equipment**

May be complex requiring technological assistance, eg monitors, ventilators.
Nursing Staff

Require special training, free interchange not possible.

Special Care

Patients

Category 3 (acute) 12-20% of patients in the average acute general medical and surgical ward.

Situation

Ward situation, preferably one such unit serving one or more wards if design permits.

Admission and Discharge

Usually nursing decision.

Equipment

Essentially normal ward equipment.

Nursing Staff

Usual ward staff with higher proportion registered nurses. Free interchange with intermediate care areas possible.

Methods of Study Used by the Design and Evaluation Unit

The nurse is used as the key to ward studies as the one person who is concerned with the entire ward and who makes use of all facilities. Patients are concerned with their immediate environment, i.e., the hospital bed and its surroundings, the position of the sanitary facilities and the day room. The medical staff are concerned primarily with the availability of the patient’s records, and any necessary equipment for use in the patient’s immediate surroundings. Visitors, and domestic and other staff using the ward have their own needs, but an understanding of the nurses’ requirements goes a long way towards effective planning.

The unit is interested particularly in sequences of activities, hence the necessity for continuous observation of each nurse. It is, for example, important in the matter of design if a nurse has to go to three different and separate supply points to collect material for one procedure. This differs slightly from time and motion studies which are concerned more with the time taken to carry out the procedure itself.

It is the importance of the sequence of events which leads to the necessity of a continuous 24-hour study. The situation regarding care of individual patients can be studied in the different circumstances of day and night. During the night hours critical situations from the design angle may well be shown up by the reduction of nursing staff during this period.

The total effect of 24-hour studies of a number of wards observed under various degrees of workload has been to produce a balanced picture of typical conditions. Any artificiality due to the presence of observers has been a constant and, in practice, negligible factor.

Technique of Study and Analysis

Study takes place over a 24-hour period commencing with the first shift of nurses in the morning. An observer is assigned to each nurse. In this way a pattern of nursing activity is built up, covering a 24-hour period. During the period of nurse observation, study is also made of the facilities available for patients, medical, and other staff, and a record is made of the supporting services such as food service, supply and disposal systems for linen, pharmaceutical and sterile supplies etc. The discipline of following a nurse throughout the period of duty has given each observer in the study team the opportunity to note numerous factors not necessarily relating to the nurse but with important function implications. Such factors include the practical consequences of various supply and disposal systems, lighting (both natural and artificial), noise, communication problems, and so on.

The results obtained from a study are analysed in a variety of ways. String diagrams are constructed in which each nurse is represented by a different coloured thread which traces movements throughout the time on duty. This process enables all members of the unit to study together the sequence of nursing activities over a 24-hour period. The string diagram illustrates the traffic flow and the areas of ward most used. It provides a measure of distance each nurse has travelled. The total distance travelled by nurses during the course of their duties is some, but by no means the only, indication of good or bad design.

Data used in compiling the string diagram is also recorded in the form of charts showing the number of journeys between specific points and the number of times each room is visited. Naturally these figures have to be interpreted with caution and with knowledge of the particular ward facilities and the circumstances prevailing at the time, e.g., the distribution of patients of varying degrees of nurse-dependency, the number of beds occupied, the categories of nursing staff available, and the type of work allocation used.
Standard Nursing Day

A sequel to the series of studies described above has been the development of a hypothetical nursing day, known as the standard nursing day. Devised by the Nurse member of the unit, this model comprises the regular nursing activities in a ward of male and female patients with a fixed percentage in each patient-nurse dependency category. Both medical and surgical nursing activities are taken for this purpose. These activities are traced on a string diagram in the same way as for actual observations. Excluded, of course, are the random movements such as going to answer the telephone or looking for the nurse with the drug cupboard keys. All wards studied by the unit have also had the standard day applied, in order to test its validity against the observed day. A reasonably constant relationship has emerged.

The standard nursing day is a useful tool in the functional assessment of any ward design. It can be used to assess sketch designs of new wards. The nursing day can be modified in accordance with varying supporting services, e.g., food service in wards may be carried out by dietary staff or by nursing staff, each requiring its own pattern of activity. An index can be obtained of the ability of the ward design to facilitate the delivery of nursing care in an efficient and economic manner. This of course, is only one aspect of ward design and other factors above to be studied also in the assessment of a new ward plan.