the hospital rehabilitation of elderly outpatients.

The investigation and treatment of elderly patients should as far as possible be undertaken by geriatric units and day hospitals rather than by general medical or rehabilitation departments. Such developments should not be regarded as an additional burden on Health Service expenditure but rather as an alternative, thus relieving the other departments of a considerable burden of responsibility and therefore requirements for staff and facilities.—We are, etc.,

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¹ Adams, G. F., McQuitty, F. M., and Flint, M. Y., *Rehabilitation of the Elderly Invalid at Home*, London, Nuffield Provincial Hospitals Trust, 1957.

Vaccination of Smallpox Contacts

SIR,—Dr. G. W. J. Bousfield and Professor G. Dick (17 November, p. 423) reiterate the commonly held belief that vaccination or revaccination of smallpox contacts during the incubation period can be relied upon to protect them from developing the disease. The basis for this statement is largely anecdotal and rests on the clinical impressions of past and present authorities. It is also based on a logical fallacy. If a vaccinated contact remains free from smallpox it is claimed that he has been protected, but there is no way of knowing whether he did in fact have the infection.

Dixon¹ has stressed that vaccination means only the operation of inoculating virus and is not synonymous with the attainment of immunity. Even if vaccination is successful smallpox may occur nevertheless. In the 1953 outbreak in northern England four cases occurred among 40 patients in a hospital ward who were exposed for three hours only and successfully vaccinated within eight hours.² The simultaneous presence of a successful vaccination lesion and the rash of smallpox is a familiar occurrence. I have seen several cases, including a large healing primary vaccination lesion which was sloughed off with large areas of skin in a fatal case of confluent smallpox. Hanna³ describes two such cases which were fatal.

There seems little point in continuing further with conjecture when hard facts are available in the literature for those who care to seek them. The effect of vaccination during the incubation period can be assessed from the results of a trial of the prophylactic effect of methisazone,⁴ in which the number of primary contacts at risk was recorded as part of the trial procedure. Among 25 contacts who were not given primary vaccination there were 14 cases of smallpox (56.0%). This high incidence can be ascribed to the fact that these contacts were mainly infants nursed by mothers

who developed smallpox as the index cases. Two cases occurred among 20 contacts in whom primary vaccination failed (10.0%) and 25 among 130 in whom it was successful (19.1%). With revaccination the incidences were 7/346 (2.02%) in contacts in whom it was not done, 26/1142 (2.28%) in those in whom it failed, and 27/751 (3.59%) in those in whom it was successful. These figures, which are based on the observation of 2,124 primary contacts, show quite clearly that primary vaccination or revaccination during the incubation period is completely ineffective in protecting against the risk of developing smallpox from an infection which has already been incurred.

In 60 contact cases in the same trial the day of the incubation period on which primary vaccination or revaccination was carried out was known with fair certainty. Similar figures have been extracted from the authorities quoted by Professor Dick and Dr. Bousfield, and the combined data are presented in the table. It is evident that smallpox can follow vaccination at any time in the incubation period, even when carried out before the onset of illness in the index case.

The analysis presented in the table and the data from the methisazone trial thus offer no evidence for the supposition that vaccination is protective if carried out in the first few days of the incubation period, but they provide firm support for my statement that the development of immunity after vaccination is too slow to protect against an infection which is already in progress (4 August 1973, p. 275).

Vaccination or revaccination obviously must be carried out on contacts of smallpox, but physicians who perform this procedure should bear in mind that its sole demonstrable effect is to create an immune environment for the containment of any cases of the next generation. To protect against the existing risk all primary contacts should be given hyperimmune antivaccinal gamma-globulin, if available in sufficient amounts, and treated with methisazone, both of which will bring about a fourfold reduction in the risk of the infection proceeding to overt smallpox. This will be of benefit not only to the individual, but also to the public health authorities, who will then be spared the task of coping with another generation of cases.—I am, etc.,

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Blood Lead Levels in Aberystwyth

SIR,—A recent paper by one of us described a survey of blood lead levels in a Welsh rural community (3 November, p. 267). This showed a higher than expected distribution of blood lead levels. Unfortunately a realistic

comparison with other laboratories was not made while the field work was in progress and so comparability with other published work cannot be assumed.

We have now conducted a comparability and reproducibility study of blood lead estimation. Blood samples from 24 subjects were divided into four aliquots. Two samples from each subject, numbered at random, were submitted to the Aberystwyth laboratory and the other samples were examined in our laboratories at London and Leeds. The means obtained for the 24 samples were: Aberystwyth laboratory, 26.0 $\mu\text{g}/100\text{ ml}$, S.D. 14.8; London laboratory, 27.3 $\mu\text{g}/100\text{ ml}$, S.D. 18.2; and Leeds laboratory, 21.4 $\mu\text{g}/100\text{ ml}$, S.D. 16.5. The coefficient of variation of lead estimation in the Aberystwyth laboratory, based on "within samples" variance, was 12%. This compares very favourably with 9% and 11% obtained in the London and Leeds laboratories in a very similar study conducted a short time previously.

These data do not, of course, relate directly to the performance of the laboratory during the survey in Aberystwyth. Nevertheless, as the laboratory technique was not altered in any way they give a considerable degree of reassurance.—We are, etc.,

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Comparative Activity of Minocycline and Tetracycline

SIR,—The findings reported by Dr. N. A. Simmons (26 January, p. 158) confirm results published in other parts of the world regarding the comparable activity of minocycline and tetracycline against Gram-negative bacilli.¹⁻³

Recently I compared 100 strains of *Staphylococcus aureus* isolated from different clinical sources against minocycline and tetracycline. Dilutions of each antibiotic were made in Sensitest agar (Oxoid) to give a range of final concentrations of 0.2-20 $\mu\text{g}/\text{ml}$. Approximate 1/100 dilutions of overnight broth cultures were made and by means of a replica plating machine these were inoculated in batches on to each plate dilution and on to a control plate. After overnight incubation the growth or absence of growth was noted. The results are summarized in the table.

Reference	Day of primary vaccination or revaccination													
	-1	0	1	2	3	4	5	6	7	8	9	10	11	>12
Smith ⁴	0	3 (1)	0	1	2	1	3	1	1	1	0	0	2	0
Hanna ³	0	0	0	3	2	2	4	11	8	7	2	0	3	20
Birchwood (cit. Hanna)	0	0	0	0	2	2	0	2	2	3	2	0	1	4
Cramb ⁵	0	1	3	3 (1)	1 (1)	1	2	0	0	0	3 (2)	1 (1)	1	3 (2)
Bauer <i>et al.</i> ⁶	1	3	2	6 (1)	1 (1)	4	3	2	6 (1)	7 (1)	8 (1)	11 (1)	5	1
Total	1	7 (1)	5	13 (2)	7 (2)	10	11	18	17 (1)	18 (1)	12 (1)	14 (2)	12 (1)	28 (2)

The figures show the number of cases of smallpox which occurred in contacts vaccinated on the day indicated. Fatal cases in parentheses

No. of Strains	Original Resistance Pattern*	No. of Strains Inhibited by 1.5 $\mu\text{g}/\text{ml}$	
		Minocycline	Tetracycline
24	Sensitive	24	23
42	P	42	42
19	PT	19	—
3	PET	3	—
9	PETN	—	—
2	PTN	—	—
1	PETLN	—	—

*P = penicillin, T = tetracycline, E = erythromycin, N = neomycin, L = lincomycin.