ruling out the presence of bony secondaries, confirming the indication for primary surgical treatment. Whole-body bone scanning is easy to perform, non-invasive in nature, takes 30 minutes of the patient's time, and costs approximately £6. It should be routinely performed in the staging of carcinoma of the bronchus.

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Bacteriology of abscesses of the CNS

SIR,—I should like to point out what seems to me to be a misleading impression from a recent article (15 October, p 981). The bacteriology of abscesses in the central nervous system is a *sine qua non* with regard to the appropriate antibiotic therapy. However, the two main causes of the high mortality in surgically treatable intracranial abscesses remain—namely, (1) delay in diagnosis and (2) failure of accurate localisation.^{1,2} Enthusiasm for early diagnosis may be dampened by accepting a pessimistic outlook from the start. It is important to emphasise from the point of view of the physician who has primary care of patients suspected of having an intracranial abscess that by computerised tomography an early diagnosis is possible as well as accurate localisation.^{3,4}

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- ¹ Jefferson, A. A. and Keogh, A. J. *Quarterly Journal of Medicine*, 1977, **46**, 389.
² Shaw, M. D. M. and Russell, J. A. *Journal of Neurology, Neurosurgery and Psychiatry*, 1977, **40**, 214.
³ Keogh, A. J. and Berrington, N. A. in preparation.
⁴ Keogh, A. J. paper read at meeting of Nederlandse Vereniging van Neurochirurgen and Society of British Neurological Surgeons, Amsterdam, 1976.

Surveillance of reactions to new medicines

SIR,—The article by Dr A. B. Wilson (15 October, p 1001) discusses various proposals for monitoring new drugs and makes a new proposal that may overcome the shortcomings of the others. Both the medical profession and the pharmaceutical industry are looking for a method to achieve safer use of drugs. One characteristic of all the suggestions made so far is that they meet the authors' requirements but generally at someone else's expense (for example, the patient or the doctor or the pharmacist or the Prescription Pricing Authority). In designing any kind of system it is sensible to start by identifying the requirements to be satisfied. May I suggest the following:

(1) To maximise the patient's probability of recovery—this implies that once a product is licensed its availability should not be restricted by fear of the unknown; (2) to make the doctor aware of foreseeable adverse reactions at the time he prescribes the drug, so that he can act responsibly and rationally; (3) to detect adverse reactions that may occur infrequently; (4) to quantify the extent of such adverse reactions; (5) to provide a means to contact patients who may be at risk; (6) to minimise the additional work and cost for all concerned.

Work has already been done by Dr R. A. Johnson² and at the Queen Elizabeth Hospital, Birmingham, to find ways of warning the doctor before he prescribes a risky drug. Both approaches involve checking the characteristics of the drug against a systematic record of the patient's medical history. A useful further step would be to record symptom information together with the normal prescription details at the time that the prescription is prepared. In this way requirements 3, 4, and 5 above could all be achieved. The symptoms are known to the doctor at the time of prescribing so why throw away this information? The approach is applicable to both new and existing drugs, so matched cohorts would be available for analysis. Doctors' names and addresses and a means to identify their patients would be on file for rapid contact and monitoring. Modern technology can provide simple and relatively cheap ways of doing this.

The final requirement remains of finding acceptable low-cost procedures. The Pharmaceutical Systems Research Association is using the resources of the pharmaceutical industry to design a system that meets all the objectives. Any one of the existing proposals would be beneficial in the short term, but only as a step towards a full solution of the drugs problem.

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- ¹ Parish, P. A. *British Medical Bulletin*, 1974, **30**, 214.
² Johnson, R. A. paper read at Symposium on Drug Monitoring in General Practice, Oxford, June 1977.

Intradermal influenza vaccine using Portojet 1976

SIR,—In the *BMJ* (27 November 1976, p 1322) I reported that some 2000 school children and teachers in Malvern had received an 0.15 ml intradermal dose of Admune influenza vaccine using the Portojet vaccinator, with minimal general or localised reactions. In order to check the efficacy of the vaccine 32 volunteers (19 adolescents and 13 adults) gave blood samples immediately before vaccination and three weeks later. Haemagglutination inhibition tests were run in parallel on the paired sera against the New Jersey 1976 strain. The results, which have just become available (see table), were disappointing so far as four-fold rises in antibody titre were concerned, though 44% had a titre of more than 1 in 20 after three weeks.

The most interesting point arising from the study is that six out of 13 adults already had titres of more than 1 in 20, two having titres of 1 in 160. It was mainly in this group of adults that the four-fold rises occurred. With only one adolescent out of 19 having a four-fold rise it can hardly be said that the intradermal route with the Portojet was successful on this occasion, yet this is at variance with the findings in 1973. More work would be necessary to ascertain the true position of the

Portojet in giving intradermal doses of influenza vaccine.

On the positive side, in difficult circumstances when reactions are likely to be severe or there is a shortage of vaccine, a little protection may be better than no protection at all. I am indebted to Dr M. Skirrow of the Worcester Royal Infirmary, for his help with the necessary virological work.

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Antibiotic sprays

SIR,—The article on antibiotic sprays (1 October, p 869) recalls our experience during the invasion of Western Europe. Penicillin was in very short supply and was reserved for those with serious wounds. One batch, however, was found to contain pyrogens and was unsuitable for parenteral use. I managed to get hold of this but the problem was how to issue it to field medical units. Fortunately, throat sprays were available in their equipment and so we issued penicillin tablets which could be dissolved in sterile water immediately before use and the solution sprayed on the skin. The effect was dramatic and hundreds of men with skin sepsis were returned within a day or two to their own units instead of being evacuated to base hospitals and even to England. This happy result lasted for only a few months until we ran into problems of resistant organisms and sensitisation but it tided us over a difficult period. One great advantage was that a spray resulted in a "no-touch" technique and avoided cross infection such as can easily occur when using ointments or creams under difficult conditions.

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Salbutamol-induced ketoacidosis

SIR,—I was interested to read the reports of ketoacidosis induced by salbutamol infusion in pregnant diabetics.^{1,2} We now report hyperglycaemia and ketosis in a non-diabetic patient treated with salbutamol infusion for asthma.

A 45-year-old woman presented with severe asthma of five days' duration. Pulse was 140/min with 45 mm Hg of paradox; peak flow rate 50 l/min; arterial blood gases breathing air were: P_{aO_2} 4 kPa (30 mm Hg), P_{aCO_2} 6 kPa (45 mm Hg), pH 7.27. Bilirubinuria testing was normal.

Prednisone 15 mg six hourly; hydrocortisone 500 mg six hourly, nebulised salbutamol, fluids (not dextrose), 35% oxygen and aminophylline infusion (1.5 mg/min) produced little improvement and after four hours aminophylline was replaced by salbutamol infusion in increasing doses until 15 µg/min was being given. Eight hours after admission blood gases had progressively improved to: P_{aO_2} 14 kPa (106 mm Hg), P_{aCO_2} 4 kPa (30 mm Hg), pH 7.36, breathing 35% oxygen. Sixteen hours after admission, 2% glycosuria and a moderate reaction for ketones were noted, and blood sugar was 12.8 mmol/l, but blood gases and pH were unchanged. Salbutamol infusion rate was

Results of haemagglutination inhibition tests after 0.15 ml intradermal influenza vaccine

	4-fold rise of HI titre	Geometric mean		Titres of 20 or more	
		Before	After	Before	After
Total numbers (32)	7	15.6	225.9	6	14
>30 years (13)	6	38.5	540.8	6	11
13-20 years (19)	1	00.0	8.95	0	3