

## TO BE TAKEN AS DIRECTED

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**M**ANY medical practitioners suspect that the drugs which they prescribe are often taken in doses and at intervals which are decided arbitrarily by the patients, rather than in accordance with the doctors' instructions. Awareness of this disturbing fact increases with experience. In many cases where treatment appears to have failed, the fault lies in the mode of administration rather than in the drug itself. It follows that, in many of the illnesses treated at home, the need is for increased simplicity of administration rather than for newer and better drugs. It might well be that in cases where this is feasible, a once daily scheme of dosage would be useful; this might apply to many drugs traditionally given in divided doses. Often a delayed-action preparation would be required.

In theory, the ideal would be administration by the doctor or under his supervision but this is not normally practicable. Some forms of calendar pack seem to be successful in the dispensing of many oral contraceptives and might be extended to a wider range of tablets if these can be taken once-a-day. This might be worth consideration by the pharmaceutical companies.

Failure to take tablets correctly seems commonest when frequent doses are prescribed. In particular, patients seem to become confused by more than three daily doses. It is the aim of this survey to investigate the relationship between the dosage frequency and the degree of failure to comply with the doctor's instructions. Unreliability is best demonstrated with tablets. Often when a patient is prescribed a sufficient course of treatment, on re-attendance he admits that a number remain. This may vary from one or two to most of the bottle. He may insist that he has not missed doses and when he is shown that too many tablets are left he is likely to propose that more were dispensed than were prescribed, or he may admit to having forgotten 'one or two'. The latter explanation is likely to be an understatement.

### Previous reports

Other workers have investigated patients' degree of faithfulness in taking drugs. Bergman and Werner (1963) studied children who

were given 10-day courses of oral penicillin in thrice daily doses. They found that after six days 71 per cent had stopped treatment altogether.

Difficulties were experienced by Jenkins (1954) because of suspicion of free drugs by patients accustomed to paying for them. His patients were selected by including only those thought to be sufficiently reliable to keep an appointment. Out of 30 patients, only 22 completed the course and of these, 18 had taken less than 60 per cent of the tablets. On the other hand, Porter (1966) found that 17 out of 22 patients took their treatment more or less as prescribed. His patients also were selected, all being on antidepressive drugs. Schwartz and his colleagues (1962) studied 220 elderly patients and found that 60 per cent made some error, most often omission of doses. It has been suggested (*Drug and therapeutic bulletin* 1965) that we ask too much of our patients and that poor communication is also partly responsible.

### Scope of investigation

The survey was carried out in a single-handed practice almost entirely situated on an 'overspill' housing estate. There is an excess of social classes IV and V and many young families, with correspondingly less elderly patients. A full appointment system is operated.

All prescriptions were for tablets or capsules. Children, usually being given liquid preparations, were largely excluded. Although only solid forms were investigated on account of the ease of checking, it is thought that liquid medicines are taken even less reliably.

### Methods

Records were kept of all prescriptions for courses of tablets lasting from one to four weeks given to patients thought to require a further appointment. A note was made of the date of issue, the patient's name, and the diagnosis. Particulars of tablets recorded were the name and dose, the number of daily doses, the duration of the course, and the number prescribed. In most cases an excess of tablets was given. A re-appointment was arranged immediately after the expected termination of the course and patients were requested to bring any remaining tablets in the container in which they were dispensed. To avoid arousing suspicion, no explanation was given for this request unless the patients asked. The few who enquired appeared to accept the explanation that a check was being made on the containers. At the re-attendance the date of starting to take the tablets was noted and the number remaining was counted. Allowance was made for the date of commencement and for any excess prescribed. The number of tablets taken was worked out as a per-

centage of the number estimated to complete the course after allowing for any delay in starting. Patients who admitted stopping treatment for any reason were excluded from the survey as were those who confessed to errors in doses. Thus, all patients included claimed that they had faithfully followed instructions.

### Results and discussion

The survey started with 111 patients. Twenty-two failed to keep their next appointment, one kept the appointment but failed to bring his tablets, and two admitted to laxity in administration. The remaining 86 patients claimed to have taken their tablets as directed.

The dose and duration of courses are shown in table I.

TABLE I  
DOSAGE AND DURATION OF COURSES—86 CASES

Duration	Dose					
	1 die	1 bd.	1 tds.	1 qds.	2 qds.	Total
1 week ..	2	2	15	37	8	64
2 week ..	0	1	12	0	0	13
4 week ..	1	3	5	0	0	9
Total ..	3	6	32	37	8	86

It will be noticed that there are a large number of qds. doses in one week courses. Most of these are for antibiotics in acute infections.

*Overall results.* The overall results for all the items investigated are shown in table II. To allow for small variations in the time of starting treatment, accurate administration was regarded as the taking of 95–105 per cent of the estimated full number of tablets.

It is seen that only one third of patients took the correct dose and that nearly 60 per cent took too few. Less than ten per cent took too many.

*Influence of dosage.* When the above results were analysed according to the prescribed dosage frequency, some interesting variations emerged. These are shown in table III.

Table III shows a clear relationship between accuracy of admin-

TABLE II  
OVERALL RESULTS

Percentage of tablets taken	No. of patients
Under 50	6 (6.9)
50–69	7 (8.1)
70–94	37 (43.2)
95–105	29 (33.7)
Over 105	7 (8.1)

istration and number of doses in the day. With one daily dose 66.7 per cent of patients took the tablets as prescribed. This number fell when more doses were supposed to be taken. With twice daily doses it was only 50 per cent and when the dose was four times daily only 21.6 per cent of patients were reliable. The latter figure was almost unaltered (25 per cent) when the dose was two tablets four times daily.

TABLE III  
INFLUENCE OF DOSAGE

<i>Percentage of tablets taken</i>	<i>Dose</i>				
	<i>1 die</i>	<i>1 bd.</i>	<i>1 tds.</i>	<i>1 qds.</i>	<i>2 qds.</i>
<i>Under 50</i> ..	1 (33.3)	0	2 (6.3)	1 (2.7)	2 (25.0)
<i>50-69</i> ..	0	0	2 (6.3)	4 (10.8)	1 (12.5)
<i>70-94</i> ..	0	3 (50.0)	10 (31.2)	21 (56.8)	3 (37.5)
<i>95-105</i> ..	2 (66.7)	3 (50.0)	14 (43.7)	8 (21.6)	2 (25.0)
<i>Over 105</i> ..	0	0	4 (12.5)	3 (8.1)	0
<b>Total</b> ..	<b>3 (100.0)</b>	<b>6 (100.0)</b>	<b>32 (100.0)</b>	<b>37 (100.0)</b>	<b>8 (100.0)</b>

Considering under-administration alone, this occurred more than twice as often with four daily doses as with one. With the fairly common scheme of two tablets four times daily which is used, for example, in the treatment of urinary tract infections with sulphonamides or nalidixic acid, three quarters of the patients failed to take the full course.

These results are shown in a simplified form in table IV.

TABLE IV

<i>Tablets taken (per cent)</i>	<i>Dose</i>				
	<i>1 die</i>	<i>1 bd.</i>	<i>1 tds.</i>	<i>1 qds.</i>	<i>2 qds.</i>
<i>Too many</i> ..	0	0	12.5	8	0
<i>Correct</i> ..	67	50	44	22	25
<i>Too few</i> ..	33	50	44	69	75

Although reliability of dosage is seen to be poor in all cases, it is significant that where four times daily doses are prescribed, the probability of accurate administration appeared to be only one half that found in the traditional dose of "three times a day after meals". For some reason, qds. doses are very confusing to patients. This is unfortunate as it is the mode of prescription of most oral antibiotics. It is hard to imagine what happens when more complicated dosage

schemes are employed; for example, reducing doses of steroid hormones.

These results seem to suggest strongly that treatment should be given once daily wherever possible and that qds. doses, in particular, should be avoided if there is any alternative.

*Influence of length of course.* The effect of the duration of the course of treatment on the reliability of administration is shown in table V.

TABLE V  
INFLUENCE OF DURATION OF COURSE

Percentage of tablets taken	Duration of course		
	1 week	2 weeks	4 weeks
Under 50 .. ..	6 (9.4)	0	0
50-69 .. ..	6 (9.4)	0	1 (11.1)
70-94 .. ..	30 (46.8)	5 (38.4)	2 (22.2)
95-105 .. ..	16 (25.0)	7 (53.9)	6 (66.7)
Over 105 .. ..	6 (9.4)	1 (7.7)	0
Total .. ..	64 (100.0)	13 (100.0)	9 (100.0)

Because of the relatively few patients taking courses lasting more than one week it is difficult to know how much significance to attach to the above results. They do suggest, however, that patients on longer courses of treatment take their tablets more conscientiously than do those on short courses. This may be due to the former being mainly chronically-ill patients on regular medication. They have often become accustomed to taking regular treatment over a period of years and, in addition, they may be suffering from illnesses giving rise to troublesome symptoms. Thus, they may be constantly reminded of the need for treatment. Patients taking, for example, a short course of an antibiotic for acute infection are in an entirely different position. After a few days the symptoms subside and the need to complete the treatment is forgotten.

No attempt has been made in this survey to ascertain whether failure to take all the tablets is due to forgetting some of the doses or to terminating the course too soon. It is likely that both factors usually operate together, the number of daily doses diminishing as time passes until finally all are missed.

*Gross under-administration.* The problems of patients who take very few of their tablets may well be quite different and has not been shown to bear such a close relationship to dosage frequency. This is particularly apparent on consideration of the very few patients who took less than half of the tablets. Whether this is due to antipathy

to treatment, to gross indifference or to memory lapses, it is difficult to know how such patients can be helped as they are likely to fail to co-operate in other respects.

### Summary

A study has been made of 86 unselected patients given courses of drugs in different doses. The degree of reliability of administration was found to be in inverse proportion to the frequency of dosage. With a dose of one tablet daily, one third of the patients took too few tablets and this number was doubled when tablets were prescribed four times daily. Patients on long term therapy appear to be more reliable than acutely-ill patients taking short courses. Once daily doses are to be preferred wherever possible; in particular an attempt should be made to avoid prescribing tablets four times a day.

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### REFERENCES

- Bergman, A. B., *et al.* (1963). *New. Engl. J. Med.*, **268**, 1334.  
*Drug and Therapeutic Bulletin* (1965), **3**, 31.  
 Jenkins, B. W. (1954). *G.P.*, **9**, 66-9.  
 Porter, A. M. V. (1966). *Brit. med. J.*, **1**, 1301.  
 Schwartz, D., *et al.* (1962). *Amer. J. publ. Hlth*, **52**, 2018.

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### General-practitioner hospital beds: Report on a general-practitioner bed unit.

B. R. WILLIAMSON, M.B., B.S., D.Obst.R.C.O.G. *Brit. med. J.* 1968. **1**, 436.

An 'experimental' general-practitioner unit consisting of six male and six female beds was opened in the East Birmingham Hospital in September 1964. Seventy-eight local doctors opted for the scheme; 36 of them have used it regularly. Admissions are confined to acute medical cases with a limit of three weeks' stay per patient. In three years 656 patients have been admitted, 445 of whom would probably have occupied a specialist bed but for the existence of the unit. Specialist consultation and access to pathology, x-ray and ECG departments are readily available. It is suggested that such a scheme if extended could prove an important stimulus to general practice, and attract doctors who are keen to make the most of their clinical abilities.