

Studies in the function and design  
of non-surgical hospital equipment

6

Design of medicine trolleys:  
guiding notes derived from trials  
of an experimental prototype.

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Report No. 6 by Kenneth M Agnew

Results of a design study undertaken to test problem analysis techniques in the hospital field. This was part of a study programme sponsored by the Nuffield Foundation. Preparation of the briefing and follow-up techniques was carried out by L Bruce Archer. The equipment was designed by Kenneth M Agnew.

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Prepared on behalf of the King Edward's Hospital Fund for London.

In November, 1962, a prototype medicine trolley was built in the Royal College of Art. This was done with the primary intent of testing a means of getting reliable specifications from hospital equipment users. This work was described in a Nuffield Foundation report entitled 'Studies in the function and design of non-surgical hospital equipment: Supplement to preliminary report, November, 1962'. The trolley is fully described and illustrated in that report.

This paper is an attempt to disseminate the experience gained from the prototype trials and evaluations, of which details follow:

1. St. George's Hospital, Hyde Park Corner, London, S.W.1  
Preliminary evaluation, 18 December, 1962. By matron and chief pharmacist.  
Trial, January until April, 1963. Trolley was in the hospital although not in continuous use for the whole period.
2. Royal College of Nursing, Research Discussion Group, residential weekend, 3 - 5 May, 1963.  
Trolley was demonstrated and discussed by the group which included senior nurses covering a large sector of the profession.
3. Whittington Hospital, Highgate Hill, London, N.19  
Trials in two wards during the period from mid May until the end of June.

The following data arises almost entirely from the sources described above and should be read in conjunction with Para 6 of the 'Supplement to the preliminary report'. The sub paragraph numbers correspond.

1. Compliance with Regulations and organisational requirements.  
A means should be provided of securing the trolley against physical removal between medicine rounds.
2. The capacity provided was not always adequate either for the Scheduled drugs or for other medicines.  
It is now thought that most requirements could be satisfied as follows:
  - 2.1 Scheduled drugs compartment, 90 to 100 square inches floor space, with a height of 9" with the alternative option of a total of about 140 square inches and smaller headroom. This might be

satisfied by a folding or removeable rack in the upper part of a compartment 8" deep by 12" wide and 9" high.

2.2 Other medicines. A floor area of up to 130 square inches, some of this to have a headroom of  $10\frac{1}{2}$ ". Again, a removeable rack or shelf over part of this area would undoubtedly be welcome in some hospitals.

There is an immense variety of types and sizes of medicine containers.

2.3 There must be work surface and storage area for medicine glasses, foil cups, water jug, etc. The area of 150 sq." provided was adequate although this was not always apparent due to the presence of containers crowded out of the medicine storage area.

The total of basic floor areas is thus

Scheduled drugs	100
Other medicines	130
Work and storage surface	150
	<hr/>
	380

3. The prototype has a lid equipped with a spring lock, which could at any time be closed in a single movement to cover both medicine compartments and the work surface. The lid when in motion cannot be obstructed by anything in the cabinet or on the work surface, and locks automatically.

Although the spring lock is useful in emergency, there is always the risk of locking the keys inside. New users in fact did this twice. It is now clear that the consequences could be more serious than thought previously and on the evidence it is now felt that an ordinary cabinet deadlock is more suitable.

The lid and the general security principle have been highly praised by the users and their suggestions for extra external shelves and work surfaces have in all cases been withdrawn after discussion.

The door of the inner compartment for Scheduled drugs is at times inconvenient in use since it must always partially cover at least one of the medicine storage areas. With an internal door there is only the choice between mechanical complexity and some degree of obstruction. This can be minimised by easy movement, light weight and transparent structure.

4. The prototype trolley was 18" square on plan and light in weight; the outlines were compact both with lid open and closed. As intended the trolley was in all cases wheeled to a point near the patient whether in bed or in the day-space, rather than being used as a central distribution point with numerous double journeys.

It is however too small (see 2) and it is suggested that the next standard plan size 18" x 24" would better answer general requirements, without a significant loss of mobility. It is felt that there is a definite upper limit on size for such trolleys since ward floor space is very much more obstructed than any study of plans will show, even with new hospitals.

5. 'Working area and layout calculated to aid speed and accuracy in identifying medicines, ascertaining dosages and measuring out doses'.

The working area level should be raised from 34" to 36" above the floor and the lower shelf should similarly be raised to 18".

Some users would welcome the availability of a small battery operated lamp as an optional extra to improve visibility inside the cabinet.

6. Internal surfaces comprise synthetic rubber<sup>①</sup>, perspex, and rigid PVC. External surfaces are cellulose and chromium. Cleaning is extremely easy with the exception of the noteholders which are covered in self adhesive PVC film which tends to peel.

7. The small, light, highly mobile trolley seemed at no time to be considered as an obstruction. There was no positive comment from the users.

8. The trolley is a medicine cupboard and has sometimes to be used at night, one user stated that the spring lock could be very noisy.

9. Resistance to tipping and jolting and breakage of glassware was good. The trolley has 4" dia solid rubber wheels and a cabinet lining of rubber. There was one breakage due to overcrowding.

10. There was general comment that the rigid lid and complete enclosure looked completely secure and thief proof.

11. The prototype has survived five months of hospital life with

slight damage to external paintwork.

13. Certain features could be cheapened without detriment but it is thought that a product with a sufficiently general application could be made in economic numbers. One might thus be justified in aiming above the minimal standards set by the small production runs current in the hospital equipment industry.

14. The trolley is easily identified by shape and no written identity seems to be required.

15. Appearance has been universally praised. One of the aims of the design was to enhance the status of what is described as one of the most boring of nursing routines. There is evidence in many fields to show that boredom is a cause of error.

It should be emphasised that these notes are intended as a guide to those responsible for buying or designing such equipment. There are some situations and needs that these recommendations will not cover.

As with the choice of any other piece of equipment it is essential that prospective users should formulate their needs in detail first.

- ① Manufacturer: Imperial Chemical Industries Limited, P.O. Box 19,  
Templar House, 81-87 High Holborn, London, W.C.1  
Material: 'Silcoaset 105'

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