Comment

With all three tests for occult blood about 36% of the negative results obtained were falsely negative. This high proportion of false-negative results is not surprising, since the tests were not used under optimal conditions³: they were not repeated and no restrictions were placed on diet. A discrepancy in the results obtained with the three methods was noted. The Fecatest produced a large number of positive results, of which nearly half were falsely positive. Fecatest is highly sensitive, probably due to the method of preparing and preserving these test kits.⁴

Screening a large population for faecal occult blood using the above tests, especially Fecatest, would necessarily entail a costly and time-consuming commitment to rectocolonoscopy or x-ray studies, or both, owing to the excessive number of false-positive results obtained. This would therefore compromise the implied simplicity of a massive screening protocol and defeat the purpose of such testing.

¹ Greigor DH. Occult blood testing for detection of asymptomatic colon cancer. *Cancer* 1971;28:131-4.

² Heinrich HC. Occult blood tests. *Lancet* 1980;ii:822-3.

³ Winawer SJ, Sherlock P, Schottenfeld D, Miller DG. Screening for colon cancer. *Gastroenterology* 1976;70:783-9.

⁴ Adlercreutz H, Liewendahl K, Virkola P. Evaluation of Fecatest, a new guaiac test for occult blood in faeces. *Clin Chem* 1978;24:756-61.

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Multiple use of ordinary disposable syringes for insulin injections

In a developing country such as Nigeria many insulin-dependent diabetics find the use of specially designed glass and plastic insulin syringes expensive and not easily available for purchase, unlike the ordinary multipurpose 2 or 2.5 ml disposable plastic syringes.¹ After finding that many diabetics were repeatedly using the same ordinary disposable syringe and needle because of difficulty in obtaining insulin syringes we encouraged them to continue with this practice and for many years have not observed any adverse effects.¹ We undertook this study to find out whether this practice is indeed safe, bearing in mind that some Nigerian diabetics, particularly those from rural areas, do not have refrigerators for storing syringes and needles.

Patients, methods, and results

Twenty-one insulin-dependent Nigerian diabetics consented to take part in this study. Each was given either a 2 or 2.5 ml ordinary disposable syringe and needle to be used repeatedly for their insulin injections. They continued with their usual dose of insulin (daily insulin zinc suspension lente) but were taught how to measure the dose in the new syringes. All were given 40-strength insulins (40 units). Each syringe had 10 markings per ml: 1 ml of insulin in the syringe was equal to 40 units of insulin and each mark therefore equal to four units of insulin.

Patients were seen at weekly intervals for a month and thereafter monthly for six months and were told to bring their syringes, needles, and insulin to every clinic visit. At each visit the sites of the injections were inspected and the patient asked about any difficulties with the new technique. At three and six months samples were taken from the injection sites using premoistened swabs and cultured. Each swab was inoculated on to two blood agar plates, one being incubated aerobically and the other anaerobically for 24-48 hours at 37°C. The swab was also inoculated on to Robertson's cooked-meat medium and incubated for 24 hours before subculturing on to two blood agar plates, which were then incubated aerobically and anaerobically. In addition, a small quantity of the insulin in use was sucked into the syringe being used at that time with the needle also in use and cultured by streaking on (i) two blood agar plates incubated aerobically

and anaerobically for a minimum of seven days and inoculating on to (ii) brain-heart infusion broth and (iii) Robertson's cooked-meat broth. Incubation time for (ii) and (iii) was seven days at 37°C before subcultures were made on to blood agar plates, which were then incubated aerobically and anaerobically for 48 hours.

When the syringe became disfigured or the markings started to disappear it was changed. The needles were changed as often as they became blunt. For home storage patients were told that after each injection they should carefully recap the needle and place the syringe with needle attached into its packet and then store it dry with the bottle of insulin in a clean container covered with a lid. The patients were asked to report immediately if any tenderness, swelling, or redness occurred at the site of injections.

Duration of use of a syringe varied from seven to 49 days, and for a needle from three to nine days. The total number of insulin injections in this study was 1890. The table shows the average durations of use of the syringes and needles.

All patients expressed general satisfaction with the new technique. No deterioration in diabetic control was noted. Only one patient complained of soreness at the site of injection, but no local inflammation was seen in any patient. Skin swabs taken from the injection sites yielded no pathogens except on one occasion, when a heavy growth of *Staphylococcus aureus* was isolated from a patient who had an infection of the pulp of one of his fingers, caused by this organism. On three occasions normal flora—namely, *Staph epidermidis*—was recovered. Culture of the insulin solutions used yielded no pathogens.

Average duration of use (number of days) of disposable syringes and needles

Case No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Mean
Syringes	9	22	30	28	15	21	29	38	42	18	45	36	29	16	22	30	34	14	19	32	26	26.4
Needles	4	5	4	6	6	4	5	6	8	3	8	7	6	6	5	8	4	5	6	8	5	5.7

Comment

Some authors^{2,3} have found no bacteriological risk in the repeated use of plastic disposable insulin syringes and needles stored in refrigerators. We found that, although refrigerators were not used for storage, the cheap ordinary 2 or 2.5 ml disposable syringes can be safely used repeatedly by the same person without adverse reactions or risk of infection. Provided the syringes and needles are stored dry the risk of infections, particularly with mycobacteria,⁴ appears low. Furthermore, the additives (0.15% metacresol and 0.06% phenol) to insulin may inhibit up to 10⁶ colony-forming units of *Staph aureus*, even when incubated at room temperature.³ This value greatly exceeds what occurs naturally as contamination, even with uncleaned human skin. Measuring an insulin dose with the 2 or 2.5 ml ordinary syringe is simple provided there are up to 10 marks in a millilitre and insulin strengths of 40 U are used. With higher strengths finer adjustments of dose may be difficult.

Variable deterioration (82-97% of normal) in potency has been found in insulin kept for three months at 36°C.⁵ We therefore usually prescribe not more than two months' supply of insulin at a time, thus minimising deterioration.

We must emphasise that the technique used in this study is to be recommended only to diabetics who cannot afford or be provided with the usual insulin syringes and needles, and who have no refrigerators for storage at their disposal. Such situations are usually found in developing countries, particularly in the rural areas. From this study the bacteriological risk of this technique appears very small.

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³ Hodge RH Jr, Krongaard L, Sande MA, Kaiser DL. Multiple use of disposable insulin syringe-needle units. *JAMA* 1980;244:266-7.

⁴ Jackson PG, Keen H, Noble CJ, Simmons NA. Injection abscesses in a diabetic due to *Mycobacterium chelonae* var abscessus. *Br Med J* 1980;281:1105-6.

⁵ Stephenson NR, Romans RG. Thermal stability of insulin made from zinc insulin crystals. *J Pharm Pharmacol* 1960;12:372-3.

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