- 4 AHCPR Depression Guideline Panel. *Depression in primary care. Vol 2. Treatment of major depression. Clinical practice guideline, number 5.* Rockville, MD: Public Health Service, Agency for Health Care Policy and Research, 1993. (AHCPR Publication No 93-0551.)
- 5 Von Korff M, Goldberg D. Improving outcomes in depression. *BMJ* 2001;323:948-9.
- 6 Katon W, Von Korff M, Lin E, Simons G. Rethinking practitioner roles in chronic illness: the specialist, primary care physician and the practice nurse. *Gen Hosp Psychiatry* 2001;23:138-44.
- 7 Wagner E. Chronic disease management: what will it take to improve the care for chronic illnesses? *Eff Clin Pract* 1998;1:2-4.
- 8 North of England Evidence-based Guideline Development Project. *The choice of antidepressants for depression in primary care.* Newcastle: Centre for Health Services Research, University of Newcastle upon Tyne, 1998. (CHSR report No 91.)
- 9 Larson D, Atkinson C, Hargreaves W, Nguyen T. Assessment of client satisfaction: development of a general scale. *Evaluation Programme Planning* 1979;2:197-207.
- 10 Zigmond A, Snaith R. The hospital anxiety and depression scale. *Acta Psychiatr Scand* 1983;67:361-70.
- 11 Goldberg DP, Bridges K. Screening for psychiatric illness in general practice: the general practitioner versus the screening questionnaire. *Br J Gen Pract* 1987;37:15-8.
- 12 Lesser A. Problem based interviewing in general practice: a model. *Med Educ* 1985;19:299-304.
- 13 Scott J, Boorman T, Standardt S, Ward R, Goldberg D. The impact of training in problem based interviewing on the detection and management of psychological problems presenting in primary care. *Br J Gen Pract* 1999;49:441-5.
- 14 Cornwall P, Scott J. Clinical guidelines on depression: are the guidelines following guidelines on the development of guidelines? *Br J Gen Pract* 2000;50:908-11.
- 15 Thompson C, Kimmouth A, Stevens L, Peveler R, Stevens A, Ostler K, et al. Effects of a clinical practice guideline and practice-based education on detection and outcome of depression in primary care: Hampshire depression project randomized controlled trial. *Lancet* 2000;355:185-91.
- 16 Bashir K, Blizard B, Bosanquet A, Bosanquet N, Mann A, Jenkins R. The evaluation of a mental health facilitator in general practice: effects on recognition, management, and outcome of mental illness. *Br J Gen Pract* 2000;50:626-9.
- 17 Solberg L, Fischer L, Wei F, Rush W, Conby K, Davis T, et al. A CQI intervention to change the care of depression: a controlled study. *Eff Clin Pract* 2001;6:128-34.

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Comprehensive health care for people infected with HIV in developing countries

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By far the greatest burden of disease from HIV infection is in developing countries, where health services are generally ill equipped to cope. The authors consider how effective HIV services can be delivered in such countries

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HIV infection poses tremendous challenges to healthcare systems globally. Over 90% of the estimated 40 million people living with HIV infection in 2001¹ live in resource poor settings and do not share the improved prognosis now achieved in developed countries.² The World Health Organization estimates that in 2002, of the 6 million people in developing countries in need of antiretroviral therapy, only 4% are getting such treatment, half of whom live in Brazil.² In 2001 about 900 000 people were infected with HIV in the United States, and over 500 000 (over 55%) were receiving antiretroviral therapy.¹ In sub-Saharan Africa, however, of the more than 28 million people with HIV infection in 2001, fewer than 30 000 (just over 0.1%) were receiving antiretroviral therapy.¹ In 2001, there were about 15 000 deaths from AIDS in the United States (roughly 1.7% annual mortality) and an estimated 2.2 million deaths from AIDS in sub-Saharan Africa (over 7.9% annual mortality).¹ In this article we explore the question of how effective HIV services can be delivered in resource poor countries.

Methods

We performed searches of Medline, AIDS databases, and global HIV and AIDS libraries such as Joint United Nations Program on HIV/AIDS (UNAIDS) publications and website, and we reviewed abstracts of major AIDS conferences including the XIV International Conference on AIDS in Barcelona, July 2002. We also relied on personal experience, research, and capacity-building activities of members of the faculty affiliated with the University of Washington Center for AIDS Research who are funded by the National Institute of Health, US Agency for International Development (USAID), WHO,

Summary points

Universal access to comprehensive health services is needed to reduce HIV related morbidity and mortality worldwide

The World Health Organization's strategy for chronic disease management in resource poor countries could provide a model for delivering comprehensive services to people infected with HIV who have similar healthcare needs

Developing effective communication and referral systems to closely link primary providers to more specialised HIV services could start to address the need for HIV expertise

Integration and coordination of services could optimise the use of resources and increase access to HIV care

Health services research is needed to define the most effective ways to develop a comprehensive system of HIV care

Partnerships between donors, governments, non-governmental organisations, and local organisations are essential for developing effective and sustainable HIV and AIDS prevention and care programmes

Centers for Disease Control and Prevention, and Health Resources and Services Administration for work in Africa, the Americas, and Asia.

Comprehensive health services for HIV care and prevention

Universal access to comprehensive health services is needed to reduce substantially HIV related morbidity and mortality worldwide. These services must effectively address six needs:

- Voluntary and confidential counselling and testing for HIV infection
- Prevention of HIV transmission, including sexual, parenteral, and mother to child transmission
- Prophylaxis against opportunistic infections
- Diagnosis and treatment of HIV related conditions including opportunistic infections and neoplasms
- Antiretroviral treatment
- Palliative care.

Developing countries will have to develop health-care system infrastructures capable of delivering these services, including skilled health providers and laboratory facilities, HIV related training programmes, aligned national and local government policies, and a capacity to do operational research to improve care.

WHO strategy for chronic disease care in the developing world

Many non-communicable chronic diseases also are increasing in developing countries as rapid improvements in health and longevity have changed the burden of illness.³ Although HIV infection has dramatically lowered life expectancy in much of sub-Saharan Africa, life expectancy in most developing countries has continued to increase over the past decade.⁴ It is estimated that half of all health services required in developing countries are for chronic conditions such as diabetes and cardiovascular disease.³ To address this epidemic, the WHO recently proposed a global strategy to design and reconfigure healthcare systems to better meet the needs of people with chronic illnesses (see box).^{3,5}

WHO strategy for comprehensive chronic disease care in the developing world

- Shift emphasis from acute, episodic care to provide continuity of care with planned visits and regular follow up
- Develop health policies, collaboration, legislation, and healthcare financing to support comprehensive care strategies
- Emphasise delivery of services at primary care level to assure broadest access to effective care
- Develop effective communication and referral systems between primary, secondary, and tertiary levels of health care
- Centre care on the patient, educate patients about their disease so they can become active participants in their care, and promote adherence to long term treatments
- Link care to community resources; provide education and support to family and community members to assist in care
- Emphasise prevention
- Monitor and evaluate the quality of services and long term patient outcomes

The WHO strategy could provide a model for delivering comprehensive services to people infected with HIV, who have similar healthcare needs.⁶ However, the medical management of HIV infection and antiretroviral treatment with regard to drug toxicity, metabolic complications, adherence to treatment, and emerging viral resistance is complex and may require a higher degree of expertise than do many other chronic conditions. In settings where combination antiretroviral therapy based on protease inhibitors and non-nucleoside reverse transcriptase inhibitors is widely available doctors with expertise in treating HIV deliver more effective antiretroviral treatment.⁷ More experienced doctors achieve better patient outcomes, including longer survival, than doctors who are less experienced in providing HIV care.⁸ Access to such expertise in developing countries will be a critical challenge.

Demands of effective antiretroviral treatment

International efforts are improving access to antiretroviral drugs with the aim of making antiretroviral treatment available worldwide.² The enabling infrastructure needed to deliver treatment includes policies, negotiated drug price structure, drug purchasing, storage and distribution systems, and development of treatment guidelines and training programmes. Additional aspects of providing antiretroviral therapy include identifying who is infected and which infected people would most benefit from treatment^{2,9}; assessing disease stage⁹ and monitoring response to treatment in the absence of ready access to measurements of CD4 cell count¹⁰ and viral load or resistance testing; managing drug toxicity; maintaining high levels of treatment adherence required to suppress viral replication and prevent development of drug resistance; and deciding when to change a failing treatment regimen and what drugs to use in the subsequent regimen.

Because antiretroviral resistance emerges not only to a particular antiretroviral drug but also to other drugs in the same class, a limited number of effective regimens can be constructed despite the increasing number of antiretroviral drugs available. Prior use of short course antiretroviral drugs by HIV infected women to prevent mother to child transmission might lead to drug resistance and limit future treatment options.¹¹ Serious toxicities associated with some antiretroviral drugs include hyperlipidaemia, insulin resistance, diabetes, lactic acidosis, and pancreatitis. Antiretroviral treatment for specific subpopulations in developing countries is complicated by drug interactions among HIV infected patients taking antituberculous drugs¹² and higher risk of hepatic toxicity among patients co-infected with hepatitis viruses.¹³ Up to 70% of HIV infected people in developing countries are co-infected with tuberculosis,¹⁴ and high rates of hepatitis C and hepatitis B co-infections exist in many parts of the developing world. Strategies to identify and address adverse antiretroviral treatment events and viral resistance in developing countries are emerging (WHO/International AIDS Society global HIV drug resistance monitoring project).¹

Defining services at different levels of health care

The WHO strategy for providing comprehensive care to people with chronic diseases emphasises the importance of defining services delivered at each level of health care, from home care, to community level participation, and to primary, secondary, and tertiary levels of service delivery.³ Delegating roles and responsibilities for specified services to less skilled staff, training primary care providers to deliver some aspects of HIV care, and developing effective communication and referral systems to closely link primary providers to more specialised HIV services could begin to address the need for HIV expertise in resource poor settings. Specially trained HIV providers located at regional health centres or hospitals could provide consultation, management of HIV related conditions, laboratory testing and monitoring, and training for primary care providers. Primary care teams could be trained to carry out clearly defined tasks such as treatment adherence counselling, supporting patient self management, and providing counselling and testing, prevention services, and palliative care in the community.

Coordination of services

Integration and coordination of services are important elements of the WHO chronic disease model that could optimise the use of resources and increase access to HIV care. Counselling and testing services are key components of HIV care and preventing HIV infection,¹⁵ but the limited services that do exist in developing countries are concentrated in urban areas, whereas most people in Africa and Asia live in rural areas. Thus, most people at risk of HIV infection remain unaware of their HIV status.¹⁵

The availability of counselling and testing services could be expanded, particularly for women, by integrating these services into existing vertical programmes such as antenatal care, family planning, and maternal and child health programmes and by linking counselling and testing with HIV prevention programmes. Integrating counselling and testing services with family planning and antenatal care is critical for preventing mother to child transmission. Training HIV prevention workers to perform counselling and testing and making rapid HIV testing technology available will help increase access to such services. In turn, HIV testing should serve as an entry point into HIV care, as in Uganda, where counselling and testing services provide access to antiretroviral treatment and referral to other AIDS services.¹

Wider access to HIV care could significantly increase the number of people who seek testing and therefore receive essential prevention counselling.¹⁶ HIV care has been successfully linked with HIV prevention programmes in Thailand, Cambodia, Uganda, and Senegal.¹⁷ Brazil is regarded as a leading example of the integration of HIV care and a renewed commitment to prevention.¹⁸ Although the provision of government funded antiretroviral drugs has increased access to antiretroviral treatment in Brazil, the extensive HIV treatment and care programme operating in Brazil and other parts of Latin America might be less applicable to countries with a larger proportion of their HIV infected populations living in rural areas with weaker transportation systems.¹⁸

Integration and coordination of services is needed to optimise use of scarce resources for HIV care

Customising models of healthcare delivery

Different models of healthcare delivery will be needed to respond to the diverse requirements for establishing comprehensive HIV care in developing countries. The Pan American Health Organization/WHO, in collaboration with the United Nations Joint Program on HIV/AIDS (UNAIDS) and the International Association of Physicians in AIDS Care, has proposed a phased-in "building blocks" approach to delivering the health services required for comprehensive HIV care,¹⁹ which shares key elements with the WHO model for chronic disease management. In this approach, the complexity and sophistication of services provided at each level of health care would depend on the availability of technical and financial resources, skilled providers, and healthcare infrastructure in a given setting.

The implementation of basic services would provide the foundation for delivering more specialised services. As resources increase, the range and specialisation of services provided at each level of care could increase. For example, a setting may have sufficient resources to train providers to manage counselling and testing and prophylaxis against opportunistic infections at the primary care level, prevention of mother to child transmission and the diagnosis and treatment of opportunistic infections at the secondary level of care, and antiretroviral treatment at the tertiary level. With the availability of more sophisticated tools, training, and supportive infrastructure, the antiretroviral treatment and management of opportunistic infections might prove feasible and effective at more peripheral levels of care, out to the primary care level.

The WHO has also proposed an approach to scale up antiretroviral treatment in developing countries that includes the use of standardised antiretroviral drug regimens.² This approach could enable primary care providers with basic training in HIV care to provide algorithm guided antiretroviral treatment with the help of evidence based guidelines for monitoring drugs' side effects and toxicities. Providing components of HIV care at the primary health care level would be essential to reach most of those infected, but experiments in healthcare delivery are needed to define what services can be delivered at the primary care level that will improve long term patient outcomes.

Need for research

Health services research is needed to define the most effective and efficient ways for countries to move from their current state of healthcare provision to developing a comprehensive system of HIV care. This research must address questions such as whether and to what extent standardised approaches to antiretroviral treatment and treatment of opportunistic infections decrease HIV related morbidity and mortality, what approaches to providing patient and family support improve adherence to drug regimens, and how best to integrate education and counselling on prevention at patient and community levels. Studies of adherence in resource poor settings have shown that monitoring programmes involving home visits can help patients attain high levels of adherence.²⁰ Designing these services must include the perspectives of people infected with HIV.

Imposing chronic disease management strategies on existing systems of care that are organised to address acute episodic illness is unlikely to be successful. HIV care, like that of other chronic illnesses, requires planned visits and regular follow up. Delivering care for other chronic communicable diseases such as tuberculosis shows the need for close follow up, prevention of antimicrobial resistance, and the effectiveness of directly observed treatment—and such lessons can help guide the care of people with HIV infection and AIDS. A community based model developed in Haiti used existing tuberculosis control infrastructure to deliver antiretroviral treatment to symptomatic patients.²¹ This programme made effective use of community health workers who provided patient support and education and gives anecdotal evidence of symptomatic improvement among small numbers of patients receiving antiretroviral treatment.²¹ Research is needed to confirm the impact on various health outcome measures, including survival, of guideline based approaches to antiretroviral treatment in resource poor settings. Ongoing evaluation and monitoring of clinical outcomes is essential.

Need for partnerships

The global epidemic of HIV infection and AIDS continues to spread, and the number of people living with HIV infection continues to increase, with five million new HIV infections and three million deaths from AIDS in 2001. The numbers living with AIDS will probably increase further with effective deployment of HIV care, particularly if prevention efforts are not strengthened concurrently.¹ Partnerships between donors, governments, non-governmental organisations, and local organisations are essential in developing effective and sustainable prevention and care programmes. Policy statements (such as those made by the United Nations General Assembly Special Session on HIV/AIDS, 2001²²⁻²³), various guidelines,²⁻¹⁹ and international training initiatives (including the CDC/HRSA International Training and Education Center on HIV programme, the International AIDS Society training programme, the Academic Alliance for AIDS Care and Prevention in Africa, and the Regional AIDS Training Network in Kenya) must coordinate their training messages and seek compatible, practical models for care delivery. A policy environment in which all sectors of society play a part in addressing the AIDS

epidemic is crucial for success. Experience with the WHO care model for chronic diseases may help inform the design of healthcare systems to provide comprehensive care for HIV infection in developing countries, and coordination between these efforts would likely benefit both initiatives.

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- UNAIDS. *Report on the global HIV/AIDS epidemic 2002*. Geneva: UNAIDS, 2002.
- WHO Working Group. *Draft: scaling up antiretroviral therapy in resource limited settings: guidelines for a public health approach*. Geneva: World Health Organization, 2002.
- World Health Organization. *Innovative care for chronic conditions: building blocks for action*. Geneva: WHO, 2002.
- Dalrymple T. *Mass listeria: the meaning of health scares*. London: Andre Deutsch, 1998.
- Epping-Jordan J, Bengoa R, Kavar R, Sabate E. The challenge of chronic conditions: WHO responds. *BMJ* 2001;323:947-8.
- Kitahata M, Holmes K, Wagner E, Gooding T. Caring for persons with HIV infection in a managed care environment. *Am J Med* 1998;104:511-5.
- Kitahata M, Van Rompaey S, Shields A. Physicians' experience in the care of HIV-infected persons is associated with earlier adoption of new antiretroviral therapy. *J Acquir Immune Defic Syndr* 2000;24:106-14.
- Kitahata M, Koepsell T, Deyo R, Maxwell C, Dodge W, Wagner E. Physician's experience with the acquired immunodeficiency syndrome as a factor in patient's survival. *N Engl J Med* 1996;334:701-6.
- Mekonnen Y, Dukers NH, Sanders E, Dorigo-Zetsma W, Wolde D, Gekus R, et al. Simple predictive markers of death in HIV-1 infected Ethiopians and their relevance in the decision of initiation of antiretroviral therapy (ART) [abstract No TuPeB4669]. *XIV International AIDS Conference, Barcelona, Spain, July 7-12, 2002*.
- Badri M, Wood R. Role of total lymphocyte count for monitoring HAART in a resource-constrained setting [abstract No MoPeB3112]. *XIV International AIDS Conference, Barcelona, Spain, July 7-12, 2002*.
- Cunningham CK, Chaix ML, Rekeciewicz C, Britto P, Rouzioux C, Gelber RD, et al. Development of resistance mutations in women receiving standard antiretroviral therapy who received intrapartum nevirapine to prevent perinatal human immunodeficiency virus type 1 transmission: a substudy of pediatric AIDS clinical trials group protocol 316. *J Infect Dis* 2002;186:181-8.
- Jack C, Friedland G, Lalloo U, El-Sadr W, Murrman M, Al-Karim Q, et al. The Start study: a pilot project to integrate antiretroviral therapy tuberculosis directly observed therapy/short course (TBDOTS) protocol in a resource constrained setting [abstract No WePeF6718]. *XIV International AIDS Conference, Barcelona, Spain, July 7-12, 2002*.
- Dakoury C, Eholie S, Aka-Kakou R, Bissagnene E, Konan-Ko R, Kadjo A. Role of viral infections HCV and HBV in liver toxicity among patients receiving antiretroviral treatment in HIV drugs access initiative in Cote d'Ivoire [abstract No MoPeB3280]. *XIV International AIDS Conference, Barcelona, Spain, July 7-12, 2002*.
- Dye C, Scheele S, Dolin P, Pathania V, Ravigliione MC. Consensus statement. Global burden of tuberculosis: estimated incidence, prevalence, and mortality by country. WHO global surveillance and monitoring project. *JAMA* 1999;282:677-86.
- Colebunders R, Ndumbe P. Priorities for HIV testing in developing countries? *Lancet* 1993;342:601-2.
- Coates T, Grinstead O, Gregorich S, Heilbron DC, Wolf WP, Choi K-H, et al. *The voluntary HIV-1 counselling and testing efficacy study. A randomized controlled trial in three developing countries*. UCSF AIDS Research Institute, 2000.
- Van Leeuwen R, Sow P, Bissagnene E, Waweru K, Waalberg E, Lange J. Implementation of an antiretroviral access program (CARE) in HIV-infected individuals in resource poor settings: initial experiences [abstract No LbPp2209]. *XIV International AIDS Conference, Barcelona, Spain, July 7-12, 2002*.
- Santos B, Beck E, Peixoto M. Survival and medical intervention in southern Brazilian AIDS patients. *Int J STD AIDS* 1994; 5:279-83.
- PAHO Working Group summary report. *Building blocks: comprehensive care guidelines for persons living with HIV/AIDS in the Americas*. Cancun, Mexico: PAHO/WHO, UNAIDS, IAPAC, 2000:1-11.
- Poole C, Chesney M, Mdanil L, Dzazela N, Nyatela N, Kasper T. Patient-centered approaches to adherence to highly-active antiretroviral therapy in resource poor settings [abstract No ThPeF8195]. *XIV International AIDS Conference, Barcelona, Spain, July 7-12, 2002*.
- Farmer P, Leandre F, Mukherjee JS, Claude M, Nevil P, Smith-Fawzi MC, et al. Community-based approaches to HIV treatment in resource-poor settings. *Lancet* 2001;358:404-9.
- UNAIDS, USAID and the Policy Project. *Measuring the level of effort in the national and international response to HIV/AIDS: the AIDS programme effort index (API)*. Geneva: UNAIDS, 2000.
- United Nations General Assembly Special Session on HIV/AIDS. *Global crisis: global action*. New York: United Nations, 2001.