clinical care, a group of more than 200 clinicians and researchers who specialize in HIV care or investigation formally protested the bill, which is expected to undergo further revision.

Remarkably, HIV infection has made the transition from death sentence to chronic condition in relatively short order. Laws that restrict the ability to collect, analyze, and appropriately share data on HIV-infected patients put them at risk for suboptimal care. HIV-positive patients should be treated in patient-centered, coordinated systems that ensure they receive all needed elements of care, for all their conditions. We believe it is time to remove special provisions for privacy that are based exclusively on HIV testing and diagnosis.

Disclosure forms provided by the authors are available with the full text of this article at NEJM.org.

From the Department of Medicine (L.E.S.-G., S.D., J.O.G.) and the Division of Infectious Diseases (P.E.S.), Brigham and Women's Hospital, and Harvard Medical School (S.D., D.K., P.E.S., J.O.G.) — both in Boston.

1. Lifson AR, Hessol NA, Rutherford GW. Progression and clinical outcome of infection due to human immunodeficiency virus. Clin Infect Dis 1992;14:966-72.
2. May M, Gompels M, Delpech V, et al. Impact of late diagnosis and treatment on life expectancy in people with HIV-1: UK Collaborative HIV Cohort (UK CHIC) Study. BMJ 2011;343:d6016.
3. Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health-care settings. MMWR Morb Mortal Wkly Rep 2006;55:RR14:1-17.
4. McGlynn EA, Asch SM, Adams J, et al. The quality of health care delivered to adults in the United States. N Engl J Med 2003;348:2635-45.

HIV and Aging — Preparing for the Challenges Ahead

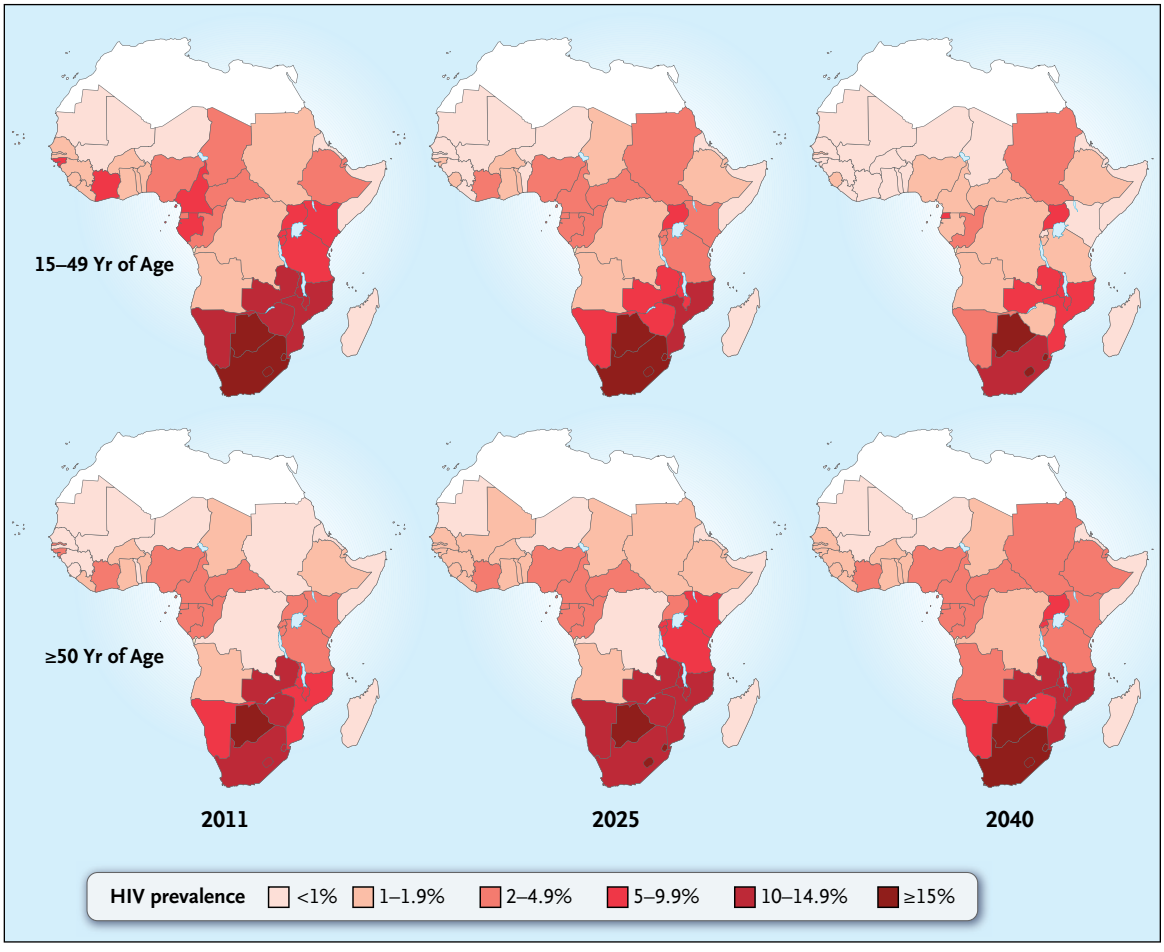
Edward J. Mills, Ph.D., Till Bärnighausen, M.D., Sc.D., and Joel Negin, M.I.A.

By 2015, half the U.S. population living with human immunodeficiency virus (HIV) infection will be older than 50 years of age. As antiretroviral therapy (ART) coverage continues to expand worldwide, this aging of the HIV epidemic will be mirrored in developing countries. In sub-Saharan Africa, ART has already reduced mortality rates, with 320,000 (or 20%) fewer people dying of HIV-related causes in 2009 than in 2004.[1] Currently, HIV-infected Ugandans in their 40s who are receiving ART can expect to live well into their 60s.[2] The increased life expectancy of HIV-infected persons will lead to increases in HIV prevalence among older adults. Approximately 1 in 8 HIV-infected adults and 1 in 10 patients receiving ART in sub-Saharan Africa are older than 50 years of age,[3] and these ratios are likely to increase manyfold in the coming decades (see maps).

Yet the world is unprepared to deal with an aging population with HIV. We are still learning about what determines the success of ART in older age groups, and our understanding of the future needs with regard to treatment for chronic noncommunicable diseases, such as cardiovascular disease and diabetes, in older HIV-infected adults in developing countries is very limited. To date, the focus of the global response to HIV has been on providing care to mothers, children, and the most severely immunocompromised patients. The June 2011 United Nations High-Level Meeting on AIDS emphasized the integration of HIV services with maternal and child health services but neglected the emerging evidence on the aging of the HIV epidemic. Similarly, the September 2011 United Nations High-Level Meeting on Non-Communicable Diseases did not consider the effect of the large-scale provision of ART in developing countries on the age distribution of the population and the future global need for the treatment of noncommunicable diseases. The failure of both meetings to consider the issue of HIV and aging underscores how little attention is being paid to this coming challenge.

Effectively addressing the needs of aging HIV-infected populations will require political will, strengthened health systems, a greater commitment of human resources, and improved clinical infrastructure and expertise.

Political will is needed to put the aging of the epidemic on political agendas worldwide, just as it was necessary before 2004 to mobilize governments and donors to commit to improving access to ART. Political pressure helped drive down the price of ART from more than $10,000 to less than $100 per person per year. Similar action could help address the current high cost of drugs for diseases occurring late in life, including many cancers and end-stage organ diseases such as congestive heart failure and renal failure.



HIV Prevalence in Sub-Saharan Africa in 2011, 2025, and 2040.

Shown are the prevalence of HIV in the population 15 to 49 years of age and in the population 50 years of age or older in sub-Saharan Africa for the year 2011 and projections of HIV prevalence in those populations in the years 2025 and 2040 with continuous scale-up of antiretroviral therapy programs. Maps courtesy of Jan Hontelez, Erasmus University, Rotterdam.

The second major challenge relates to the way in which health systems in developing countries respond to the need for treatment of chronic noncommunicable diseases in HIV-infected patients. Both HIV infection and ART exacerbate a range of diseases that occur in older people, including cardiovascular disease, diabetes, and osteoporosis. In Africa, providers of HIV-related services are unable to meet the health systems challenges of caring for HIV-infected patients with other chronic diseases. Clinics that provide ART are typically minimally stocked with drugs other than antiretrovirals and rarely offer drugs that reduce modifiable disease risk factors (most notably, antiplatelet, antihypertensive, and lipid-lowering medications). Health maintenance through routine assessment of blood pressure, blood glucose levels, and cardiac function through clinical examination, as well as counseling and screening for common cancers, is often overlooked. Clinical visits for HIV care may be the only medical access that a patient has in many African countries. ART programs therefore ought to begin screening for coexisting chronic conditions and ensuring that patients have access to appropriate treatments. Yet few ART clinics can offer laboratory tests to detect risk factors for noncommunicable diseases and to diagnose cardiovascular disease, diabetes, and cancers; and treatments for common chronic diseases of old age are either not integrated into ART services or not available at all.

The third challenge — the need for adequate human resources —

has been largely ignored. There are fewer than 25 geriatric clinicians in all of sub-Saharan Africa, and in most of the region's countries there are none. In many sub-Saharan African countries, medical schools do not offer courses in geriatrics. Clinicians in HIV service organizations typically do not receive ongoing education about the complexity of HIV in older patients.

One of the great achievements in the organization of the HIV response has been the definition of, training for, and large-scale implementation of appropriate ways of shifting clinical tasks from medical experts to nonphysician clinicians and even lay health workers and patients. Given current shortages in the health workforce in many developing countries, it seems likely that managing chronic diseases in HIV-infected patients will require similar approaches. Task shifting in the provision of clinical services such as hypertension screening, monitoring of adherence to cardiovascular drugs, tobacco cessation programs, and cancer support groups can be a first step while infrastructure is built. However, task shifting is not a long-term solution to aging-related care. Training and recruiting specialist nonphysician clinicians with expertise in geriatrics will be necessary and require the involvement of medical colleges and support from international funding bodies.

Rehabilitation services, including physical therapy, occupational therapy, and mobility aids, will also present an important challenge for HIV service providers. Building rehabilitation infrastructure will require innovative strategies such as turning to resources and talent in the affected communities. For example, makeshift mobility or rehabilitative aids constructed from locally sourced materials could benefit patients when standard equipment is unavailable or in short supply. Even such small advances can have a large positive impact on communities.

Finally, older adults with HIV face a number of distinct clinical challenges, including slower immunologic recovery with ART than is observed in younger populations. According to emerging evidence on survival, patients 50 years of age or older who are receiving ART are 30% (95% confidence interval, 19 to 40) more likely than younger adults to die prematurely within 4 years after beginning treatment.[4]

Both HIV infection and antiretroviral therapy exacerbate a range of diseases that occur in older people, including cardiovascular disease, diabetes, and osteoporosis.

The reasons for poor survival in this population are not well understood. Insufficient attention has been given to clinical challenges of adherence, drug interactions, and toxicities when older HIV-infected patients are receiving multiple treatments for various conditions such as tuberculosis. These challenges are exacerbated by poor nutrition, high rates of poverty, and the social demands on older adults in many communities in developing countries.

Yet services for HIV-infected patients cannot be provided without also considering the needs of HIV-negative patients with aging-associated diseases. Although there is currently international attention focused on noncommunicable diseases, the level of commitment for treating these conditions is limited. The principles of the HIV–AIDS response — test, treat, retain, adhere, and simplify care — can be useful in addressing aging-associated diseases in Africa.

U.S. Secretary of State Hillary Clinton has called on the world to commit greater treatment and preventive resources in the hope of ushering in an "AIDS-free generation." This is indeed a laudable goal, yet we must also care for the millions of already-infected people struggling to obtain and cope with long-term ART while dealing with coexisting conditions. Recent modeling using South African data suggests that HIV prevalence among people older than 50 years of age will nearly double in the next 30 years, and the absolute number of similarly aged HIV-infected patients will triple in the same period.[5] The development of programs for aging HIV-infected populations in developing countries will thus be a critical medical and public health challenge in the near future. How it is addressed may well decide the long-term success of the global ART scale-up, one of the largest public health interventions in history.

Disclosure forms provided by the authors are available with the full text of this article at NEJM.org.

From the Faculty of Health Sciences, University of Ottawa (E.J.M.); the Harvard School of Public Health, Boston (T.B.); the Africa Centre for Health and Population Studies, Mtubatuba, South Africa (T.B.);

and the Sydney School of Public Health, University of Sydney, Sydney, NSW, Australia (J.N.).

1. UNAIDS report on the global AIDS epidemic 2010. Geneva: Joint United Nations Programme on HIV/AIDS, 2010 (http://www.unaids.org/globalreport/global_report.htm).

2. Mills EJ, Bakanda C, Birungi J, et al. Life expectancy of persons receiving combination antiretroviral therapy in low-income countries: a cohort analysis from Uganda. Ann Intern Med 2011;155:209-16.

3. Negin J, Cumming RG. HIV infection in older adults in sub-Saharan Africa: extrapolating prevalence from existing data. Bull World Health Organ 2010;88:847-53.

4. Bakanda C, Birungi J, Mwesigwa R, et al. Association of aging and survival in a large HIV-infected cohort on antiretroviral therapy. AIDS 2011;25:701-5.

5. Hontelez JAC, Lurie MN, Newell ML, et al. Ageing with HIV in South Africa. AIDS 2011;25:1665-7.