

# The use of amantadine and influenza vaccine in a type A influenza epidemic in a boarding school

H. J. ROSE, MB, BS, DRCOG, DPM

General Practitioner, Chilcompton, Bath; Medical Officer, Downside School

**SUMMARY.** Prophylactic immunization with the current standard vaccine failed to prevent an epidemic of type A influenza in a large boarding school. In one House 31 boys were given amantadine 100 mg daily at the start of the epidemic. None of these boys suffered influenza whereas 30 per cent of the rest of the school was confined to the sickbays. This experience with amantadine challenges the policy of routine prophylactic immunization against influenza.

### Introduction

**I**N the winter of 1977 reports of 'red flu' were circulating. The vaccine given to the school the previous September was known not to contain this virus. Reports from Russia and elsewhere (Davies *et al.*, 1964) had shown that the cyclic primary amines with a three dimensional birdcage structure called the amantadine series had inhibitory properties on Influenza A virus (Oxford and Schild, 1968). The backing of the local public health laboratory was sought and the family practitioner committee quickly agreed to pay the cost of a trial of amantadine. The co-operation of these authorities was arranged very quickly when the first boys with influenza came into the sickbay.

### Method

On 30 September 1977, 380 (65.7 per cent) boys out of a possible 578 in a West Country public boarding school were given 'Duphar' trivalent vaccine by gun 0.5 ml. The 31 youngest boys were given 0.25 ml. These boys were subsequently given amantadine. The immunization was voluntary and many of the older boys avoided the gun either because they feared it or doubted its efficacy.

The epidemic started on 15 January 1978 and there

was a sudden increase in numbers a week later. On 22 January amantadine 100 mg was given to 31 of the younger boys. It was continued, given daily after breakfast, until the school broke up for the half-term, for a total of 23 days. On their return 10 days later (snow prolonged half-term) there were no further cases of influenza, so the drug was not restarted.

The younger boys were chosen because:

1. The cost of the trial would be less.
2. The youngest were the most easily supervised and therefore the effects of the drug and illness more easily monitored.
3. It was felt on emotional grounds that the youngest should be the most protected.

The school is in the country, the boys come from all over the UK and many live abroad. The school is organized into six senior and two junior houses. The school activities are mostly all under one roof—all boys share the same refectories, tuck-shop, corridors, abbey church, theatre, and gymnasium. The junior houses are treated differently—they are encouraged to stick together, are more closely supervised and go to bed earlier. They share many of the same masters.

### Results

The epidemic ran a typical course (Figure 1). Temporary sickbays were brought into use on 25 January and school life was interrupted as masters and staff became ill. None of the boys was gravely ill, the commonest complications being otitis media and bronchitis. The average length of fever was four days, although some were feverish for six days.

One hundred and sixty-six boys (29 per cent) were treated in the sickbays by bedrest and aspirin. Certainly this is not the total number with influenza, as the older boys had their own rooms in which some remained, treating themselves and avoiding detection and supervision as a result of the dislocated curriculum.

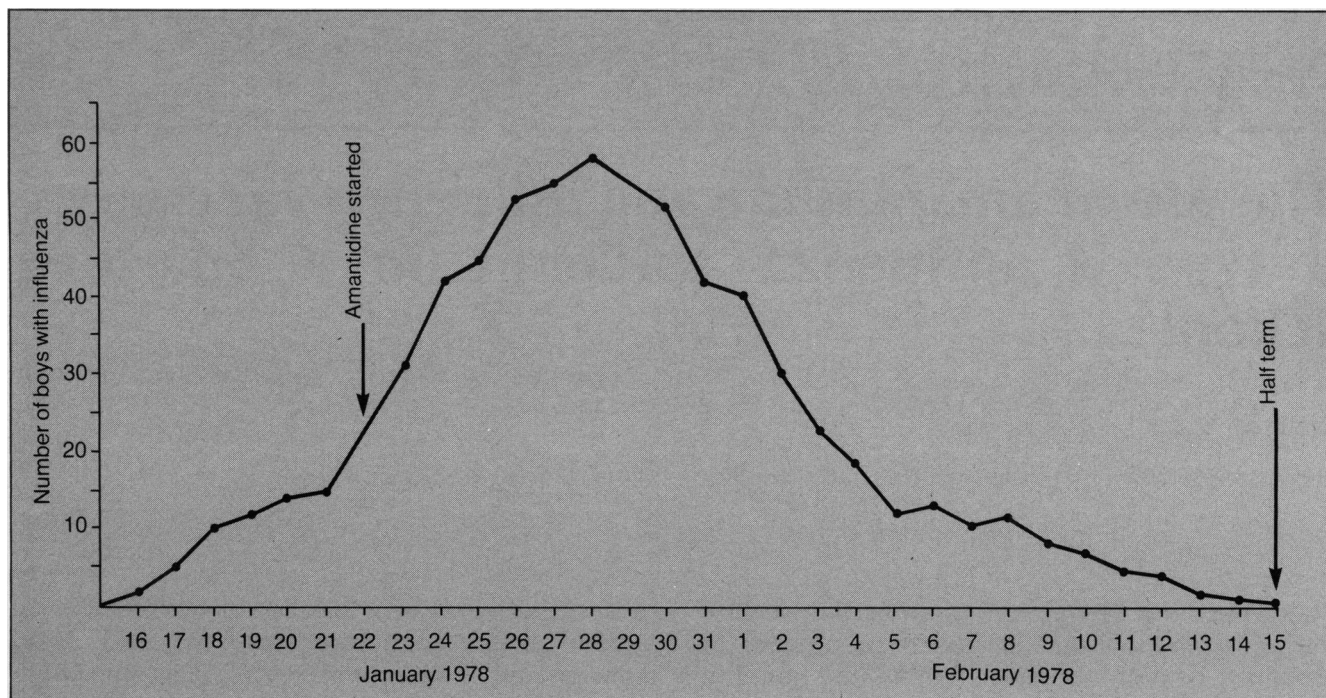


Figure 1. Progress of the epidemic of Type A influenza, January 1978.

Table 1. Number of boys with influenza compared with number immunized (percentages in brackets).

	Immunized	Not immunized	Totals
Number of boys with influenza	106 (63.9)	60 (36.1)	166 (100)
Number of boys without influenza	274 (66.5)	138 (33.5)	412 (100)
Totals	380 (65.7)	198	578

Table 2. Effect of treatment with amantadine.

	Amantadine 100 mg daily	Without amantadine	Totals
Number of boys with influenza	0	166	166
Number of boys without influenza	31	381	412
Totals	31	547	578

$\chi^2 = 11.2$   $p < 0.001$

The public health laboratory service swabbed 33 boys; 19 viral isolations were made: 15 Texas 1/77 H3N2; four A/USSR 90/77 HN. Table 1 shows the number of boys treated for influenza and the number of those vaccinated. Table 2 shows the number of boys with influenza and whether they were treated with amantadine or not. However the results are analysed—by severity of symptoms, length of illness, or lack of

Table 3. Comparison of costs of influenza vaccination and amantadine.

Cost of influenza vaccination over 4 years 65.7% acceptance 380 boys @ £1.75/boy	£2,260
Cost of amantadine 100 mg bd for 5 days at the onset of an epidemic 65.7% acceptance	£646

symptoms—previous immunization seems to have had no protective effects. The 31 boys to whom amantadine was given found it easy to take and no side-effects were noticed, although the boys were unusually quiet for the first few days. None of these boys developed influenza. On several occasions these boys were seen talking with those in the sickbays and several of their masters were ill during the epidemic. Several of the boys also had siblings with influenza.

### Discussion

These results confirm earlier reports that amantadine prevents the clinical syndrome of Type A influenza (Galbraith *et al.*, 1969; Watson, 1970). In his extensive and frank review of his experiences with vaccination at Rugby School, Sparks (1978) draws attention to the suspect protective effect in the short and long term of prophylactic immunization. The conclusions of Hoskins and colleagues (1979) are clear: previous immunization confers no long-term advantage. If the financial consequences of prophylaxis with amantadine versus immunization are considered there is a striking difference (Table 3). This comparison assumes influenza epidemics

every four years and a 65.7 per cent uptake (the figures in this report) of prophylaxis in a school of 578 boys.

This comparison in no way explores the difficulties and dilemmas of giving vaccines or drugs to minors. Parents nowadays often have strong views.

### Conclusion

These preliminary findings indicate that it would be beneficial to extend the use of amantadine. Policy was changed the following year when there was a further outbreak of influenza. Amantadine seemed to be largely protective but the virological studies reported virus B/E/95/79. A further paper is planned on this subject. Key people, such as the Headmaster and kitchen and medical staff, who need to keep going through an epidemic, would perhaps do well to take amantadine at the onset of an epidemic until it is known whether it is virus A or B. Meanwhile our policy has changed this year and a general immunization programme abandoned, as the experience described showed it not to be protective, especially when a new strain such as A/USSR emerges.

### References

- Davies, W. L., Grunert, R. R., Haff, R. F. *et al.* (1964). Antiviral activity of 1-adamantanamine (amantadine). *Science*, **144**, 862-863.
- Galbraith, A. W., Oxford, J. S., Schild, G. C. & Watson, G. I. (1969). Protective effect of 1-adamantanamine hydrochloride on Influenza-A2 infections in the family environment. *Lancet*, **2**, 1026-1028.
- Hoskins, T. W., Davies, J. R., Smith, A. J., Miller, C. L. & Allchin, A. (1979). Assessment of inactivated Influenza-A vaccine after three outbreaks of Influenza-A at Christ's Hospital. *Lancet*, **1**, 33-35.
- Oxford, J. S. & Schild, G. C. (1968). Immunofluorescent studies on the inhibition of Influenza A and B viruses in mammalian cell cultures by amines and ammonium compounds. *Journal of General Virology*, **2**, 377-384.
- Sparks, J. P. (1978). Recent experience of influenza. *Journal of the Royal College of Physicians of London*, **12**, 437-449.
- Watson, G. I. (1970). General practitioners' forum. Use of amantadine in an epidemic of 'Hong Kong' Influenza type A2 in family practice. *Practitioner*, **205**, 351-357.

### Acknowledgements

My grateful thanks are due to Sister Peggy Woods for her help during the epidemic and gathering of these figures subsequently; also to the Somerset Family Practitioner Committee and the Bath Public Health Laboratory for their interest and support.

**PARDALE FOR PAIN RELIEF**  
**PARDALE FOR PAIN RELIEF**  
**PARDALE FOR PAIN RELIEF**  
**PARDALE FOR PAIN RELIEF**  
**PARDALE FOR PAIN RELIEF**

**Paracetamol 400mg Codeine Phosphate 9mg  
Caffeine Hydrate 10mg**

Full product information available on request

 **Dales  
Pharmaceuticals Limited**

Snaygill Industrial Estate, Keighley Road,  
Skipton, North Yorkshire BD23 2RW  
(Tel: 0756 61311)

PL 0123 5015

**SELECTED PAPERS  
FROM THE EIGHTH  
WORLD CONFERENCE ON  
FAMILY MEDICINE**  
Occasional Paper 10

World conferences on family medicine are held only every two years and it is not easy for those who have not been able to attend them to keep in touch with new ideas around the world. This report of the Eighth World Conference held in Montreux contains a selection of 13 articles from 11 countries and five continents and demonstrates some of the important new ideas discussed at Montreux.

Many of these articles are directly relevant to British general practice and over half of them have already been published in medical journals in several countries.

*Selected Papers from the Eighth World Conference on Family Medicine, Occasional Paper 10*, is available now, price £3.75 including postage, from the Royal College of General Practitioners, 14 Princes Gate, Hyde Park, London SW7 1PU.