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REVIEW ARTICLE

Human Immunodeficiency Virus in the State of Texas of the United States: Past Reflections, Present Shortcomings, and Future Needs of the Public Health Response

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A strategy titled "Ending the HIV Epidemic: A Plan for America" aims to reduce human immunodeficiency virus (HIV) incidence in the United States by at least 90% by 2030, using diagnosis, treatment, and prevention strategies. Texas is a Southern state that has one of the highest numbers of new HIV diagnoses and people with HIV in the country, and where HIV disproportionately impacts minorities. We retrace the historical epidemic in its largest city, Houston, to illustrate the lessons learned and milestones accomplished, which could serve as guideposts for the future. We examine the current epidemic in Texas, including the achieved levels of HIV testing, treatment continua, and pre-exposure prophylaxis prescription, and compare and contrast these with the national estimates and Plan targets. Our findings call for urgent and accelerated expansion of efforts to end HIV in Texas.

Keywords. EHE; epidemic; HIV; Houston; Texas.

A SNAPSHOT OF THE NATIONAL HIV EPIDEMIC

The United States embarked on a landmark initiative on February 5, 2019, Ending the human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) Epidemic (EHE) [1]. The overall goal is to reduce new diagnoses by 75% within 5 years and by 90% within 10 years [2]. Targets include diagnosis of 95% of people (persons) with HIV (PWH), 95% of whom have viral suppression; and 50% of persons at increased risk for HIV acquisition are prescribed pre-exposure prophylaxis (PrEP). Coordinated and fortified efforts, focusing on diagnosis, treatment, prevention, and response, prioritize 50 local jurisdictions (48 counties, the District of Columbia, and San Juan, Puerto Rico) with the highest number of new HIV diagnoses, and 7 states having substantial rural diagnoses (Figure 1). Six of these 7 states and half of jurisdictions are located in the Southern United States, including 5 counties in Texas.

Despite incredible progress against HIV, the annual number of new HIV diagnoses in the United States has remained steady for over a decade, and since the first case report in 1981, approximately 700 000 persons have died [3, 4]. In 2018 alone [3], 37 515 persons were newly diagnosed, who were disproportionately African American and Hispanic/Latinx. Male-male sexual contact ± injection drug use accounted for most of these (70%), followed by heterosexual contact (24%) and injection drug use alone (7%). By age group, diagnoses rates were highest among 20- to 34-year-olds. This brings the total number of PWH in the United States to an estimated 1.2 million, 14% of whom are undiagnosed [3]. Although 64% have received some HIV medical care, 49% are retained in continuous care and just 53% have viral suppression [5]. Consequently, approximately 38% of HIV transmission occurs from undiagnosed persons, 43% from those who are diagnosed but not in care, and 20% from those in care who are not virally suppressed [6].

The epidemic's epicenter has shifted from the coastal urban centers to the Southern United States [5]: home to approximately 50% of persons who are newly diagnosed, living, or dying with HIV; where the HIV knowledge and health of PWH is below the national average; and where various regional disparities are rampant, driven by pervasive economic, cultural, social, structural, and geopolitical factors [7]. In this study, we examine the HIV epidemic and control efforts in Texas, the second largest and second most populous US state, against a backdrop of the epidemic's history in Houston, its largest city.

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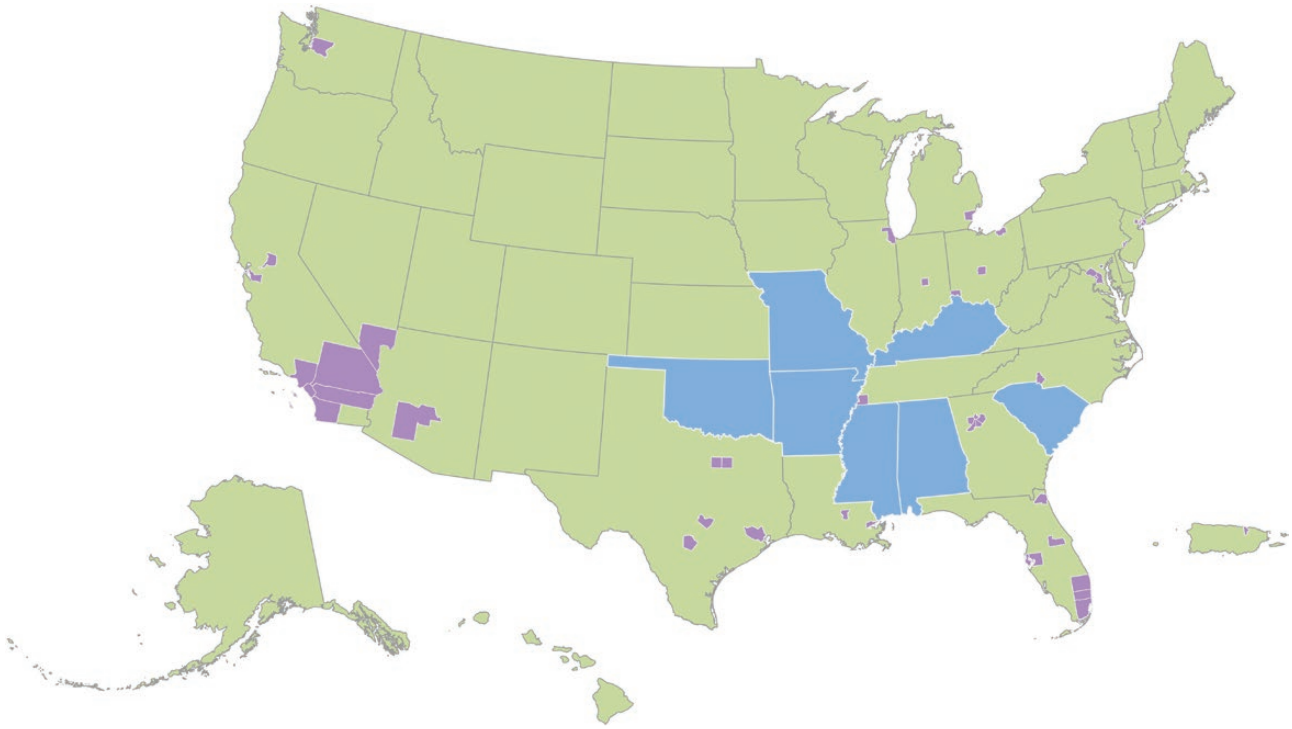

Figure 1. Forty-eight highest burden counties, Washington DC, and San Juan, Puerto Rico, that accounted for more than 50% of new human immunodeficiency virus (HIV) diagnoses during 2016 and 2017 are shown in purple. Seven states with substantial rural burdens of HIV are shown in blue. Adapted from Centers for Disease Control and Prevention. Ending the HIV epidemic. Available at: https://www.cdc.gov/endhiv/index.html. Accessed 17 July 2020.

HIV THROUGH THE AGES IN HOUSTON: INSIDERS' ACCOUNT

Early Years (1970s–1985)

Houston's first health initiative for men who have sex with men (MSM) was launched by a gay activist, Ray Hill, who created and distributed a trifold flyer about sexually transmitted infections (STIs) in gay bars during the 1960s [8]. Later, "Dan the VD Man," from the Houston Health Department, pioneered (mobile) STI testing at gay bars in 1976, followed in 1978 by "Mother Ruth" Ravas [8].

The Montrose Clinic (currently, Legacy Community Health Services) became established in 1978 as a grassroots organization to test and treat MSM for STIs, alongside the Montrose Counseling Center (currently, the Montrose Center) for mental health services, through the efforts of twin gay physicians, Robert and Richard O'Brien [8]. Both of these institutions evolved and thrived, providing crucial prevention, care and support services to the lesbian, gay, bisexual, transgender and queer (LGBTQ) community and PWH. Their board members founded the AIDS Foundation Houston in 1982, the earliest Texas organization dedicated to prevention education and services [9].

In 1981, the first case of gay-related immune deficiency disease ([GRID] currently, AIDS) was diagnosed in Houston, followed by 7 others, mostly white MSM, only 2 of whom survived by the year-end [10]. Next year, Houston's LGBTQ newspaper, the Montrose Voice [11], published a supplement titled "Sexually Transmitted Diseases," focused on Kaposi's sarcoma (KS). The supplement reported that 53 men with suspected immunodeficiency were screened at The University of Texas MD Anderson Cancer Center (MDACC) and found to have cellular immunodeficiency and high risk of developing the "new gay disease," with 4 men receiving treatment for KS [12]. Concurrently, Houston's community physicians cared for many terminally ill MSM. Notable early pioneers included Didier Piot, who had provided care for Gaëtan Dugas in Toronto in 1978, a flight attendant for Air Canada (erroneously termed "Patient 0") [13], Rodger Frasier, Paul Gustafson, Patrick McNamara, Patricia Salvato, and Shannon Schrader.

These and other reports fueled the parallel epidemics of fear and stigma. When the first commercial HIV test became available in 1985 [14], the Montrose Clinic was inundated with testing requests. Different agencies sprung up to provide patients with assistance (eg, food pantry [Stone Soup], residential hostel [McAdory House], hospice [Omega House], numerous charitable organizations, and fundraisers), alongside support venues (Figure 2, Top). However, these efforts and resources were severely outpaced by the epidemic's sheer scale and pace [15].

Call to Action (1986–1995)

Houston became an AIDS epicenter with a record number of cases, fourth highest for several years, nationwide [16]. At the public MDACC, there was an explosive increase in the volume

Figure 2. (Top) Mary's bar located on Westheimer Avenue in Houston was a prominent place of support and family for the community. Credit: JD Doyle, HoustonLGBTHistory.org. (Center) George Foreman, right, with Director of Houston AIDS Foundation and Adan Rios, donates a check for the Food Pantry. Credit: Dr. Adan Rios. (Bottom) John Lawrence (left) and Tyron Garner recite the Pledge of Allegiance at a Houston rally after the Supreme Court's 2003 decision in Lawrence v. Texas. Credit (original photograph owner): © 2018 The Dallas Morning News, Inc.

of AIDS patients in both outpatient and inpatient settings. Here, Peter Mansell and Guy Newell, physicians in the department of cancer prevention, spearheaded AIDS prevention studies and public education efforts [17]. Based on the prevailing healthcare needs and opportunities, American Medical International Inc. (AMI), a for-profit hospital corporation that owned 11 hospitals in Houston, successfully proposed to the University of Texas (UT) System and MDACC, the conversion of AMI's Citizens General Hospital to a unique, freestanding, dedicated AIDS hospital [18]. Predicated on such a facility, and with Peter Mansell as the principal investigator and coinvestigators including Evan Hersh, James Reuben, Blaine Hollinger, and UT Health Science Center School of Public Health (Dean, R. Palmer Beasley), MDACC became a recipient of the first 14 AIDS Treatment and Evaluation Unit (ATEU) Grants countrywide. The 5-year ($5.8 million) grant was awarded for both basic science and clinical AIDS research, by the National Institutes of Health (NIH) [19]. Thus, the nation's first AIDS hospital, the Institute for Immunological Disorders, opened on August 1, 1986, under the leadership of Peter Mansell (medical director), Daniel Moreschi (operations), and Adan Rios (clinical research) [20]. Grounded in MDACC's philosophy of cancer care, the Institute pioneered the now established, outpatient model for HIV care and paved the way for humane treatment and development of therapies for HIV and related malignancies [17]. Unfortunately, the Institute was shut down by AMI, just 15 months later, on December 11, 1987, due to heavy financial loss ($8 million) and dire operational challenges [21]. The drivers for this included the following: Institute's inconvenient location and difficult transportation (~20 miles from inner city and MDACC); disrepute of Citizens General Hospital; inadequate support from local community, private practitioners, and public health officials; meager resources for indigent patients; and underutilization of inpatient services due to an outpatient-, home-, and/or hospice-based model of care [17]. This shutdown was not only a major setback for Houston's AIDS response but also a fatal blow to the Houston ATEU. The MDACC did not revive its former AIDS clinic nor did any other medical institution step forward, to enable ATEU's continued operation [22]. Therefore, MDACC returned the residual grant funds ($4 million) to the NIH, leaving the epicenter Houston without an ATEU, and branding the city with a bad track record and the state with a nonserious reputation about AIDS [23]. Subsequently, MDACC swapped its Railroad Hospital on Thomas Street, with land at Holcombe Street owned by the Harris County Hospital District ([HCHD] currently named the Harris Health System). Thus, the Thomas Street Hospital for AIDS patients was created in 1989, that later became established as the Thomas Street Health Center (TSHC) [24]. The late Robert Awe, a pulmonologist at the Baylor College of Medicine, was a long-time AIDS activist, founder of Omega House (hospice), and medical director of HCHD's Jefferson Davis Hospital (closed since 1991) and its AIDS clinic, the city's first [25]. As an advocate for accessible and high-quality indigent care [26], he declined to direct TSHC upon its inception, to draw attention to insufficient commitment of funds and personnel [27].

Also in 1989, the Montrose Clinic formed the Houston Clinical Research Network, for clinical research and access to investigational drugs, as 1 of 12 sites sponsored by the American Foundation for AIDS Research ([amfAR] currently named The Foundation for AIDS Research) [28]. Furthermore, the Annual Houston Conference on AIDS in America was launched to keep Houston's AIDS community engaged and apprised with the national AIDS scene. This conference was organized by Houston physicians (Adan Rios [director], Gordon Crofoot [codirector], Gary Brewton, Benjamin Valfre, and Jorge Quesada), with collaboration from the City of Houston Bureau of Business and Conventions (director, Don Ward), and

management of International Meeting Managers (director, Lynn Tiras). The codiscoverer of HIV, Luc Montagnier [29], inaugurated both the first session in 1989 and the last held 11 years later. Martin Delaney [30], the founder of Project Inform, a national HIV/AIDS organization for advocacy, treatment information, and public policy, attended this conference, where information was disseminated about new products and services. In addition, the Houston chapter of the NAMES project organized the AIDS Quilt exhibition here in 1990 at the George R. Brown Convention Center [31].

Former heavyweight champion George Foreman contributed substantially to Houston's AIDS welfare. He donated funds ($100 000) to the AIDS Foundation Houston (Figure 2, Center) that, together with land donated by the city of Houston, led to the creation of a well stocked food pantry (Stone Soup) for AIDS patients that exists to this day [9].

Houston was 1 of 6 cities awarded funds from the Centers of Disease Control and Prevention for HIV prevention, including health education, counseling and testing, public information and minority campaigns, plus support for community-based organizations (CBOs). The Ryan White Comprehensive AIDS Resources Emergency Act was enacted in 1990 to provide federal funds for HIV care [32]. Given the epidemic's severity, under the program's first year, Harris and 5 surrounding counties received $3.7 million in 1991, followed by continued substantial funding, which revolutionized HIV care in Houston and nationwide.

The first antiretroviral (ARV) drug, zidovudine (AZT), was approved by the Federal Food and Drug Administration (FDA) in 1987 [33]. Several other nucleoside reverse-transcriptase inhibitors (NRTIs) ensued; however, the first protease inhibitor (PI), saquinavir, was not approved until December 1995, and AIDS deaths continued to rise in the United States including Texas (Figure 3).

Epidemic Maturation, Control Progress (1996–2017)

HIV-related morbidity and mortality started trending down eventually. The availability of several PIs and non-NRTIs, alongside NRTIs, started the era of combination antiretroviral therapy (ART) and declining AIDS deaths, reported for the first time in 1996 (Figure 3). That same year, the FDA approved the first home (over-the-counter) HIV test, urine HIV test, and in vitro nucleic acid amplification test for plasma HIV-1 ribonucleic acid quantification (viral load) [33]. Subsequently, new and improved ARVs have become available for therapy in terms of the following: potency, tolerability, safety, and resistance barrier; fixed-dose drug combinations; and novel ARV generations and classes (including integrase strand transfer inhibitors). Advances in prevention include the milestone approval for ARV PrEP of emtricitabine/tenofovir disoproxil fumarate in 2012 [33]. Consequently, treatment and prevention paradigms have converged towards universal access, treatment as prevention, and combination prevention [34].

Disparities among PWH became apparent by 1996 that showed disproportionately high diagnoses among African Americans nationally. In 1999 [35], name-based HIV diagnosis reporting began in Texas and similar disparities were observed. These and other data prompted the US Congressional Black Caucus to create the Minority AIDS Initiative (MAI). Thus, Houston/Harris County began to receive MAI funding besides Ryan White Title I. The Expanded Testing Initiative, introduced in 2007, helped establish routine, opt-out HIV screening in hospitals and community health centers throughout Harris County [36],

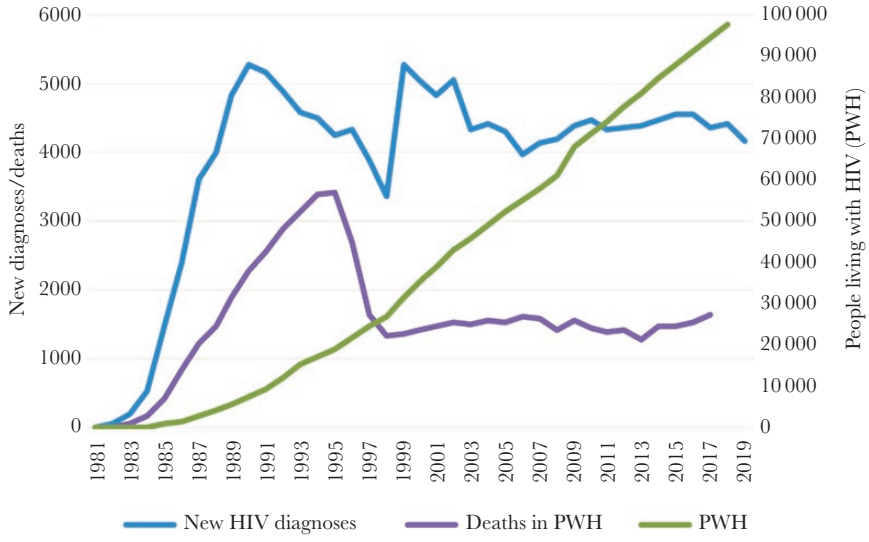

Figure 3. New human immunodeficiency virus (HIV) diagnoses, persons with HIV (PWH), and deaths among PWH in Texas (1980–2019). Adapted from Texas Health and Human Services. Patterns in new HIV diagnoses and HIV prevalence, Texas 2018. Available at: https://dshs.texas.gov/hivstd/reports/. Accessed 17 July 2020.

and a standard nonrapid approach was proven feasible, in a busy urban emergency department [37]. In 2010, the first US National HIV/AIDS Strategy [38] and the Joint United Nations Programme on HIV/AIDS "Getting to Zero" Strategy were created [39]. Subsequently, Houston showcased innovation through various demonstration projects, including the Enhanced Comprehensive HIV Prevention Planning Project (intensify and focus HIV prevention's impact), Project PrIDE (PrEP awareness and using surveillance data for care re-engagement), and Project Conéctate (molecular cluster detection and response) [40–42]. The above have substantially augmented the HIV prevention and care efforts in Houston.

On the societal front, in the 2003 landmark civil rights case, Lawrence v. Texas, the US Supreme Court struck down the sodomy law in Texas in a 6 to 3 decision and, by extension, invalidated sodomy laws in 13 other states, legalizing same-sex sexual activity across the nation [43] (Figure 2, Bottom). This ruling not only supported the civil rights and emancipation of the LGBTQ community, but it also facilitated the historic legalization of same-sex marriage nationwide in 2015. Nevertheless, PWH have been prosecuted in Texas for HIV exposure under criminal laws, including attempted murder and aggravated assault, with consideration of bodily fluids as a deadly weapon because of HIV-positive status [44]. Weeks v. State affirmed the conviction of a PWH for attempted murder, for spitting at a prison guard, and imposed a life imprisonment sentence [45].

Current Epidemic

In 2019, Houston signed with the Fast Track Cities Paris Declaration, an initiative that seeks to end the HIV epidemic by 2030 [46]. This is a crucial commitment because despite control efforts, the Houston Metropolitan Statistical Area ranked 10th in rate of new HIV diagnoses in 2018 [3]. Harris County, which comprises most of Houston, is the third most populous US county, and it is ethnically diverse, predominantly (60%) African American and Hispanic/Latinx [47], and an HIV hot spot [1]. In 2018, this county had the highest diagnoses in Texas (1193; rate, 25.4/100 000 population), and the annual numbers have remained similar since 2008 with cumulative 46 280 diagnoses [48]. Here, there were 26 385 PWH in 2018 [48], with almost 70% of diagnoses among those with male-male sexual contact and 25% with heterosexual contact, while injection drug use contributed another 4%–6% [47–49]. Moreover, although HIV seropositivity is no longer a threat to immigration status [50], immigration regulations and procedures [51] are additional barriers to care and resource utilization for the more than 1.6 million immigrants living in the Houston metropolitan area [52].

The above account of Houston's HIV epidemic and response pays tribute to many unsung heroes and illustrates the shaping of the current face of HIV in the worst affected US region, the Deep South [53, 54]. Moreover, it highlights the importance of addressing stigma, discrimination, criminalization, healthcare barriers, and inequities, as well as prioritization of research, alongside implementing biomedical interventions, for EHE success [55, 56].

THE EVOLVING HIV EPIDEMIC IN TEXAS

Texas is among the US states most severely affected by HIV. In 2018, it registered the second highest number of new diagnoses (4520; rate, 15.7/100 000) and the fourth largest number of PWH (94 106; rate, 327.9/100 000) [3, 48].

The overall trends in the national epidemic are also reflected in Texas [48, 49]. New diagnoses have been relatively stable (>4000 annually) for over a decade, with a modest decrease in rates from 17.7/100 000 in 2009 to 15.7/100 000 in 2018, which are highest among males (26/100 000), blacks (46/100 000), and 25- to 29-year-olds (45.2/100 000). Men who have sex with men and MSM who inject drugs accounted for 74% of new diagnoses, followed by heterosexuals (21%) and other people who inject drugs (5%). The proportion of diagnoses in 2018 compared with 2009 decreased among black heterosexual women (8.1% vs 10.9%), remained stable among white MSM (14.3% vs 14.8%), but increased among transgender persons (1.1% vs 0.7%) and black (21.4% vs 19.2%) and Hispanic/Latino (30.3% vs 23.6%) MSM. Late diagnoses (stage 3/AIDS within 3 months of diagnoses) have also decreased over time (19.9% vs 29.1%) [49].

Predominantly black (37%) or Hispanic/Latinx (34%) and ≥45 years of age (53%) PWH mostly reside in urban areas of Texas [49]. More than half (61%) have acquired HIV through male-male sexual contact, whereas heterosexual contact (23%), injection drug use (9%), and male-male sexual contact/injection drug use (6%) comprise other frequent transmission modes. Jurisdictions with the highest HIV burden are Harris and Dallas, followed by Bexar, Tarrant, and Travis counties [49].

The highest percentage of people without health insurance (17.7%) is in Texas, which is among the states that have not expanded Medicaid; a joint state-federal program that provides healthcare to low-income individuals [57]. Lack of Medicaid expansion is not only a significant barrier for access to HIV prevention and care services but also a major driver of health disparities including among PWH [58].

ENDING THE HIV EPIDEMIC (EHE): STRATEGIC PILLARS

Texas, among other Southern states, is lagging behind in HIV control efforts [3–5, 48, 49, 55, 59]. The EHE initiative, launched by the US Department of Health and Human Services, provides a once-in-a-generation opportunity to eliminate HIV through action focused on the following 4 strategic pillars [1].

Diagnosis

This strategy comprises early diagnosis and immediate linkage to care. HIV testing is a gateway for both prevention and treatment. However, only 38.9% of the US population in 2016–2017 had ever been tested, including 46.9% in the 50 local jurisdictions and 35.5% in the 7 high rural burden states [59]. Although 86% of PWH across the United States were diagnosed, the biggest gaps in the prevalence-based HIV care continuum were linkage to and receipt of care (64%) and retention in care (49%) [60].

In Texas, the percentage of people undiagnosed is higher (18.9%; 95% confidence interval [CI], 13.4%–23.7%) compared with the national average (14.2%; 95% CI, 12.5%–15.7%) [4], as is the rate of new HIV diagnoses (15.7/100 000 vs 11.4/100 000) [3, 48]. Although the diagnosis rate has modestly decreased over time, the proportion of new diagnoses have increased among blacks and Hispanics/Latinx [49]. Stage 3 (AIDS) at the time of diagnosis among the Hispanics/Latinx in Texas is higher than the national average (22.9% vs 21.4%) [5]. In contrast, the overall care linkage at 1 (73% vs 78.3%) and 3 (83.2% vs 86.8%) months is lower [5]. The gaps in the national targets for HIV testing are even wider in Texas [59]. Overall, 46.9% (95% CI, 46.3%–47.5%) of adults aged ≥18 years in the 50 jurisdictions had ever been tested during 2016–2017. By comparison, the percentage ever tested in Texas exceeded the 50-jurisdiction aggregate in only Travis County (50.2% vs 46.9%), whereas the other counties lagged behind (Bexar 45.1%, Dallas 44.2%, Harris 45.9%, and Tarrant 46%). Likewise, the percentage tested in the past year fell short of the aggregate (14.5%; 95% CI, 14%–14.9%) in all counties (Bexar 13.7%, Dallas 14.4%, Harris 13.2, Tarrant 11.6%, and Travis 12.3%). Thus, substantial escalation and prioritization of HIV testing for diagnosis and linkage to prevention and care is required.

Treatment

The treatment pillar entails rapid and effective treatment after diagnosis and achievement of sustained viral suppression. This is critical for several reasons: (1) ~80% of HIV transmission events involve PWH unaware of their serostatus and/or not receiving HIV care and treatment [6]; (2) an undetectable HIV plasma virus level is considered untransmittable (U=U) [61]; and (3) viral suppression leads to reduced HIV-related morbidity and mortality [34].

The diagnosis-based HIV care continuum for Texas (Figure 4) [62] compares favorably to the national continuum in terms of care receipt (76.1% vs 75.7%) and retention (58.2% vs 57.9%), although HIV viral suppression is lower (62.1% vs 64.7% among PWH and 81.6% vs 85.4% among persons with ≥1 viral load test) [5]. However, much more effort is required to achieve the ambitious target of 95% viral suppression within 10 years in Texas and nationwide.

The Ryan White Program provides federal funding for low-income PWH and provides support to more than half of PWH

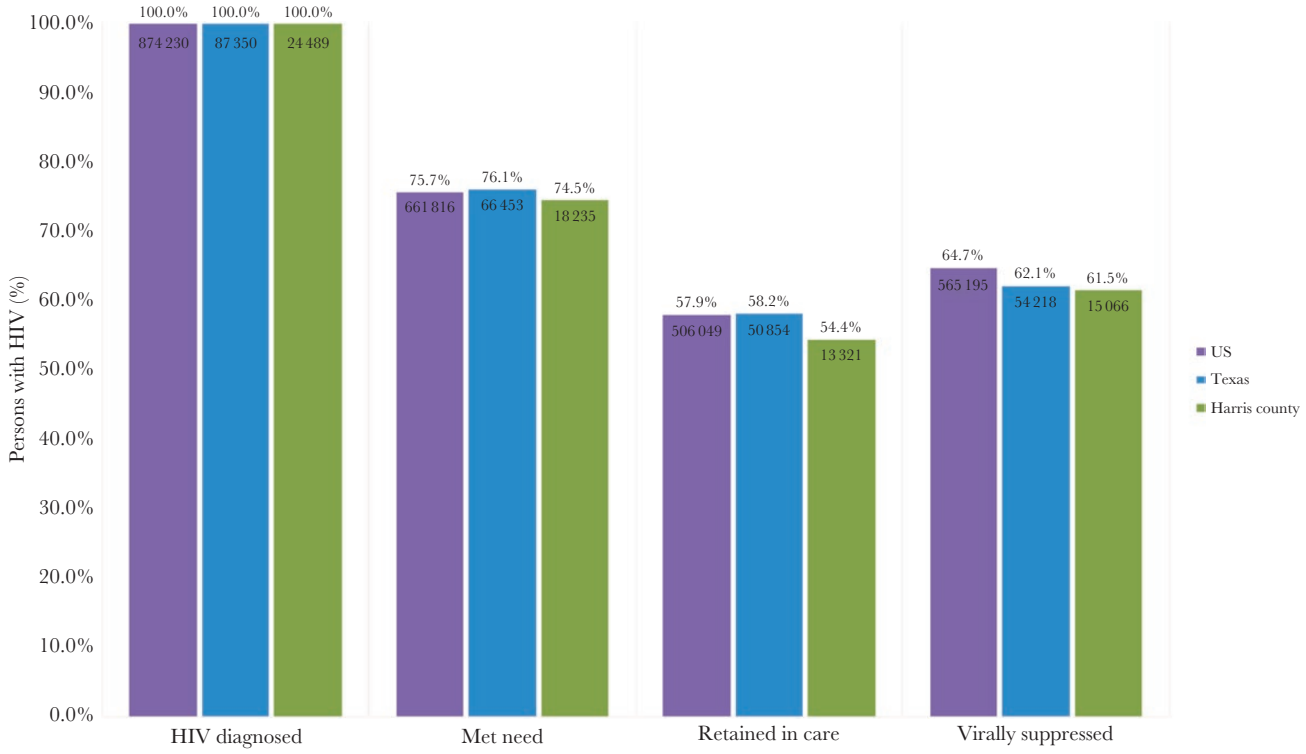

Figure 4. Texas and Harris County diagnosis-based human immunodeficiency virus (HIV) care continuum, 2018. Data source [5]; HIV diagnosed = persons with HIV alive at year-end 2018; Met need = ≥1 CD4 or viral load (VL) test during 2018; Retained in care = ≥2 CD4 or VL tests performed at least 3 months apart during 2018. Virally suppressed = VL test <200 copies/mL in 2018.

in the United States, 63% of whom have incomes below the poverty line [63]. Texas has 40 program-funded primary care providers including Harris County, which has 8 [28]. A 2015–2016 financial assessment in Houston revealed approximately $900 of Ryan White funding per PWH [64], which fell far lower than the 6 cities reviewed in a similar time period [65]. The Ryan White program is crucial for the EHE success and requires sustained and augmented funding nationwide including Texas [63].

Prevention

The prevention pillar embodies the protection of individuals at risk for HIV using proven methods, especially oral ARV PrEP, which is highly efficacious against HIV acquisition among all populations [66]. In 2018, among the 1.2 million persons nationwide with PrEP-use indications, the overall PrEP prescription coverage was just 18.1%, with higher levels among men (20.8%), whites (42.1%), and 25- to 44-year-olds (43.4%) [4]. The overall coverage was even lower in Texas, at 14.3% [4], where an estimated 13 945 persons (rate, 60/100 000) were using PrEP [67]. Of those, 95.5% were males and 39% were aged 25–34 years, whereas 24%, 17%, and 15% were 35–44, 45–54, and ≤24 years old, respectively. These data underscore the urgent and severe need for PrEP scale-up among at-risk individuals and the addressal of PrEP disparities that adversely affect minorities, youth, and women in Texas. Uptake of other biomedical interventions [68], including condom use, needle exchange, and drug rehabilitation, requires concomitant scale-up. Finally, a deeper understanding of the risk factors for HIV acquisition and transmission plus the knowledge, access, positive attitudes, and practices of PrEP and other interventions are crucial for augmenting HIV prevention in Texas.

Response

This stratagem requires rapid detection and response to emerging HIV molecular clusters and prevention of new infections. Drug resistance testing is recommended at entry into care for PWH [34]. Although this may not be cost effective at the individual level [69], resistance testing generates HIV-polymerase nucleotide sequence data that can be analyzed to determine genetically similar viral variants, infer transmission relationships, and identify growing clusters that represent ongoing transmission and potential recipients of public health interventions [70]. Rapidly growing clusters have been detected across the United States, including Texas [71]. Of the 76 confirmed and other cases in a substantial cluster during 2015–2016, 100% were male, 78% were aged 13–29 years, 87% were Hispanic, and 89% reported male-male sex. The lifetime sex partners were 2–300, with 24% reporting anonymous partners. An STI was diagnosed among 13% within 12 months before HIV. None had used PrEP. Overall, 41% had viral suppression within 6 months of HIV diagnosis, whereas 13% had never had a viral load test. High-risk sexual behavior, low PrEP availability, missed cases of acute HIV, and delayed viral suppression were associated with rapid growth of this cluster among young Hispanic MSM [71]. These data highlight the importance of cluster detection and response for focused HIV prevention and treatment.

WIDER PERSPECTIVE

Besides efforts geared towards implementation of biomedical interventions, success of EHE hinges upon optimizing its operational environment [56]. In the South including Texas, access to HIV prevention, care and support services is impeded by the lack of Medicaid expansion and restrictive eligibility criteria, high uninsured rates and low public and private funding. Here stigma, poverty, structural racism, housing and food insecurity, education disparity, and other social determinants of health are rampant and intertwined, with worsening of HIV outcomes and barriers to care [55, 58].

LESSONS AND MEASURES FROM HOUSTON

Houston's HIV experience provides valuable guidance for successful EHE efforts in Texas and elsewhere. Early initiatives relied on trusted activists and community-led grassroots organizations. Although federally qualified health centers (FQHCs) have greatly expanded in the United States and can serve as a critical source of prevention and care services [72], some populations (eg, immigrants) may benefit from renewed efforts to preserve CBOs as trusted partners [73]. Policy adjustment [74] and legal assistance, including immigration-related services [75], are potential structural interventions to decrease risk and improve outcomes of HIV. However, several challenges remain pervasive. There is still substantial HIV stigma in the South [76], more recently evolving into stigma against biomedical prevention tools, such as PrEP [77]. Social determinants of health continue to drive HIV-related disparities [56]. Finally, reminiscent of the loss of ATEU, the Baylor-UTHouston Center for AIDS Research (CFAR) operated from 1994 until 2016 [78].

Table 1 shows a comparison of Harris County with select other EHE priority jurisdictions, in terms of core [79] and other indicators [28] from the following areas [56]: policy and legal, socioeconomic, and service availability. Based on modeled forecasts, EHE scale-up of interventions is likely to be cost-saving in Houston/Harris County similar to other Southern hotspots such as Atlanta, Baltimore, and Miami [80]. However, augmented scale-up [81, 82] and differentiated service delivery [83, 84] will be required for optimal results.

COVID-19 and HIV

The coronavirus disease 2019 (COVID-19) pandemic due to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is an emergent threat to EHE. HIV positivity per se

Table 1. Comparison of Select EHE Jurisdictions

Measure	Baltimore City	District of Columbia	Fulton County	Harris County	King County	Los Angeles County	Miami-Dade County	New York County
EHE Core Indicators (2018) [79]								
Percentage with Knowledge of HIV Status	91.9	93.0	83.7	83.8	88.1	89.5	87.9	91.9
No. of HIV Diagnoses	231	275	605	1199	292	1690	1177	371
No. of Estimated New HIV Infections	210[a]	210[a]	670	1200	310[a]	1400	1100	300[a]
No. of People with Diagnosed HIV	9317	14 067	15 044	25 433	6844	49 184	26 015	26 790
Percentage of People with Diagnosed HIV and Viral Suppression	59.3	55.9	60.6	61.5	82.4	62.8	61.8	63.0
PrEP Coverage Rate (%)[b]	8.7	36.5	22.5	12.9	52.6	29.0	17.1	86.4
EHE Noncore Indicators [28]								
Policy and Legal								
Medicaid Expansion (2020)	Y	Y	N	N	Y	Y	N	Y
HIV/STI Criminalization Laws (Y/N) (2019)	Y	N	Y	N	Y	Y	Y	Y
Syringe Exchange Legal (Y/N) (2019)	Y	Y	Y	N	Y	Y	Y	Y
Socioeconomic								
Percentage of People Experiencing Poverty (2018)	21.8	16.8	15.1	16.2	9.6	16.0	18.0	16.6
Unemployment Rate (%) (2020)	7.4	7.2	7.4	8.5	8.0	11.3	6.0	6.9
Percentage of People without Health Insurance (2018)	8.2	4.5	12.2	22.0	6.4	12.2	20.9	6.7
Service Availability								
No. of Ryan White Medical Providers (2019)	16	14	7	8	5	41	33	18
No. of FQHC Facilities (2019)	32	60	21	88	105	400	213	104
No. of Substance Abuse Facilities with MAT (2020)	80	11	15	31	52	176	27	93
No. of Licensed Providers for Buprenorphine (2020)	768	328	213	553	1240	1865	408	1613
No. of Syringe Services Programs (2020)	3	3	2	2	4	7	2	6
No. of Planned Parenthood Sites (2020)	1	1	0	6	8	26	3	1

Abbreviations: EHE, Ending the HIV Epidemic; FQHC, federally qualified health centers; HIV, human immunodeficiency virus; MAT, medication-assisted treatment; PrEP, pre-exposure prophylaxis; STI, sexually transmitted infection.

[a]The Centers for Disease Control and Prevention indicates that this estimate should be used with caution because it does not meet the standard of reliability (has a relative standard error of 30%-50%).

[b]Defined as "the number who have been prescribed PrEP divided by the estimated number of persons who had indications for PrEP."

does not increase the risk of COVID-19 diagnosis, morbidity, or mortality, and some ARVs may even be protective [85]; however, many PWH belong to demographic groups or have comorbidities that heighten the risk of infection, morbidity, and/or mortality due to COVID-19 [86]. The pandemic has severely disrupted the healthcare infrastructure that PWH use, with as-yet unknown implications [87]. Furthermore, it has overwhelmingly diverted the national and local resources, including those of the health departments in Texas and elsewhere, for the foreseeable future. Nevertheless, the pandemic provides an opportunity for expediting HIV-differentiated service delivery [88].

CONCLUSIONS

The EHE is a laudable initiative. Lessons learned, precise target-gap knowledge, intervention-demand creation, financial and political commitment, and coordinated implementation of strategies will be crucial for ending HIV in Texas.

PATIENT CONSENT STATEMENT

We have permission from the owners of the photographs shown for publication herein. These photographs were taken at public events with the knowledge of their subjects. We do not show any photograph of a patient in a healthcare setting. No original data collection was conducted for this article and therefore institutional review was not required.

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