concluded that the clinical success rate is not related to the alarms' speed of response to urination.

Discussion

With regard to the technical performance of the commonly used alarm systems studied, none of the alarms in the trial deviated to any substantial extent in their construction or performance from the safety code governing their use (British Standard 5724, Safety of Medical Equipment Part I; and specifically in relation to the Department of Health and Social Security Enuresis Alarm Performance specification, RE/1004/03). No child had 'buzzer ulcers'. Only one unit—an accessory unit, the Silent Wakener—was considered too poor in design to be recommended for purchase. This is an optional accessory provided with the Headingley alarm. It is a vibrator in a 'flying saucer' shaped container which is placed under the patient's pillow in the hope that fewer members of the household will be disturbed when the child wakes up. This hope was not fulfilled in our experience and although it was effective in waking patients, the internal battery was over worked and replacement was a 'fiddly' process. It is stressed, however, that the Headingley alarm itself is extremely well constructed; good clinical results were achieved, but as with the other alarms, the number of patients using the alarm were too few to allow any definite conclusion in relation to clinical performance. If parental attitudes are taken into account, however, the Eastleigh and Urilarm De-Luxe models had distinct advantages in respect of false alarms, breakdowns, and durability of mats. These are the factors most likely to maintain enthusiasm in the use of the conditioning apparatus. Confidence in the reliability of the apparatus was an important factor in retaining cooperation of the parents.

In our series an initial arrest of bed wetting in 45 children (45%) was disappointingly low, as other trials have reported an initial success rate of approximately 70%.

Nine of the 45 children, (20%) subsequently relapsed within six months of stopping the conditioning treatment. Relapsers and non-responders were not offered a second course of conditioning treatment. It would be inappropriate to use the clinical success rate achieved by each type of alarm as the solitary criterion for a 'best buy' selection because only a small number of children were allocated to each alarm. Furthermore, certain factors such as social conditions and the psychological state of the child were not taken into consideration.

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Commentary

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Those treating children with enuresis are likely to achieve the best results if they accustom themselves to one or two types of enuresis alarm only. In that way they become expert with the equipment and can arrange for satisfactory spares and servicing. Using nine different alarms during the same period must have been difficult for the Glasgow workers, which is perhaps why the overall success rate was lower than that reported for clinics using only one or two types of alarm.

The comparisons are limited to alarms which use a wet detector pad or mat on which the child sleeps, connected to an alarm near the bed. There are available now small wet detector strips which may be attached to the child's pants and connected to an alarm which is either pinned to the shoulder or worn on the wrist (like a watch). It is not known, however, whether this newer type of alarm is as effective as one which the child can only silence by getting out of bed to switch off.

Although the small numbers of children using each type of alarm prevent a strict comparison of efficiency in relation to treatment outcome, nevertheless, the Glasgow workers and the parents involved end up with clear preferences. Readers accustomed to using enuresis alarms will not be surprised to learn that sturdiness and reliability emerge as the paramount needs. Such reliability is even more imperative when alarms are owned by a
Evaluation of nine different types of enuresis alarms

Clinic which loans them out for periods to successive families. Unfortunately, much of the equipment available at the moment does not stand up to this sort of heavy wear. Alarm faults are common, and broken connections at the mat lead junction particularly common. Durable detector mats are essential also, since children using an enuresis alarm are likely to use it for anything between three and six months. During that time the detector mats will receive many soakings which is why the aluminium foil type mats are found to have a short life—they disintegrate into a pulpy mess. (My record is of a boy who dissolved 12 such mats within three weeks).

Until now systems incorporating a single detector mat have not been as sturdy as twin wire mesh mats. Plastic mats overlain with a printed circuit are now available, however, and if they are found to have a long life they could be of considerable benefit because they will be easier to use than a system comprising two mats.

There have been previous studies of the effect of differing alarm intensities. Usually, there does not seem to be much difference, which is surprising in terms of learning theory since a loud noise would be expected to lead to more rapid acquisition of the conditioned response. One study did suggest that a 105 dB bell was more effective for 'slow responders' than an 80 dB bell but no different for the child who was going to respond quickly anyway. Regardless of the intensity of the bell itself, there are various manoeuvres which can be used to alter its quality and ability to rouse, such as putting it on top of an empty biscuit tin to increase resonance, or putting it under a tin containing small objects which rattle when the bell sounds. Twenty years age a few mild cases of scalded skin (buzzer ulcers) resulted from design faults in the early equipment. Ministry of Health regulations were introduced in 1968 and rapidly the manufacturers produced machines that were entirely safe. It would be helpful if some of the alarm manufacturers would act again with speed and efficiency in modifying their alarms to make them more reliable and suitable for extended use by clinics. Enuresis alarms are an excellent treatment for most children over the age of 7 who wet the bed and it is a pity that many families become disenchanted with the treatment too early, because of poor equipment.

References