no evidence at present to suggest that resistant strains of varicella zoster virus will occur in the immunocompetent community with antiviral use, but this will need to be monitored. Resistance has occurred rarely in immunocompromised patients with varicella zoster virus infection; prolonged viral replication in these patients provides an optimum environment for selection of resistant strains.

The mildness and self limiting nature of chickenpox is confirmed by the placebo groups in the American studies. Though an argument can be made for treating secondary and tertiary cases and adults with acyclovir as well as any immunocompromised patient, the modest clinical benefit from what would be a very costly programme do not support the routine treatment of chickenpox in normal healthy children.

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No reason not to treat

Henry H Balfour Jr

Acyclovir has been shown to shorten the course of chickenpox in otherwise healthy children by 25-33% according to three placebo controlled trials in the United States.¹⁻³ All clinical events monitored were favourably affected by acyclovir, with the most important differences being reductions in degree and duration of fever, constitutional illness score, and number of residual lesions present at the 28 day follow up examination. No appreciable adverse events were reported. These studies also identified two subsets of patients particularly suitable for acyclovir therapy: adolescents and children who acquired chickenpox from a family member.

Need for treatment

The main controversy regarding use of acyclovir is not its clinical usefulness, which is scientifically incontestable, but whether treatment is needed for a relatively benign disease. To fully appreciate the impact of acyclovir on chickenpox you need to make daily visits to treated subjects and controls, as our research nurse clinicians did. In the three studies, which included 979 children and adolescents, there were nearly 6000 clinic and home visits. Such daily observations made it evident that the "misery index" of chickenpox for the patient and family was rapidly attenuated by antiviral drugs. It is difficult to integrate such firsthand observations into a two dimensional Kaplan-Meier plot.

Is treatment of chickenpox practical? The reported trials have enrolled children only during the first 24 hours of rash, and antiviral drugs begun later has not been studied for children. Treatment may need to be started within 24 hours because a placebo controlled study of naval recruits who were enrolled as late as 72 hours after onset of rash concluded that acyclovir was beneficial only for adults whose treatment was started during the first 24 hours.⁴ Parents cannot always recognise the index case of chickenpox in the family soon enough to notify a doctor within 24 hours. With knowledge of the incubation period, however, they can identify secondary cases, which is actually more important because secondary cases are more severe.

Problems of treatment

Cost and cumbersome dosing are valid arguments against using acyclovir. Cost varies tremendously from

country to country. Because of its relatively poor bioavailability, oral acyclovir must be given four times per day, which is inconvenient and reduces compliance.

A theoretical argument against treatment of chickenpox is that widespread use of acyclovir will lead to viral resistance. This concern has not been completely allayed, but short term treatment with acyclovir for herpesviruses in otherwise healthy patients has not resulted in emergence of resistant viral strains.^{5,6}

Another concern is that treatment of chickenpox will blunt the active immune response, leaving the patient susceptible to a second case of chickenpox at an older age, when the likelihood of complications is greater. But three papers have now shown durability of immunity after acyclovir treatment.^{1,7,8}

Prophylaxis

Some have argued that if treatment is good, prophylaxis would be better. I am opposed to prophylaxis against chickenpox using acyclovir for the following reasons. Firstly, we do not have any controlled data showing that acyclovir can prevent chickenpox. Secondly, unless antibody titres are carefully followed, it is uncertain whether acyclovir prophylaxis has resulted in a subclinical case of chickenpox or whether the exposure was trivial. Without that knowledge the patient will need to receive prophylaxis after every subsequent exposure. As the patient grows older, the likelihood of chickenpox with complications increases. Thirdly, data from the first controlled treatment trial in Minnesota indicated that a short course of acyclovir did not reduce antibody titres measured one year after chickenpox.¹ Another study indicated that the same holds true for varicella zoster virus specific cell mediated immunity.⁸ It would therefore be better to allow chickenpox to manifest itself and then treat immediately with acyclovir, knowing that there will be a durable immune response. Prophylaxis could leave the patient with imperfect immunity and susceptible to chickenpox later in life when the disease can be more serious.

The final factor in the "to treat or not to treat" equation is the difficulty of predicting who will have a relatively severe case of chickenpox at the onset of disease. We searched for predictors of disease severity in our placebo controlled trials and identified only age and case order in the family. Added to this conundrum is the fact that even mild immunosuppressive therapy has been associated with visceral dissemination of

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Commentary: reserve acyclovir for secondary cases

Acyclovir is a safe drug that reduces the duration and severity of childhood chickenpox when started within 24 hours of the rash appearing. The case for using the drug in children who are immunocompromised (including those receiving steroids) is unanswerable. But I am not convinced that the drug should be used routinely in all children with chickenpox. The cost would be substantial and out of proportion to the benign course of most cases of the disease. Both authors make the point that secondary cases within a family are more severe and easier to identify earlier than the primary case. In an era of limited health care resources it seems more appropriate to reserve acyclovir for these secondary cases.—PETER C RUBIN, *professor of therapeutics, University of Nottingham*

chickenpox.⁹ Since acyclovir given orally is virtually devoid of side effects, why not treat chickenpox with acyclovir now?

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The World Health Organisation

WHO fellowships—what do they achieve?

Fiona Godlee

This is the fifth in a series examining the role of the World Health Organisation, its current problems, and its future prospects

Training health professionals is one of WHO's major strategies for improving health care in the developing world. The aim, to strengthen a country's own capacity rather than injecting expertise from outside, is in the best tradition of sustainable development. But how effective is this so called "capacity building in human resources"? Since it accounted for \$43m of WHO's budget in 1992-3 and is considered by WHO to be a major contribution to health in individual countries, it deserves detailed examination.

WHO funded over 4500 fellowships in 1992-3, to which it allocated about 5% of its core budget. The fellowships allow health professionals to visit teaching institutions, largely in the developed world, for periods of up to a year. They are administered by the regional offices but paid for almost entirely out of individual countries' budgets, the idea being that each country will know what expertise it needs and will be best placed to select the right people to train to fill the gaps. In theory the training fits fellows for a specific assignment when they return home, in line with the country's and WHO's strategic plan. Also in theory candidates are selected according to set WHO criteria by a specially formulated selection committee, which includes a representative from WHO.

Major shortcomings

In practice, however, as several reports have made clear, the fellowship programmes in many areas are badly administered and often unevaluated.

In a report to the executive board in January 1991 the director general highlighted major shortcomings in the fellowships programmes in some regions. Member states were requesting fellowships for training in highly specialised areas of medicine rather than primary health care, and many countries, especially in Africa, had no selection committees and no clear selection criteria. Three years later WHO's external auditor, Sir John Bourne, found little improvement. In a highly critical report presented to the World Health Assembly in May he concluded that, because most countries in the highest spending regions—South East

Asia and Africa—had no clear idea of their training needs, it was impossible to assess whether fellowships were being properly targeted.¹ Study objectives were, he said, stated in the vaguest terms and referred to activities (for example, "to carry out a two week visit to the Leprosy Control Programme in Thailand and Malaysia") rather than objectives. There was, he said, "virtually no evidence to show that the ministries of health had obtained the support of the WHO representative; that the WHO representative had appraised the application against national or WHO policy objectives; or that the candidate was an appropriate choice for WHO support."

The South East Asian regional office spends nearly a fifth of its budget on fellowships, but none of the 10 countries in the region that were studied by the external auditor explicitly assessed whether a fellowship was the most suitable form of training to meet the applicant's objectives. Nor did they formally assess whether a fellowship would help towards achieving Health for All objectives. Three of the countries in South East Asia had no formal selection procedure, and of the seven who did, five did not involve WHO in the process. A quarter of the fellowships studied were awarded to people aged over 50 (three of them to people over 55), which, as the external auditor noted, "limits the time in which the benefits obtained from the fellowship may be applied."

The situation in Africa was no better. Over half of the fellows studied failed to meet one or more of WHO's criteria: two applicants were not engaged in medical or health work in their national health organisation, and seven did not have the requisite practical experience. Five of the 45 fellows reviewed by the external auditor had been awarded places at training centres before they applied for funds from WHO, and the audit found no evidence that the regional office had assessed whether the course was the most suitable option for WHO. The external auditor also noted that some people received more than one fellowship, one person having received five fellowships in the space of seven years. One of the main criteria used for selecting fellows was length of service in the national health administration. By 1992, only 15 of Africa's 46 member countries had established national policies for

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