

COMMENTARY

THIRTY YEARS OF AIDS IN AMERICA: A STORY OF INFINITE HOPE

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The year 2011 marks the thirtieth anniversary of the first case reports in the United States of what we now know to be end-stage HIV disease. This chronological milestone provides an opportunity to reflect upon the changing context of the American HIV/AIDS epidemic. Using two seminal documents as a framework, the 1986 Institute of Medicine Report, “Confronting AIDS,” and the 2010 National HIV/AIDS Strategy, this descriptive analysis details our accomplishments in addressing the domestic U.S. epidemic and outlines what remains to be done on the long road to eradication of HIV disease. The past three decades have witnessed tremendous biomedical and behavioral advances in preventing, diagnosing, and treating HIV disease. However, to fully realize the promise of these scientific advances, such that we achieve the vision of the National HIV/AIDS Strategy, we must develop effective strategies to surmount a number of salient challenges, including: unbalanced combinations of prevention interventions; programs that are not of adequate scale to achieve population-level results; systems of service delivery that do not function in an integrated fashion; and social and economic structures that increase the vulnerability of populations who are at risk for or living with HIV disease.

As both the lay (Healy & Maugh, 2011) and scientific (Dieffenbach & Fauci, 2011) press have noted, June 5th of this year, marked the thirtieth anniversary of the first case reports of what we now know to be end-stage HIV (human immunodeficiency virus) infection (CDC, 1981), otherwise known as AIDS, the acquired immune deficiency syndrome. Given the broad and profound impact that this epidemic has had on families, communities, systems of care, social norms, and our collective scientific enterprise, there are many ways that one might make note of this milestone. First and foremost, it is an occasion for solemnity and commemoration. Since those first five cases were reported in early June 1981, nearly 600,000 men, women, and children have died in the United States as a result of HIV disease (CDC, 2011a), and

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globally, an estimated 30 million people have died of HIV-related causes (UNAIDS, 2010). With profound sadness, we recognize that HIV has brought premature death to millions—and that behind every one of these mind-numbing numbers are families, partners, spouses, co-workers, and neighbors who have been permanently affected by the loss of someone held dear (Valdiserri, 1994).

Even in the face of this astonishing mortality, there are reasons to mark this thirtieth anniversary with hopeful expectation. In the industrialized nations of the world, including the U.S., survival following an HIV diagnosis has improved considerably with the advent of highly active antiretroviral therapy (HAART) in the mid 1990s. Between 1995 and 1998, AIDS deaths decreased 63% in the United States (CDC, 2011b). Analysis of surveillance data from 25 U.S. states found that the average life expectancy after HIV diagnosis increased from 10.5 to 22.5 years between 1996 and 2005 (Harrison, Song, & Zhang, 2010). But it's not only in the treatment realm where we have seen remarkable advances in knowledge. Prevention science has, likewise, logged very impressive gains in the past three decades.

In the United States, routine HIV screening of women during pregnancy and prompt antiretroviral treatment for those found infected has resulted in a 92% decline in perinatal HIV transmission (Fowler, Gable, Lampe, Etima, & Owor, 2010). Scientifically rigorous studies of behavioral interventions, targeting both homosexuals and heterosexuals, have shown efficacy in reducing sexual risk behaviors and promoting condom use (Darbes, Crepaz, Lyles, Kennedy, & Rutherford, 2008; Herbst, Beeker, et al., 2007; Johnson, Scott-Sheldon, Huedo-Medina, & Carey, 2011; Johnson et al., 2008). Among drug users who inject opioids, domestic and international observational studies show that treatment with opioid agonists are effective in reducing injection drug use and are associated with lower rates of HIV prevalence and incidence (Hartel & Schoenbaum, 1998; Sullivan, Metzger, Fudala, & Fiellin, 2005). And for injection drug users who are unable or unwilling to curtail drug use, access to sterile injection equipment, as a component of a comprehensive package of prevention services, has been shown to reduce risky injection behaviors and in some studies has been associated with reduced HIV transmission among injection drug users (Palmateer et al., 2001).

Results from several noteworthy prevention trials have been published in the past decade. A randomized controlled trial of over 3,000 men conducted in South Africa between 2002 and 2004 demonstrated that men who had been circumcised were 60% less likely to become infected with HIV compared to a delayed circumcision, that is, control, group (Auvert et al., 2005). In 2009, Rerks-Ngarm and his colleagues reported the results from the first HIV vaccine trial that showed any degree of efficacy (Rerks-Ngarm, 2009). Although the results were relatively modest at 31%, researchers are conducting follow-up case-controlled studies to try and identify one or more immunologic correlates of protection (Dieffenbach & Fauci, 2011). Two ground-breaking studies demonstrating the efficacy of antiretrovirals in the prevention of *new* HIV infections were published in 2010. Quarraisha Abdool Karim and her colleagues were able to demonstrate that a 1% tenofovir gel inserted intra-vaginally before and after sexual intercourse reduced HIV acquisition by an estimated 39%, compared to a placebo gel—and its use was not associated with any increase in adverse events (Abdool Karim et al., 2010). Later that same year, Robert Grant and members of the iPrEx Study Team reported a 44% reduction in the incidence of HIV among men and transgendered women who have sex with men who took daily pre-exposure prophylaxis with a combination of two antiretroviral medications as part of a comprehensive package of prevention services (Grant et al.,

2010). The most recent prevention breakthrough, described by Cohen and his colleagues, is the first randomized clinical trial to show that treating an HIV-infected individual can reduce the risk of sexual transmission of HIV to an uninfected partner (Cohen, 2011).

PROGRESS IN ADDRESSING THE U.S. EPIDEMIC

Recent advances notwithstanding, we must acknowledge that we have not yet achieved the vision of the U.S. National HIV/AIDS Strategy which strives to make our nation:

a place where HIV infections are rare, and when they do occur, every person, regardless of age, gender, race/ethnicity, sexual orientation, gender identity or socio-economic circumstance, will have unfettered access to high quality, life-extending care, free from stigma and discrimination. (White House Office of National AIDS Policy, 2010)

Despite declines in reported AIDS cases and deaths since the first decade of the epidemic, CDC estimates that close to 1.2 million Americans are living with HIV, including some 230,000 with undiagnosed infection. And every year in America, nearly 17,500 persons with HIV die (CDC, 2011b).

Perhaps, then, the best way to mark this 30-year milestone is with a critical examination of the progress we have made since those earliest days of the epidemic, reflecting upon the changing context of the American HIV/AIDS epidemic and noting what has been done and what remains to be done on the long road to eradication of HIV disease. The framework for this descriptive analysis will be constructed around two seminal documents: the 1986 publication, *Confronting AIDS: Directions for Public Health, Health Care, and Research* (Institute of Medicine), and the recently released National HIV/AIDS Strategy for the United States (White House Office of National AIDS Policy, 2010). The published report, “Confronting AIDS,” was called for by the presidents of the National Academy of Sciences (NAS) and the Institute of Medicine (IOM) in early 1986, in order to review current responses to the AIDS epidemic—and to make recommendations for future actions and strategies to combat and control the disease (Institute of Medicine, 1986). The National HIV/AIDS Strategy (NHAS), released in July 2010, was put forward as “a concise plan to identify a set of priorities and strategic action steps” to reduce new HIV infections, increase access to care and optimize health outcomes for people living with HIV/AIDS and to reduce HIV-related health disparities (White House Office of National AIDS Policy, 2010, p vii.). Comparing recommended actions in the 2010 NHAS to recommendations that were made some twenty-five years earlier provides a useful framework for reviewing our national progress in the context of a changing American HIV/AIDS epidemic.

REDUCING NEW HIV INFECTIONS

Without doubt, the current prevention landscape provides a number of opportunities that were not available in 1986. As summarized above, in the last three decades substantial progress has been made in both behavioral and biomedical approaches to preventing HIV infection. Furthermore, at the time of the IOM report, HIV incidence in the United States was approximately 130,000 infections per year (Hall et al., 2008), whereas more recent estimates suggest that there were approximately 48,100 new HIV infections in the United States in 2009 (Prejean et al., 2011).

And unlike the situation today, when most Americans are not “very concerned” about HIV/AIDS in America, public opinion polls conducted near the time of the IOM report indicated that a majority of Americans saw HIV/AIDS as the “most urgent health problem” facing the country (Kaiser Family Foundation, 2011).

Unquestionably, there have been substantial contextual changes between AIDS’ past and its present. But, remarkably, some issues have remained salient over this 30-year interval. In 1986, the IOM recommended that sexual behavior and IV drug use be studied, “to find ways to reduce the risk of infection” (IOM, 1986, p. 34). Among the IOM’s specific recommendations was that “the proper use of condoms... should be stressed and condoms must be widely and readily available to the public” (IOM, 1986, p. 111). The 1986 publication also recommended that the United States should “experiment with making clean needles and syringes more freely available to reduce sharing of contaminated equipment” (IOM, 1986, p. 34). Some twenty-five years later, the National HIV/AIDS Strategy continues to recognize condom availability and access to sterile needles and syringes as two “scientifically proven” approaches to reduce HIV transmission (White House Office of National AIDS Policy, 2010).

However, a major distinction between HIV recommendations past and present is the greater awareness today that to effectively reduce HIV incidence at a population level, prevention approaches must be multi-modal, complementary, and mutually reinforcing. The NHAS unequivocally asserts that U.S. “prevention efforts have been hampered by not deploying adequate overlapping, combination approaches to HIV prevention” (White House Office of National AIDS Policy, 2010, p. 15). Publicly funded HIV prevention programs in the United States have long recognized the necessity of employing a combination of effective prevention strategies (Holtgrave et al., 1995). But arguably, the issue of deploying prevention efforts “to scale”—that is, with a critical examination of the geographic, temporal, epidemiologic, and programmatic circumstances of where, when, how broadly and how frequently programmatic efforts should be deployed—has not heretofore been a strong, consistent feature of the U.S. HIV prevention response. This is in stark contrast to the international arena, where explicit considerations of program scale have been a much more prominent feature of program planning discussions (Glick, 2005; Kanshana & Simonds, 2002; Stover et al., 2006).

At one level, a discussion of scaling-up efforts to reduce the incidence of new HIV infections is a discussion of budget. Namely, modelers have estimated that expanding HIV prevention efforts over a ten-year time frame could reduce national HIV incidence by as much as forty percent—and the cost of such an investment is estimated at \$10 billion over the next ten years (Hall et al., 2010). Without minimizing the importance of this observation, there are equally relevant—albeit less obvious—reasons why discussions of prevention scale-up have been somewhat “late to the table” in strategic deliberations about the U.S. HIV/AIDS epidemic.

In many developing nations of the world, HIV/AIDS is a “generalized epidemic,” characterized by UNAIDS as an HIV epidemic that is firmly established in the general population and which consistently demonstrates an HIV prevalence rate of greater than 1% in pregnant women (UNAIDS, 2008). While there is ongoing heterosexual transmission of HIV in America, the U.S. HIV/AIDS epidemic is not a “generalized epidemic” and most new HIV infections occur among men-who-have-sex-with-men (MSM) (Prejean et al., 2011). Even in those instances when American men and women have become infected with HIV as a result of heterosexual transmission, it is apparent that risk is not equally distributed across all heterosexuals

and that risk is much higher among African Americans and Hispanics (Prejean et al., 2011). Simply stated then, assessing the size and the various locations of the populations in need of HIV prevention services—an absolute prerequisite for determining population coverage and scale-up—in situations where the epidemic is generalized and infection risk is more equally distributed across the entire heterosexual population is far more straightforward than in situations where high risk groups may be difficult to locate, characterize, and enumerate.

In 1986, the Institute of Medicine noted that “the homosexual male population...is probably the largest group in the United States at high risk of AIDS but accurate demographic data on this population are extremely limited” (IOM, 1986, pp. 57-58); a similar observation was made about injecting drug users (p. 59). We have learned more about the demographic and other characteristics of various MSM populations in the intervening years since the IOM report was published (Wolitski, Valdiserri, & Stall, 2008). But tellingly, it wasn’t until 2010, the same year that the NHAS was released, that the CDC first estimated the size of the gay and bisexual male population in the United States in order to develop population-specific HIV and syphilis rates among U.S. MSM (CDC, 2010; Purcell et al., 2010). Likewise, researchers have found it challenging to develop accurate estimates of the number of injecting drug users in U.S. metropolitan areas (Friedman et al., 2004).

Resource constraints and lack of accurate demographic data are not the only reasons why discussions of scaling-up HIV prevention responses are inherently complex. In addition to these two sources of uncertainty, we are challenged by current limitations in our understanding of what combinations of interventions—biomedical, behavioral, and structural—will result in the maximum reduction in HIV incidence for specific populations (Millett et al., 2010). While advances have been made in testing individual risk reduction interventions, our study of various “packages” of prevention interventions is far less advanced (Kurth et al., 2011). Currently, the NIH is funding research to: 1) devise optimal HIV prevention packages for specific populations; 2) perform pilot studies to demonstrate that the proposed prevention package is acceptable to the target population and that the study design is appropriate and feasible; and 3) design clinical protocols to rigorously examine the safety and efficacy of these packages in the target population (NIH, 2010).

To summarize, our national HIV prevention efforts have evolved significantly from initial conceptualizations that were often based on assumptions which viewed risky behavior as resulting primarily from inadequate or incomplete information (Valdiserri et al., 1992). But there is no question that achieving the reductions in HIV incidence called for by the NHAS (White House Office of National AIDS Policy, 2010) will require continued investment in the evaluation of population-specific prevention packages (Kurth et al., 2011; NIH, 2010).

IMPROVING ACCESS TO HIV CARE AND HEALTH OUTCOMES

In its 1986 report, the Institute of Medicine recommended that the nation “expand the availability of serologic testing” (IOM, p. 34). At the time of this recommendation, less than two years had passed since the FDA had licensed, in March 1985, the first test to screen donated blood for antibodies to HIV—then referred to as HTLV-III (Valdiserri, 2003). And, it was that very same year—in March 1986—that the CDC issued guidelines recommending counseling and voluntary serologic testing of asymptomatic persons in “high risk groups” as a way “to prevent further transmission of this virus” (CDC, 1986, p. 154). Without specific antiretroviral treatments and given the substantial ambiguity, at that time, surrounding the

interpretation of a positive test result (Valdiserri, 2003), the individual benefits of early diagnosis of HIV infection were often challenging to express in the first decade of America's HIV/AIDS epidemic.

How different the situation today. Treatment advances, especially combination antiretroviral therapy, have greatly increased per-person survival rates. Walensky and her colleagues estimate that at least 3 million years of life have been saved in the U.S. as a direct result of care of patients with AIDS (Walensky et al., 2006). Likewise stunning are the results of the HPTN 052 Clinical Trial, published by Myron Cohen and his colleagues, which unequivocally demonstrated that among 1,763 serodiscordant heterosexual couples, early initiation of antiretroviral therapy, compared to delayed therapy, reduced rates of sexual transmission of HIV-1 by some 96% (Cohen et al., 2011).

Yet sadly, at least 20% of the estimated 1.2 million persons living with HIV/AIDS in the United States are unaware of their HIV infection (CDC, 2011b) and, as such, unable to take advantage of life-saving treatments—treatments that could also result in reduced rates of viral transmission to partners. Also of concern, among those with newly diagnosed HIV in the United States, some 33% go on to develop full-blown AIDS within one year of their initial HIV positive test—meaning that they've been infected and undiagnosed for years prior (CDC, 2011b). Not surprisingly, the National HIV/AIDS strategy notes that “too many people living with HIV are unaware of their status” and calls for an increase from 79-90% in the percentage of persons living with HIV who know their serostatus (White House Office of National AIDS Policy, 2010).

Although today's HIV treatment landscape is bountiful compared to the situation in the 1980s, and we now have unequivocal evidence of the prevention benefits of early HIV diagnosis and treatment (Cohen et al., 2011), we continue to face substantial challenges in terms of the capacity of systems currently in place to diagnose, treat, and care for persons with HIV in America (Institute of Medicine, 2011). To state the obvious, HIV-infected individuals cannot take advantage of improved treatment modalities if they are unaware of their infection. Thus, diagnosing HIV infection is a necessary gateway to HIV care and treatment, initiating a cascade of events that, in the optimal scenario, results in infected individuals being fully and consistently engaged in high-quality systems of care, adherent to antiretroviral therapy, sustaining undetectable viral loads, and receiving recommended prevention services, including clinical preventive services and ongoing risk reduction counseling (Gardner, McLees, Steiner, del Rio, & Burman, 2011).

One must not underestimate the complexities of optimizing the delivery of HIV prevention, care, and treatment services across a variety of different providers and organizations—both governmental and non-governmental—nor minimize the challenges inherent in attempting to knit together services that are delivered by separately funded and managed, vertical programs. To wit, federal HIV/AIDS programs for prevention are located in one agency, programs for care and treatment in another, programs to treat substance use and mental health in a third agency, and programs for housing homeless persons with HIV/AIDS in a different federal department altogether! Further complicating this organizational heterogeneity is the fact that federal HIV/AIDS programs typically lack common program metrics, have data systems that are usually not interoperable, and maintain separate program planning and grant-making processes that are often not well coordinated. Then, too, we must reckon with the growing body of evidence suggesting that the performance of state and local public health systems—important providers of HIV services to vulnerable popula-

tions in the United States—varies widely depending on size, financial resources and organizational structure (Mays et al., 2006). Finally, even if we are able to improve coordination and harmonization across federal, state, and local governmental and non-governmental organizations responsible for diagnosing, linking, and maintaining HIV-infected persons in care, we are faced with the reality that health care-seeking behavior, like all human behavior, is not uniform and is influenced by a number of psychosocial, cultural and structural barriers (Aziz & Smith, 2011).

In order to prevent the cumulative drop-off in subsequent steps of the engagement in care cascade, so compellingly described by Edward Gardner and his colleagues (2011), we must invest in systems that will actively assist persons as they move from one step of the cascade to the next. Different barriers will require different approaches. To improve and enhance the prompt diagnosis of HIV infection, several systemic changes will be required. First, we must continue to support the adoption of routine HIV testing of all adults and adolescents in medical care settings, as was first recommended by the CDC in 2006 (CDC, 2006). There are many understandable reasons why the historical “trigger” for HIV testing was initially based on an apparent risk (e.g., presentation with a sexually transmitted infection, history of current injection drug use, multiple anonymous sexual partners, etc.) or a history of risk that was solicited in a clinical encounter. But thirty years into the American epidemic, ongoing documentation of late and missed HIV diagnoses (CDC, 2011c) requires that we change the mind set of providers as well as patients when it comes to the utility of routine HIV testing in medical care settings.

From the provider’s perspective, this will require modifications in pre- and post-graduate education and training such that HIV testing is no longer seen as an “exceptional” clinical service provided, by “specialists,” to specific, “high-risk” populations (Institute of Medicine, 2011). In medical care settings, systems “that promote HIV screening regardless of risk and streamline consent requirements” will promote the uptake of routine HIV testing (Korthuis et al., 2011, p. 81). Clinical reminders in the electronic medical record, when coupled with an integrated package of quality improvement interventions, have been shown to increase rates of HIV testing in a sustainable fashion in healthcare systems serving U.S. veterans (Goetz et al., 2009).

Consumer attitudes about HIV testing must also change. When persons receiving medical services come to understand that HIV testing is routinely recommended for all patients—regardless of any assumptions about risk behavior, expressed or implied (McCoy et al., 2009), the cultural shift from risk-based to routine testing will be firmly underway. Evidence supporting the acceptability of a “cultural shift” away from risk-based and toward routine HIV testing can be found in our nation’s previous experience in moving away from risk-based HIV testing in pregnancy (CDC, 1985) to recommending that HIV testing be a part of the routine prenatal care for all pregnant women in the United States (CDC, 2001). A more recent example suggesting consumer willingness to accept routine HIV testing can be found in a survey of over 30,000 U.S. veterans receiving care in the Veterans Health Administration (Valdiserri et al., 2010). This survey was conducted on a secure website which provides health information to registered veterans. Seventy-three percent of respondents, over 24,000 veterans, indicated that they would be “very likely” to get an HIV test if it was recommended by their doctor (Valdiserri et al., 2010) The percentage responding affirmatively to accepting an HIV test was very similar to the proportion who indicated their acceptability of receiving more widely recognized screening tests, such as glucose and cholesterol.

HIV testing must also be expanded in non-clinical settings. Offering rapid HIV testing in mobile testing units in outreach settings (such as public parks, outside bars, and during special community events) and providing rapid HIV testing in other venues (including gay bathhouses, homeless shelters, and needle exchange programs) has been shown to be a feasible approach for reaching individuals who may not be actively engaged in routine medical care (Bowles et al., 2008). But expanding HIV testing services in non-clinical settings will also require systemic changes, including greater investments in staff training programs and quality assurance systems as well as the development of standard operating procedures for locating and providing confirmatory test results to clients with preliminary positive results (Clark, Bowles, Song, & Heffelfinger, 2008).

More than ever before, we appreciate the absolute criticality of systems needed to actively link into HIV care those persons who have been recently diagnosed, to support their retention in care, and to assure their ongoing receipt of needed services, including antiretroviral therapy. Despite this heightened awareness, existing approaches to linking and retaining persons in HIV care are in need of strengthening (Mugavero, Norton, & Saag, 2011). Gardner's analysis indicates that approximately three-quarters of persons diagnosed with HIV in the United States successfully link to HIV care within 6-12 months after diagnosis; this means that at least one-quarter do not (Gardner et al., 2011, p. 794). And after their initial linkage into care, studies reveal that approximately half of all diagnosed HIV-infected individuals are not engaged in regular HIV care (Gardner et al., 2011, p. 794; Marks, Gardner, Craw, & Crepaz, 2010).

Like the multiple factors that influence, pro and con, the uptake of HIV diagnostic services, there is no single circumstance or variable that can account for all variations of retention in HIV care. Predictors of delayed linkage to HIV care and poor retention in care include demographic, socioeconomic, and psychosocial variables as well as measures of disease severity (Giordano, 2011; Torian & Wiewel, 2011). And even in systems where there are minimal financial barriers to HIV care, retention may be suboptimal (Giordano et al., 2007). Clearly, there is no single solution to improving linkage to and retention in HIV care. Granted "the study of interventions to retain patients in care is a fairly young science" (Giordano, 2011, p. 13), but there are a number of promising strategies that are worthy of further evaluation.

One obvious solution to improving linkage to and retention in HIV care is to strengthen the integration of the various prevention, medical, and psycho-social components that are required to deliver high quality HIV care. But let's be clear; this proposed solution is not unique to HIV/AIDS. The increasing complexity of providing quality health care, via multi-disciplinary teams, to health consumers with a host of chronic illnesses, has sparked a rich and dense literature on integrated care (Ouwens et al., 2005). Integrated health care has been defined in a variety of ways with varying emphasis on different elements, including: improving organizational management; enhancing consumer access; ensuring quality of care; and promoting user satisfaction (Kodner & Spreeuwenberg, 2002). Each of these elements can be seen in recent movements in the United States to transform traditional medical/health care delivery into more patient-centered models of care (Nutting et al., 2009). These features can also be seen in recent approaches that have been employed to improve linkage/retention in care for persons with HIV infection.

Hoang and colleagues reported that persons with HIV who were cared for in medical settings with integrated multi-disciplinary care (i.e., in addition to HIV pri-

mary care, onsite services for viral hepatitis, mental health, substance use, social services, etc.) were three times more likely to achieve viral suppression compared to persons who were seen in clinics that only offered HIV primary care (Hoang et al., 2009). Others have also reported positive outcomes, documented by quality performance measures, for person receiving HIV care in integrated health care systems (Backus et al., 2010; Horberg et al., 2011). But even in these large, integrated health care delivery systems, areas for improvement turn up. Horberg and his colleagues noted that more than one in five persons newly diagnosed with HIV had immunologic AIDS (i.e., CD4+ cell counts below 200) at the time of their initial HIV diagnosis (Horberg et al., 2011). And Backus and her VA colleagues found that African Americans and persons who had a history of using opiates, cocaine, or amphetamines were less likely to access and receive HIV-specific care (Backus et al., 2010).

There are other systems-level approaches to addressing shortcomings in linkage to and retention in HIV care that don't, strictly speaking, require co-location of services. For example, Lytt Gardner and his colleagues were able to show that "strengths-based" case management was associated with a significantly higher rate of successful linkage to HIV care, compared to passive referral (Gardner et al., 2005). In San Francisco, a clinical linkage team consisting of a nurse, a social work associate, and a nurse practitioner were able to connect, into HIV care, over 90% of newly diagnosed and out-of-care HIV-infected patients who were tested in an emergency room setting (Christopoulos et al., 2011). And there is growing enthusiasm for the use of patient-navigators, a strategy first employed for cancer patients with poor socioeconomic supports, as a means of improving linkage, access, and retention in HIV care (Bradford, Coleman, & Cunningham, 2007).

The systems-level approaches cited above, and likely several others newly under development, will require ongoing study and support. But in order to achieve the NHAS goal of increasing access to care and optimizing health outcomes, we will need to not only improve the interoperability of various health-care delivery systems, but also expand their capacity. Although the context is vastly different today, it is noteworthy that in 1986, the IOM urged that we "begin planning and training now for an increasing case load of patients with HIV infection" and that the government "devise methods of financing care that will provide appropriate and adequate funding" (IOM, 1986, p. 34). In a 2011 IOM analysis of "Health Care System Capacity for Increased HIV Testing and Provision of Care," developed in response to a request from the White House Office of National AIDS Policy (ONAP), experts noted that there has been a "dramatic increase in the number of clients served in Ryan White clinics in the past decade" (IOM, 2011, p. 3) as witnessed by the over 9,000 persons on ADAP (AIDS Drug Assistance Program) waiting lists in 12 states (National Alliance of State and Territorial AIDS Directors, 2011). The 2011 IOM report also noted that "the supply of HIV providers is not keeping up with demand for HIV care" (p. 29).

These observations make clear that, although the scientific, economic, and demographic terrain of the American HIV/AIDS epidemic has changed considerably in the 25 intervening years since 1986, we continue to grapple with the systems-level changes that are necessary in order to increase access to HIV care and improve health outcomes. These requisite systems changes must take place in both the public and private sectors among governmental as well as non-governmental organizations.

REDUCING HIV-RELATED HEALTH DISPARITIES

When “Confronting AIDS” was published in 1986, the Institute of Medicine recorded that, by race/ethnicity, 60% of persons with AIDS were white, 25% black, and 14% Hispanic. At that time, 93% of reported AIDS cases were among men and male-to-male sexual contact was the predominant mode of transmission (IOM, 1986, pp. 70, 72). In contrast, persons who were diagnosed with AIDS in 2009 (most recently available data) were predominantly racial/ethnic minorities: 49% were black, 28% were white and 20% were Hispanic (CDC, 2011a). The percentage of women diagnosed with AIDS in 2009 was 25% and while cases attributable to heterosexual transmission have greatly increased since 1986, male-to-male sexual contact remains the predominant mode of HIV transmission in the United States (CDC, 2011a).

One can legitimately argue that even in 1986, blacks and Hispanics were over-represented in the tally of persons with AIDS—compared to their distribution in the general U.S. population (Hobbs & Stoops, 2002)—but admittedly, this disparity has become even more pronounced in recent years (CDC, 2011e). Updated estimates of incident HIV infections in the United States underscore this assertion. Epidemiologists at CDC estimate that of all new HIV infections that occurred in the United States in 2009, 44% were among blacks, 32% among whites, and 20% among Hispanics (Prejean et al., 2011). And without a doubt, HIV disparities among gay and bisexual men have continued. The CDC estimates that in 2009, 61% of all new HIV infections in the United States occurred among gay and bisexual men. Male-to-male sexual transmission accounted for 86% of all new HIV infections among white men, 73% of all new HIV infections in black men, and 81% of all new HIV infections among Hispanic men (Prejean et al., 2011).

Population-level disparities are seen not only in the risk of acquiring HIV infection, but also in the clinical outcomes of persons once they acquire HIV disease. Harrison and her colleagues noted that while all racial/ethnic groups in the U.S. have experienced increases in life expectancy in the wake of highly active antiretroviral therapy (HAART), gender and racial/ethnic disparities persist (Harrison, Song, & Zhang, 2010). Using models to simulate cohorts of HIV-infected persons, Losina and her colleagues predicted greater survival losses for HIV-infected racial/ethnic minority women compared to their white counterparts (Losina et al., 2009). In their model, avoidable losses in life expectancy were due to late presentation, early discontinuation of care, and persistent risk behavior, for example, substance use.

As previously stated in this commentary, the burden of HIV/AIDS in America has never been equally distributed across the general U.S. population. Granted, in the early days of the epidemic, there was much heated discussion reflecting a “broad spectrum of opinion” about the extent to which the virus would move from “high risk group” to penetrate general heterosexual populations (IOM, 1986, p. 90). But three decades of U.S. surveillance data continue to describe an epidemic that is not generalized but is, instead, disproportionately distributed on the basis of sexual orientation and race/ethnicity (Prejean et al., 2011). Unlike earlier surveillance summaries of groups at disproportionate risk, more recent summaries identify transgender (male-to-female) women as a group at very high risk for infection (CDC, 2011f; Herbst et al., 2008).

Disparities, then, are not a new feature of the American HIV/AIDS epidemic. But what is novel about today’s context compared to the early epidemic years is our heightened understanding of the broad array of non-biologic variables that significantly influence HIV disease acquisition and subsequent health outcomes. Twenty-

first century scholars cannot claim to have discovered this strong connection between social circumstance and health. Public health historians often point to Rudolf Virchow's groundbreaking report on the social factors contributing to a typhus outbreak in Upper Silesia in the late 1840s as one of the first major pronouncements on the social origins of illness (Virchow, 2006). And even in the first decade of the American HIV/AIDS epidemic, there were those, including Drs. Rodrick and Deborah Wallace, who recognized and called attention to the complex interrelationship between social and community structures and the spread of AIDS (Wallace & Wallace, 1990). But, without question, as we seek to resolve health disparities in this fourth decade of the U.S. HIV/AIDS epidemic, it is apparent that the public health community has come to accept the reality that health inequities cannot be resolved without addressing fundamental social inequalities (CDC, 2011g; Rubin, Colen, & Link, 2009).

In their excellent review of the social epidemiology of HIV/AIDS, Poundstone and his colleagues note that "advances in multi-level modeling, geographic information systems software, and databases linking public health data with information on social factors" have contributed to a deeper appreciation of the social and structural determinants of HIV/AIDS (Poundstone, Strathdee, & Celentano, 2004, p. 29). A more comprehensive understanding of these determinants can, in turn, lead to the development and testing of more effective, multi-component interventions to address the structural factors that continue to account for HIV/AIDS disparities: discrimination due to racism, sexism, homophobia, transgenderphobia, and AIDS stigma; economic disadvantage; and other constraints that prevent vulnerable populations from accessing societal benefits (Choi, Han, Paul, & Ayala, 2011; Operario & Nemoto, 2010).

The National HIV/AIDS Strategy identifies the following steps as critical for reducing HIV-related disparities and health inequities: 1) reduce HIV-related mortality in communities at high risk for infection; 2) adopt community-level approaches to reduce HIV infection in high-risk communities; and 3) reduce stigma and discrimination against people living with HIV (White House Office of National AIDS Policy, 2010). Accomplishing these steps will require a concerted effort to effect changes in the social determinants of health, namely, the very conditions in which people are "born, work, live, and age" (World Health Organization, 2010). As noted by Adimora and Auerbach, our ability to impact the social determinants of the U.S. HIV/AIDS epidemic will necessitate the widespread implementation of structural interventions to change policy, alter harmful social norms, empower communities, and enable other necessary environmental changes. This cannot happen without strengthening the evidence base for these interventions, compelling us to take-up the study of structural interventions as "a legitimate research pursuit" (Adimora & Auerbach, 2010, S134).

CONCLUSION

There is no doubt that we have made substantial progress in confronting HIV/AIDS in the thirty years since this "new disease" was first described. But as this commentary underscores, we continue to face challenges. Identifying effective prevention packages for at-risk populations and bringing them to scale, modifying health care and other systems so that they can work efficiently across organizational boundaries, and altering the social determinants that impede individuals and communities

from living healthy, disease-free lives—none of these are easily, or quickly, accomplished. But neither are they impossible. In closing, we would do well to remember the words of Dr. Martin Luther King, Jr., who reminded us that “we must accept finite disappointment but never lose infinite hope.” Perhaps that is how we can best commemorate the first thirty years of the AIDS epidemic in America, by recognizing it as a story of infinite hope—a story told by hundreds of thousands of people whose lives, relationships, and careers have been profoundly shaped by this virus.

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