In 1948, along with most other hospitals, the Dreadnought Seamen's Hospital was taken over to form part of the National Health Service.

The hospital today

A visitor to the ship *Dreadnought* once said in 1850 that "the hospital would be a good school for physiognomy." This is still true today, for the patients continue to come from all parts of the world. So do many nurses and doctors, who "double-up" as interpreters.

It is not sufficiently realised that hospitals for seafarers have particular problems. The shipping industry demands that a seaman should have a higher standard of health as he may be without the services of a doctor for long periods. There is also the problem of religion and food, and special diet sheets are prepared by the hospital's kitchen. From the welfare and employment point of view it is necessary to keep in constant contact with foreign embassies, consulates, and shipping agencies, as well as with the immigration authorities.

The hospital offers full general medical services, mainly for male patients, but stewardesses have also been seen in the respective wards. There are five wards dealing with medical conditions; general surgery; orthopaedic, ENT, and eye surgery; dentistry; and diseases of the skin. There is a special VD clinic, which has recently been extended to deal with female patients. There is also a "homeward-bound" unit. In 1973 a modern rehabilitation centre was opened, consisting of a remedial gymnasium, a physiotherapy and occupational therapy room, and also a billiard room. There are communal rooms and facilities for reading and writing. The bigger wards have colour television. The hospital will keep a seaman until he is fully fit to return to sea. The often complicated processes of administration and social work necessitate a system of "tidal priorities" to coincide and dovetail with shipping movements. At the Dreadnought the seafarer has the companionship of fellow seamen, and there is a good and understanding welfare department, which deals with anv personal problems a seafarer may have.

There is no waiting list at the Dreadnought Hospital. All patients are seen straight away and admitted when needed. Rather than hang about his town waiting to go to the local hospital a seafarer may be treated at the Dreadnought at once and return to sea that much quicker. If a seafarer is sick or injured abroad the shipping company or agent will, if necessary, arrange for his repatriation and flight back to England.

The Dreadnought Hospital has no shortage of sisters or nurses. Most of the staff have trained there and are used to seafarers' problems. Adjacent to the hospital is Nairne House, a Seamen's Hospital Society property, which provides accommodation for close relatives of seafarer patients from outside the London area who are seriously ill.

As long as there are ships sailing on the high seas there will be seafarers. At the Dreadnought Seamen's Hospital at Greenwich, where there is no rigid discipline as in other hospitals, the matron, sisters, nurses, and doctors can provide not only expert medical treatment but also social help and a human touch when needed.

Statistics at Square One

V—Populations and samples

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Populations

In statistics the term "population" has a slightly different meaning from the one given to it in ordinary speech. It need not refer only to people or to animate creatures—the population of Britain, for instance, or the dog population of London. Statisticians also speak of a population of objects, or events, or procedures, or observations, including such things as the quantity of lead in urine, visits to the doctor, or surgical operations. A population is thus an aggregate of creatures, things, cases, and so on. It also has several other properties besides this generality of meaning.

Though a statistician should clearly define the population he is dealing with, he may not be able to enumerate it exactly. For instance, in ordinary usage the population of England denotes the number of people within England's boundaries, perhaps as enumerated at a census. But a physician might embark on a study to try to answer the question, What is the average systolic blood pressure of Englishmen aged 40-59? His population here is Englishmen. Who are they? Not all Englishmen live in England, and of those that do the social and genetic background may vary. Or a surgeon may study the effects of two alternative operations for gastric ulcer. But how old are the patients? What sex are they? How severe is their disease? Where do they live? And so on. The reader needs precise information on such matters if he is to draw valid inferences from the sample that was studied to the population being considered.

Samples

Since a population commonly contains too many individuals to study conveniently, an investigation is often restricted to one or more samples drawn from it. A sample may therefore, like a population, consist of immaterial and abstract things as well as creatures and objects. But, to allow true inferences to be made about a population from study of a sample, the relation between the sample and the population must be such as to make that possible.

Consequently, the first important attribute of a sample is that every individual in the population from which it is drawn

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must have a known chance of being included in it; a natural suggestion is that these chances should be equal. To ensure this we make the choice by means of a process in which chance alone operates, such as spinning a coin or, more usually, the use of a table of random numbers. These may be consulted in several publications.[1-3] A sample so chosen is called a *random sample*. Thus the word "random" does not describe the sample as such but the way it is selected.

To draw a satisfactory sample sometimes presents greater problems than to analyse statistically the observations made on it. A full discussion of the topic is beyond the scope of this article, but invaluable guidance is readily available.[1 2 4] Here only an introduction is offered.

Before drawing a sample the investigator should define the population from which it is to come. Sometimes he can completely enumerate its members before he begins his analysis—for example, all the livers he has studied at necropsy over the previous year, all the patients aged 20-44 admitted to hospital with perforated peptic ulcer in the previous 20 months. In retrospective studies of this kind numbers can be allotted serially from any point in the table to each patient or specimen. Then a sample may be drawn by taking every even number, for instance, or every number ending in 2 or 5, and so on.

In prospective studies to be carried out on observations to be made in the future it is important to begin by defining a limit to the making of the observations. For example, a surgeon might draw one or more samples from the next 100 cases of acute appendicitis to be admitted to hospital or a general practitioner might draw one from all the cases of iron-deficiency anaemia to be seen during the next 12 months in his surgery. In studies of this kind every patient eligible for admission to the study is allotted serially a number from the table of random numbers. He is then actually admitted to the study, and perhaps assigned to one or another group within it, in accordance with a predetermined plan for using the random numbers. For example, all patients with even numbers might receive a new treatment, all patients with odd numbers receive a standard treatment.

The use of random numbers in this way is generally preferable, unless the population is very large, to taking every alternate patient or every fifth specimen or acting on some such regular plan. The regularity of the plan can occasionally coincide by chance with some unforeseen regularity in the presentation of the material for study—for example, by hospital appointments being made for patients from certain practices on certain days of the week, or specimens being prepared in batches in accordance with some schedule.

Since susceptibility to disease generally varies in relation to age, sex, occupation, family history, exposure to risk, inoculation state, country lived in or visited, and many other genetic or environmental factors, it is advisable to examine samples when drawn to see whether they are, on the average, comparable in these respects. The random process of selection is intended to make them so, but sometimes it can by chance lead to disparities between samples. To reduce the chance of some disparities the sampling may be stratified. This means that a framework is laid down initially, and the patients or objects of study are then allotted by a random process to the compartments of the framework. For instance, the framework might have a primary division into males and females and then a secondary division of each of those categories into five age groups, the result being a framework with 10 compartments. It is then important to bear in mind that the distributions of the categories in two samples made up on such a framework may be truly comparable, but they do not reflect the distribution of these categories in the population from which the sample is drawn unless the compartments in the framework have been designed with that in mind. For instance, equal numbers might be admitted to the male and female categories, but males and females are not equally numerous in the general population, and their relative proportions in it vary with age.

Not a random sample

It is now convenient to consider another problem arising from Dr Green's studies. His sample of 15 children had a mean urinary lead concentration of 1·5 μmol/24 h. Can he generalise from this and say anything valid about the whole 140 children's urinary lead concentration? The answer is No. The 15 children were all the children in one street. Children living in other streets of the housing estate had no chance of inclusion in the sample, so it is not a random sample of those 140 children. The mean of 1·5 μmol/24 h found for the 15 children therefore does not indicate what the mean of the whole population of 140 children may be. The population mean was in fact 2·18, and the sample mean in this case cannot be validly compared with it. Moreover, the 15 children were included in the 140, so if their mean urinary lead concentration is included in the mean for the 140, the observations derived from the 15 are counted twice. This also complicates any comparison Dr Green might try to make between the two sets of data.

References

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3 Hill, A B, *Principles of Medical Statistics*, 9th edn. London, Lancet, 1971.
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If a perfectly fit child of 6 months comes for the first triple injection and (a) *either parent has hay fever, asthma, or eczema or* (b) *the child had a convulsion at 3 months during an acute febrile illness but has been quite well since, are these contraindications?*

There is no evidence that a family history of hay fever, asthma, or eczema necessitates withholding pertussis vaccine. As the incidence of atopy in first degree relatives is high (about 15% of children could be expected to give such a family history), any relationship between serious side effects of the vaccine and family atopy would be apparent by now. Whooping cough remains a dangerous disease, and to withhold effective protection from such a large group of children would be hazardous both for the individuals and for the community. A history of a convulsion or neurological disorder constitutes the only clear contraindication to pertussis vaccine. This is especially true for convulsions occurring before 6 months, as at this age simple febrile convulsions are rare and any convulsive episode is more likely to be associated with serious or continuing neurological disturbance. The evidence for regarding the risk of pertussis vaccine to such children as being greater than the risk of whooping cough is incomplete and controversial; but, at least until the results of a recently mounted DHSS study become available, it seems wise to observe this officially recommended contraindication.

Some young children run high temperatures when they get an infection. What antipyretics are safe?

I have never prescribed an antipyretic myself as I think there is nothing better than tepid sponging: but normally if a doctor feels the urge to give a medicine, he would prescribe aspirin or possibly paracetamol. I have no experience of mefenamic acid, which was said by Weiss *et al*[1] to be as effective as aspirin in a dose of 6·5 mg/kg. Having checked several paediatric textbooks I can find little enthusiasm for antipyretic drugs, and I suggest (as I always have done) that tepid water is the cheapest, safest, and most effective material to use, with a notable absence of side effects.

1 Weiss, C F, *et al*, *Journal of Pediatrics*, 1968, **72**, 867.