

Infectious Disease Issues in Underserved Populations



Samuel Neil Grief, MD, FCFP^{a,*}, John Paul Miller, MD^b

KEYWORDS

- Infectious disease • Underserved populations • Minorities • Inmates • Homeless
- HIV • Health outcomes • Barriers

KEY POINTS

- Underserved populations are afflicted with infectious diseases at disproportionately higher rates than the general population.
- Underserved populations face many unique barriers to accessing quality health care.
- Although the Affordable Care Act has helped mitigate some of these challenges, significant obstacles remain.
- Primary care physicians are uniquely qualified to deliver high quality, culturally competent care to this important population.

INTRODUCTION

Although underserved populations have many of the same health concerns as the general population, they are disproportionately affected by higher rates of both acute and chronic illness, receive lower quality care, and experience worse health-related outcomes.¹ Although the Affordable Care Act (ACA) has expanded insurance coverage to many Americans, underserved populations continue to face numerous barriers to accessible and quality health care.²

Although early identification and treatment of infection have the potential to reduce transmission and improve health outcomes,³ shortage of primary care physicians; immigration status; difficulties with transportation; communication issues, including health illiteracy, appointment availability, and previous negative experiences with health care, are some of the challenges underserved populations encounter in navigating the complex health care system.² Given these and other obstacles, infectious diseases are much more likely to be diagnosed at a late stage.^{4,5}

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^a Department of Family Medicine, University of Illinois at Chicago, 1919 West Taylor Street, Chicago, IL 60612, USA; ^b Bakersfield Memorial Family Medicine Residency Program, Department of Family Medicine, University of California Irvine School of Medicine, 420 34th Street, Bakersfield, CA 93301, USA

* Corresponding author.

E-mail address: sgrief@uic.edu

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A comprehensive and integrated patient-centered approach delivered by providers knowledgeable about the specific needs of underserved populations is imperative. In addition, community-based outreach and collaboration with social support services is vital. Primary care physicians are uniquely qualified and positioned to provide essential care to these vulnerable populations.

THE HOMELESS

In the United States, more than 650,000 American men, women, and children of all ages and ethnicities are homeless at any given time.⁶ People facing homelessness often lack adequate health insurance coverage, and struggle with substance use, poor nutrition, mental illness, and chronic medical conditions, including infectious diseases.⁷ Competing priorities for shelter, food, and safety mean homeless populations often delay seeking health care.⁸ These issues contribute to fragmented care that often takes place in crowded emergency departments and requires frequent acute hospitalizations.⁸

Attempts to alleviate an issue may lead to unintended consequences. Although shelters provide protection from the elements, overcrowding may contribute to increased risk of contracting infectious diseases such as pneumonia, tuberculosis (TB), hepatitis A, and skin infestations.³ Homeless women and youth are particularly vulnerable to contracting infectious diseases because they are more likely to suffer from mental illness, use drugs, and engage in high-risk sexual practices, such as exchanging sex for drugs, shelter, food, or money.⁹

Human Immunodeficiency Virus–Acquired Immunodeficiency Syndrome

An estimated 3.4% of the homeless population is infected with the human immunodeficiency virus (HIV) compared with 0.4% in the general population.¹⁰ Prevalence rates in homeless men who have sex with men (MSM) and injection drug users are much higher at 30% and 8%, respectively.¹¹ It is also estimated that 50% of persons living with HIV or acquired immunodeficiency syndrome (AIDS) (PLWHA) are at risk for becoming homeless.¹² The lack of affordable housing, high costs of medical care, and job loss due to discrimination are contributing factors.¹³ Risky behaviors, such as needle sharing, unprotected sex, and survival sex (exchanging sex for money or drugs), increase transmission risk.¹⁴

Due to underlying immunosuppression, homeless individuals with HIV/AIDS may be at increased risk of acquiring other infectious diseases. The prevalence of TB in the HIV-positive population is increased 2-fold in those who stay in shelters compared with those who do not.¹² Evidence shows that homeless or marginally housed PLWHA experience delays in HIV diagnosis¹⁵ and entry into care,¹⁶ as well as lower rates of continuity of care.¹⁷ Adherence to treatment is problematic and is complicated in those with underlying depression and/or substance abuse.¹⁸

Overall, homeless PLWHA have lower CD4 counts, higher viral loads, are less likely to be prescribed or adhere to treatment regimens,^{4,19,20} and have higher mortality rates compared with their nonhomeless counterparts.²¹ Conversely, stable housing improves access to care, HIV-related outcomes, and reduces the risk of ongoing transmission.²²

Hepatitis C

Hepatitis C virus (HCV) is the most common chronic blood-borne viral infection in the United States with an estimated prevalence of 2% in the general population.¹⁷ Prevalence rates in the homeless population were reported as 24% in a recent study⁸ and

as high as 65% to 69% among those who are HIV-positive.¹⁷ Strikingly, as many as 50% of homeless persons with HCV are unaware that they are infected,^{23,24} which puts noninfected contacts at significant risk. Concurrent injection drug use is the strongest risk factor for contracting HCV.²⁵ Older age, veteran status, having multiple tattoos, and previous incarceration are also risk factors.²⁶

Because HCV is asymptomatic until significant complications arise, early screening and detection is paramount.²⁴ Recent guidelines from the US Preventive Services Task Force and the Centers for Disease Control and Prevention (CDC) recommend routine screening for high-risk individuals.^{26,27} The availability of rapid point-of-care testing²⁸ and more effective, tolerable, and easier to administer treatment regimens hold promise for the future.²⁹

Tuberculosis

Despite a declining overall incidence of TB in the United States to a record low,³⁰ outbreaks of TB in certain populations, including the homeless, continue to be a public health challenge.³ A prevalence of 6%³¹ and incidence 46 times the general population has been estimated for homeless people.³² Poor nutritional status and concomitant illnesses such as HIV may promote susceptibility to TB and progression to active disease.³³ Poorly ventilated and overcrowded living conditions were responsible for several recent outbreaks.³⁴

Early recognition and treatment of disease are imperative to improve health outcomes and limit the spread of TB to others.³³ Unfortunately, issues such as alcohol use, use of illicit drugs, incarceration, and underlying psychiatric illness contribute to difficulties in diagnosis and treatment of TB in the homeless.³⁰ The transient nature of the homeless population makes contact identification and tracking difficult, and results in delays in diagnosis and treatment.⁵ Poor compliance with treatment regimens leads to increased morbidity and mortality compared with the general population.⁵

Interferon-gamma release assays as an alternative to traditional skin testing, chest radiograph screening,³⁵ incentives,³⁶ directly observed therapy (DOT),⁵ and the use of a simplified 12-dose regimen of isoniazid and rifapentine³⁷ are some of the strategies used to improve detection and treatment.

Other Infectious Diseases

Scabies and body louse infections are more common in homeless individuals compared with the general population.³⁸ Transmission occurs through close person-to-person contact or through contaminated clothing or bedding.³⁸ Louse-borne disease caused by *Bartonella quintana* (trench fever) and *Rickettsia prowazekii* (typhus) is also possible.³⁹ Frequent scratching of pruritic skin can lead to bacterial superinfections.³⁸

Community-acquired pneumonia and influenza are common in the homeless population.⁴⁰ Overcrowding, smoking and alcohol use, and chronic lung disease increase risk.⁴¹ Vaccination against pneumococcal pneumonia and influenza is underutilized and recommended.⁴¹ Homelessness is also associated with higher rates of tinea pedis, impetigo, and folliculitis.³⁹

INJECTION DRUG USERS

Illicit drug use is a common and growing social problem in the United States, with an estimated prevalence of 9.4%.⁴² Minorities, including African Americans and Latinos, are disproportionately affected.⁴³ Persons who inject drugs, also known as injection drug users (IDUs), are at a substantially increased risk of acquiring and transmitting

blood-borne viruses such as HIV, hepatitis B virus (HBV), and HCV.^{44,45} In addition, illicit drug use is associated with higher rates of TB and sexually transmitted infections (STIs).^{46,47}

Factors that facilitate the transmission of infectious disease in drug users include unstable living conditions,⁴⁸ inability to access treatment programs,⁴⁹ and fear of criminalization and stigmatization,⁴⁸ as well as undiagnosed or untreated mental health disorders.⁴⁸ In addition, individuals may be asymptomatic and/or unaware they are actively infected, which puts unaffected partners at risk.

Illicit drug use impairs judgment, which can increase disease transmission through risky sexual behavior,⁵⁰ needle sharing, and the use of unsterile drug injection equipment (cookers, cotton, and rinse water).⁴⁸

Finally, women IDUs of childbearing age face unique challenges. They often underutilize family planning and prenatal services.⁴⁸ Moreover, actively infected pregnant women who use illicit drugs are at risk of transmitting disease to their children during pregnancy and delivery.⁴⁸

Human Immunodeficiency Virus–Acquired Immunodeficiency Syndrome

Injection drug use is currently the third most common risk factor for contracting HIV and accounted for 8% or 3900 new cases in 2010.⁵¹ HIV transmission also occurs through high-risk sexual behaviors, including but not limited to unprotected sex and engaging in sexual behaviors under the influence of drugs or in exchange for drugs.⁵² Coinfection with other infectious diseases, such as HCV and herpes simplex virus (HSV)-2, is common and further increases transmission and progression of disease.⁴⁸

Addressing comorbid conditions, such as mental illness, substance use disorders, and homelessness, improves HIV treatment.⁵³ Delaying treatment due to concerns about nonadherence is unwarranted,⁵⁴ and may contribute to further spread of HIV⁵⁵ and lower survival rates.⁵⁶ In addition, treatment with antiretroviral therapy (ART) of infected individuals prevents transmission to others.⁴⁸ Care should be taken when combining ART with other drugs, such as methadone and buprenorphine, because potentially toxic drug interactions can occur.⁵⁷

Tuberculosis

Similar to other underserved populations, TB prevention, identification, and treatment remain a challenge among illicit drug users.⁴⁷ Drug use has been associated with increased prevalence of both latent TB infection (LTBI) and active TB.⁵⁸ Several studies report an LTBI prevalence of 10% to 59%.⁴⁷ Several factors may contribute to the high prevalence of TB in drug users, including homelessness, prior incarceration,⁵⁹ alcohol⁶⁰ and tobacco use,⁶¹ and concurrent HIV.⁶² Some evidence suggests drug use may have a direct effect on cell-mediated immune response^{63,64} but the clinical significance of this remains unclear.⁶⁴

Drug users with TB have higher rates and longer periods of infectivity, which leads to greater likelihood of transmission⁶⁵ and extrapulmonary disease.⁶² Coinfection with HIV, HBV, and HCV is common.⁵⁹ Coinfection with HIV increases progression from latent to active infection⁶² and is associated with higher TB-related mortality.⁶⁶ Drug users are less likely to get screened or to initiate and complete treatment, resulting in increased transmission, the development of multidrug resistance, and more severe disease.⁶⁷

Hepatitis B and C Viruses

Being an IDU is the most common risk factor in the transmission of HCV in the United States, accounting for 48% of all new infections in 2007.⁶⁸ Furthermore, IDUs

accounted for 15% of the 43,000 new cases of HBV⁶⁸; 75% to 90% of IDUs are anti-HCV positive.⁶⁹ An emerging epidemic of HCV infection is being seen in young adult injection drug users who have transitioned from the use of oral opioids.⁷⁰ Coinfection with HBV and HCV is not uncommon.⁷¹ Among HIV-infected persons who inject drugs illicitly, 80% also are infected with HCV.⁴⁹ Compared with HIV, HCV is much more infectious⁷² and can survive in syringes and on inanimate objects for prolonged periods of time.⁷³ As a result, environmental contamination and sharing injection preparation equipment are important modes of transmission.⁷⁴ Newer, highly effective and tolerated treatment regimens for HCV are available.²⁹ Administering HCV treatment in concert with medically supervised opioid therapy can increase adherence and treatment success.²⁹

Other Infectious Diseases

The reported prevalence rates of STIs among persons who use drugs illicitly are 1% to 6% for syphilis, 1% to 5% for chlamydia, 1% to 3% for gonorrhea, and 38% to 61% for HSV-2 infection.⁴⁸ Skin and soft tissue infections, such as cellulitis and abscesses, are common in IDUs and are frequent reasons for hospital admission.⁷⁵ Right-sided infective endocarditis, most commonly caused by *Staphylococcus aureus*, can occur.⁷⁶ Coinfection with HIV is not infrequent and advanced immunosuppression (CD4 count <200/mm³) increases mortality.⁷⁶ Nonadherence to long inpatient antibiotic treatment regimens is common in IDUs.⁷⁶ Shorter courses of antibiotics and the use of oral therapy in the outpatient setting may be appropriate in some cases.⁷⁶

LESBIAN, GAY, BISEXUAL, AND TRANSGENDER

Although some progress has been made in understanding and addressing health disparities in the lesbian, gay, bisexual, and transgender (LGBT) community, it remains a significant national public health issue. LGBT populations, like other marginalized groups, face barriers to culturally competent and quality health care.⁷⁷ They are more likely to lack insurance coverage and experience significant societal stigma and discrimination.⁷⁷

Mental illness,⁷⁸ substance use,⁷⁹ and sexual and physical abuse⁸⁰ occur at higher rates compared with the heterosexual population and have negative consequences on general health. In addition to some infectious diseases, studies have found that sexual and gender minorities have more chronic conditions and overall poorer health status.⁷⁸ Recent policy and legal changes offering nondiscrimination protections⁸¹ and recognizing same-sex marriage^{82,83} may help to mitigate some of these challenges.

Human Immunodeficiency Virus–Acquired Immunodeficiency Syndrome

Although MSM are greatly affected by HIV/AIDS, minority men are disproportionately affected.⁷⁷ In 2010, it was estimated that MSM accounted for 56% of all HIV cases and roughly two-thirds of the 50,000 new cases of HIV in the United States.⁸⁴ Coinfection with other STIs, including syphilis, among HIV-positive MSM is common.⁸⁵

Transgender women, especially African Americans, are also significantly affected by HIV/AIDS. Prevalence rates of 28% and 56%, respectively, have been reported.⁸⁶ However, transgender women are less likely to receive ART⁸⁷ and have higher HIV-related morbidity and mortality compared with other populations.⁸⁸ Possible interactions between ART and hormone therapy is a concern for many transgender women.⁸⁹

HIV prevalence in transgender men is low (0%–3%)⁸⁹ but data are limited.⁹⁰ Moreover, although female to female sexual transmission of HIV is rare,⁹¹ lesbian, bisexual,

and other women who have sex with women (WSW) are still at risk of HIV primarily through male sexual contact and injection drug use.⁹²

Human Papilloma Virus

Transmission of the human papilloma virus (HPV) between female sexual partners is common.⁹³ Furthermore, most WSW have had sex with men and many continue to do so.⁹⁴ Abnormalities have been detected on cervical smear testing, even in women who have not had sex with men,⁹⁵ highlighting the importance of adherence to current cervical cancer screening and vaccination guidelines.

The prevalence of HPV is high in MSM, increasing the risk of genital warts and cancers of the penis, oropharynx, and anus.⁹⁶ MSM are 17 times more likely to develop anal cancer than heterosexual men,⁹⁷ with a much higher rate in those who are coinfected with HIV/AIDS.⁹⁸

Other Infectious Diseases

Primary and secondary syphilis in the United States have continued to increase at an alarming rate in MSM, now accounting for 83% of new cases.⁸⁵ MSM transmission accounts for 15% to 25% of all new cases of HBV.⁹⁹ In MSM, gonorrheal and chlamydial infections of the rectum and pharynx are common, especially in those with HIV.¹⁰⁰ The prevalence of bacterial vaginosis in WSW is estimated to be nearly 26% compared with 14% in heterosexual populations.¹⁰¹ The results of several studies suggest female to female sexual transmission is likely.^{101,102} Limited data exist on transmission rates of STIs among WSW but probably varies by the type of STI and sexual behavior.¹⁰³

INMATE POPULATION

Individuals who inhabit correctional facilities, both state and federal, are at increased risk for infectious disease.¹⁰⁴ The prevalence of HIV and other infectious diseases is much higher among inmates than among the general population.¹⁰⁴ High-risk sexual behavior and illicit drug use among incarcerated inmates, and a general lack of condoms and sterile needles or syringes, predispose these individuals to greater risk of infectious diseases.¹⁰⁴ The prevalence of ever having an infectious disease among state and federal prisoners and the general population are compared in [Table 1](#).¹⁰⁵

A similar comparison is presented in [Table 2](#) among jail inmates versus the general population.¹⁰⁵

Human Immunodeficiency Virus–Acquired Immunodeficiency Syndrome

Contracting HIV for men and women is far more likely in prison.¹⁰⁶ Incarcerated women suffer disproportionately from HIV/AIDS and other infectious diseases.¹⁰⁷ High-risk behavior among prison inmates is likely a significant contributing factor to transmission and acquisition of HIV.^{108,109} Unfortunately, prisoners in low- and middle-income countries (LMICs) are at much higher risk for HIV and other infectious diseases. The prisoner prevalence of HIV in 20 LMICs is greater than 10%.¹¹⁰ Overcrowding, lack of public health initiatives, and inadequate access to clean injecting equipment for intravenous drug users are among the reasons for the continued higher risk for HIV and other infectious diseases among incarcerated prisoners.¹¹¹

Education and enhanced protection from sexually transmitted diseases, along with expanded HIV testing among the US inmate population will likely continue to reduce the rate of HIV among all US incarcerated individuals.^{104,112} Awareness of HIV status does affect risk behavior, supporting arguments for increased HIV screening among

Table 1
Prevalence of ever having infectious disease among state and federal prisoners versus general population

	State and Federal Prisoners		General Population	
	Percent (%)	Standard Error	Percent (%)	Standard Error
Ever had an infectious disease ^a	21.0	1.3%	4.8	0.2%
TB	6.0	0.6	0.5	0.1
Hepatitis ^b	10.9	1.0	1.1	0.1
Sexually transmitted diseases ^c	6.0	0.5	3.4	0.1

^a Excludes HIV or AIDS due to unknown or missing data.

^b Includes hepatitis B and C for the prison population and all types of hepatitis for the general population.

^c Excludes HIV or AIDS.

Adapted from The prevalence of ever having an infectious disease among state and federal prisoners and the general population (2011–12). Bureau, National Inmate Survey (NIS), 2011–12; and the Substance Abuse and Mental Health Services Administration, National Survey on Drug Use and Health (NSDUH), 2009–2012.

jail and prison populations.¹¹³ **Fig. 1** reflects the declining rate of HIV or AIDS among US incarcerated individuals.

RACIAL AND ETHNIC MINORITIES

According to the 2010 US Census, approximately 36.3% of the population currently belongs to a racial or ethnic minority group: American Indian or Alaska Native (AI/AN), Asian American, Black or African American, Hispanic or Latino, and Native Hawaiian or other Pacific Islander.¹¹⁴ Racial and ethnic health disparities are widespread in the United States.^{115,116} These disparities are apparent in regard to infectious disease.^{117,118} For example, morbidity and mortality rates from HIV/AIDS in the United States are highest among black or African American, Hispanic or Latino, and native Hawaiian or other Pacific Islander racial or ethnic minorities.¹¹⁹

Table 2
Prevalence of ever having infectious disease among state and federal jail inmates versus general population

	Jail Inmates		General Population	
	Percent (%)	Standard Error	Percent (%)	Standard Error
Ever had an infectious disease ^a	14.3	0.7%	4.6	0.1%
TB	2.5	0.3	0.4	<0.05
Hepatitis ^b	6.5	0.5	0.9	<0.05
Sexually transmitted diseases ^c	6.1	0.5	3.5	0.1

^a Excludes HIV or AIDS due to unknown or missing data.

^b Includes HBV and HCV for the jail population, and all types of hepatitis for the general population.

^c Excludes HIV or AIDS.

Adapted from The prevalence of ever having an infectious disease among state and federal jail inmates and the general population (2011–12). Bureau, National Inmate Survey (NIS), 2011–12; and the Substance Abuse and Mental Health Services Administration, National Survey on Drug Use and Health (NSDUH), 2009–2012.

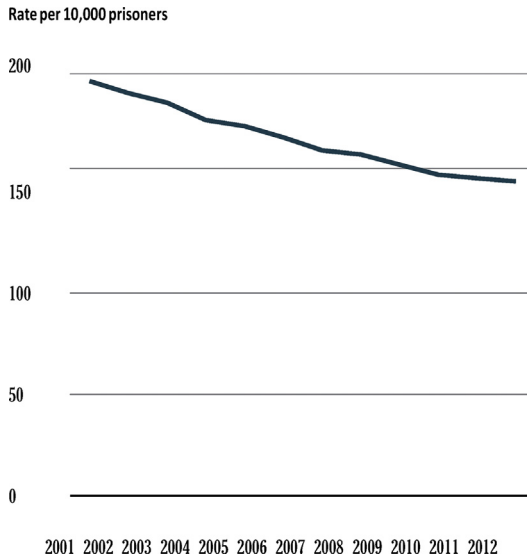


Fig. 1. Rate of HIV or AIDS cases among state and federal prisoners, 2001 to 2012. (Data from Bureau of Justice Statistics, National Prisoner Statistics Program, 2001–2012. Available at: <http://www.bjs.gov/content/pub/pdf/mpsfjpi1112.pdf>. Accessed March 8, 2016.)

Human Immunodeficiency Virus–Acquired Immunodeficiency Syndrome

The AIDS epidemic disproportionately affects racial and ethnic minorities. In 2007, African Americans made up 13% of the US population but accounted for nearly half of PLWHA. HIV/AIDS rates (cases per 100,000) were 77 among black or African Americans, 35 among Native Hawaiians or other Pacific Islanders, 28 among Hispanics, 13 among AI/AN, 9.2 among whites, and 7.7 among Asian Americans.¹²⁰

Non-Asian racial or ethnic minorities continue to experience higher rates of HIV diagnosis than whites. Compared with whites, a lower percentage of blacks diagnosed with HIV were prescribed ART and a lower percentage of both blacks and Hispanics had suppressed viral loads.¹²¹

Tuberculosis

TB case rates declined among all racial or ethnic minority groups and among US and foreign-born individuals from 2006 to 2010. However, rates remained higher among racial or ethnic minority groups than among whites in 2010.¹²² Case rates of TB in the United States are still highest among the foreign-born who have immigrated from Latin America, Asia, and Africa^{122,123} but are also elevated among US born black and AI/AN persons.^{124,125} Lower respiratory tract infection morbidity and mortality rates are higher among AI/AN children than US children.^{114,126}

There are also substantial racial and ethnic disparities for most, if not all, vaccine-preventable illnesses, most notably including HBV, influenza, and pneumococcal disease.¹¹⁴ The CDC's Racial and Ethnic Adult Disparities in Immunization Initiative (READII) was a 2-year project aimed to improve immunization rates for influenza and pneumococcal pneumonia among the African-American and Hispanic communities. Results were favorable, and many strategies for bridging the immunization gap were developed and learned.^{127,128}

HEALTH LITERACY

Health literacy is the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.¹²⁹ Limited health literacy affects all ages, races, incomes, and education levels; however, the impact of limited health literacy disproportionately affects lower socioeconomic and minority groups.¹³⁰ It also affects people's ability to search for and use health information, adopt healthy behaviors, and act on important public health alerts. Limited health literacy is also associated with worse health outcomes and higher costs.¹³¹

Although limited health literacy affects most adults at some point in their lives, there are disparities in prevalence and severity. Some groups are more likely than others to have limited health literacy:

- Adults older than the age of 65 years
- Racial and ethnic groups other than white
- Recent refugees and immigrants
- People with less than a high school or general educational development degree (GED)
- People with incomes at or below the poverty level
- Non-native speakers of English.¹³²

Limited health literacy is negatively associated with the use of preventive services (eg, mammograms or flu shots), management of chronic conditions (eg, diabetes, high blood pressure, asthma, and HIV/AIDS), and self-reported health.¹³² Recent research has focused on health literacy as one of the critical factors in health disparities.^{133–135} The greatest opportunities for reducing health disparities are in empowering individuals and changing the health system to meet their needs.¹³⁵ The National Action Plan to Improve Health Literacy, released May 2010 by the US Department of Health and Human Services, seeks to engage organizations, professionals, policymakers, communities, individuals, and families in a linked, multisector effort to improve health literacy.¹³² The plan includes 7 broad goals with multiple high-level strategies for various stakeholders and provides a focal point for the field.

What are the 7 Goals in the Plan?

- Goal 1: Develop and disseminate health and safety information that is accurate, accessible, and actionable.
- Goal 2: Promote changes in the health care delivery system that improve information, communication, informed decision-making, and access to health services.
- Goal 3: Incorporate accurate and standards-based health and developmentally appropriate health and science information and curricula into child care and education through the university level.
- Goal 4: Support and expand local efforts to provide adult education, English-language instruction, and culturally and linguistically appropriate health information services in the community.
- Goal 5: Build partnerships, develop guidance, and change policies.
- Goal 6: Increase basic research and the development, implementation, and evaluation of practices and interventions to improve health literacy.
- Goal 7: Increase the dissemination and use of evidence-based health literacy practices and interventions.¹³²

BARRIERS TO HEALTH CARE FOR THE UNDERSERVED

The advent of the ACA has made health insurance more accessible for millions of Americans, including underserved populations. It also offers access to preventive services, including screening for HIV, STIs, depression, and substance abuse; the delivery of culturally competent care; coordinated care for chronic conditions; and calls for enhanced data collection and research on health disparities. Despite these advancements, significant barriers to quality medical care still exist (**Box 1**).^{47,77,136–141}

Box 1

Barriers to health care

Health care delivery system barriers

- Inadequate number of providers
- Location of clinics and hospitals
- Availability (operating hours and long appointment wait times)
- Limited data or research on issues related to underserved
- Inadequate reimbursement for behavioral health services in primary care setting
- Inadequate education, testing, and counseling services
- Restricted access to substance use treatment, mental health, and specialty care (HIV clinics)
- Increased administrative and infrastructure challenges with Medicaid expansion

Provider barriers

- Lack of cultural competency
- Poor attitudes
- Lack awareness and knowledge of specific health needs of underserved populations
- Bias, unwelcoming environment

Individual or population barriers

- Lack insurance coverage
- Lack of primary care provider
- Low education and health literacy
- Language barriers
- Immigration status
- Lack support system
- Comorbid mental illness and/or substance abuse
- Mistrust of health care system due to previous negative experiences
- Difficulty adhering to treatment or medication regimens
- Concerns about confidentiality
- Sexual and physical violence (LGBT community)
- Lack of documentation, such as an identification card

DISEASE PREVENTION AND HARM REDUCTION STRATEGIES

Implementing culturally competent public health strategies in a manner that respects the rights of underserved populations is vital for preventing and treating HIV infection, TB, viral hepatitis, STIs, and other infectious diseases.

Health Care Delivery System Improvement Strategies

Although providing comprehensive, integrated, and accessible care in a safe nondiscriminatory environment free from fear of harassment and/or legal intervention is the first priority,^{48,66,141,142} the first task may be assessing health care provider's attitudes and knowledge, and providing the necessary training and education.¹³⁶

Targeted counseling, education, and risk assessment (eg, for drug use and STIs) in concert with timely disease-specific testing^{48,136,142,143} is fundamental, along with improving the availability and access to condoms^{3,48}; vaccination programs^{3,48}; evidence-based interventions, such as ART,^{136,142} TB, and pre-exposure prophylaxis¹⁴²; and mental health services.^{48,136}

Vital for IDUs are access to sterile injection and drug preparation equipment (ie, needle exchange programs),^{48,136,140–143} training in overdose prevention and the provision of naloxone,¹⁴⁴ and improving access to substance abuse treatment programs such as medication-assisted therapy (MAT).^{48,66,136,141–143}

Prevention and control strategies in shelters include ensuring adequate ventilation⁵ and strict enforcement of screening and education programs for all staff and clients.^{5,66} Protocols for identifying high-risk clients (eg, those with HIV) and handling and/or referral of symptomatic clients (eg, cough alert logs) are important.⁶⁶ Finally, bed systems to position (head to toe) and track potentially infectious clients can be helpful.

Providing multiple services (testing, diagnosis, and treatment) in one location,^{48,66} combining treatment services (DOT for TB, MAT for substance abuse,⁶⁶ hormone therapy, and ART)¹⁴² and supervised therapy (DOT, MAT)⁶⁶ can improve adherence. Adherence reminders, such as beepers, pill boxes and calendars, and providing incentives also may be useful.^{48,66,136}

Support Services Improvement Strategies

Community-based outreach programs aim to engage at-risk populations by providing disease-specific and risk reduction education, materials such as condoms and clean needles, and crisis intervention and referrals to essential support services, including drug treatment programs.^{48,66,136,137,141}

Despite health insurance becoming more accessible and affordable for many underserved, the enrollment process can be complicated and confusing.¹³⁸ Frontline workers, including case managers, are uniquely positioned to help guide individuals through this complex process.¹³⁸ In addition, assistance is needed with transportation (eg, bus tickets),¹³⁸ housing, employment services, and legal advice.¹⁴²

Confidential notification of partners who may have been exposed to certain infectious diseases (STIs, HIV, and HCV) through high-risk sexual behavior and/or being an IDU is effective in reducing further transmission.⁴⁸ Disease-specific testing, counseling, vaccination, and referral for treatment or other needed services may be necessary.⁴⁸

REFERENCES

1. Focus on health care disparities. Disparities in health and health care: five key questions and answers. Menlo park (CA): The Henry J Kaiser Family Foundation; 2012.

2. Kullgren J, McLaughlin C, Mitra N, et al. Nonfinancial barriers and access to care for U.S. adults. *Health Serv Res* 2011;47(1pt2):462–85.
3. Badiaga S, Raoult D, Brouqui P. Preventing and controlling emerging and re-emerging transmissible diseases in the homeless. *Emerg Infect Dis* 2008;14(9):1353–9.
4. Kidder DP, Wolitski RJ, Campsmith ML, et al. Health status, health care use, medication use, and medication adherence among homeless and housed people living with HIV/AIDS. *Am J Public Health* 2007;97(12):2238–45.
5. McAdam JM. *Combatting tuberculosis and homelessness: recommendations for policy and practice*. Nashville (TN): National Health Care for the Homeless Council; 1994.
6. Sermons MW, Witte P. *State of homelessness in America*. Washington, DC: National Alliance to End Homelessness; 2011.
7. Hwang SW, Henderson MJ. *Health care utilization in homeless people: translating research into policy and practice*. Agency for Healthcare Research and Quality Working Paper No. 10002. 2010. Available at: <http://gold.ahrq.gov>. Accessed March 8, 2016.
8. Bharel M, Lin W, Zhang J, et al. Health care utilization patterns of homeless individuals in Boston: Preparing for Medicaid expansion under the Affordable Care Act. *Am J Public Health* 2013;103(S2):S311–7.
9. Moore J. *Unaccompanied and homeless youth: review of literature*. Greensboro (NC): National Center for Homeless Education; 1995–2005.
10. *HIV/AIDS and homelessness*. Washington, DC: National Coalition for the Homeless; 2009.
11. Robertson M, Clark R, Charlebois E, et al. HIV seroprevalence among homeless and marginally housed adults in San Francisco. *Am J Public Health* 2004;94(7):1207–17.
12. *Fact sheet: homelessness and HIV/AIDS*. Washington, DC: National Alliance to End Homelessness; 2006.
13. Tomaszewski EP. *Human rights update. HIV/AIDS and homelessness*. Washington, DC: National Association of Social Workers; 2011.
14. Marshall B, Shannon K, Kerr T, et al. Survival sex work and increased HIV risk among sexual minority street-involved youth. *J Acquir Immune Defic Syndr* 2010;53(5):661–4.
15. Aidala A, Cross J, Stall R, et al. Housing status and HIV risk behaviors: Implications for prevention and policy. *AIDS Behav* 2005;9(3):251–65.
16. Aidala A, Lee G, Abramson D, et al. Housing need, housing assistance, and connection to HIV medical care. *AIDS Behav* 2007;11(S2):101–15.
17. Chak E, Talal A, Sherman K, et al. Hepatitis C virus infection in USA: An estimate of true prevalence. *Liver Int* 2011;31(8):1090–101.
18. Royal S, Kidder D, Patrabansh S, et al. Factors associated with adherence to highly active antiretroviral therapy in homeless or unstably housed adults living with HIV. *AIDS Care* 2009;21(4):448–55.
19. Schwarcz S, Hsu L, Vittinghoff E, et al. Impact of housing on the survival of persons with AIDS. *BMC Public Health* 2009;9(1):220.
20. Nelson K, Thiede H, Hawes S, et al. Why the wait? Delayed diagnosis among men who have sex with men. *J Urban Health* 2010;87(4):642–55.
21. Milloy M, Marshall B, Montaner J, et al. Housing status and the health of people living with HIV/AIDS. *Curr HIV/AIDS Rep* 2012;9(4):364–74.
22. Audain G, Bookhardt-Murray LJ, Fogg CJ, et al, editors. *Adapting your practice: treatment and recommendations for unstably housed patients with HIV/AIDS*.

- Nashville (TN): Health Care for the Homeless Clinicians' Network, National Health Care for the Homeless Council, Inc; 2013.
23. Gelberg L, Robertson MJ, Arangua L. Prevalence, distribution, and correlates of Hepatitis C virus infection among homeless adults in Los Angeles. *Public Health Rep* 2012;127:407–21.
 24. Strehlow A, Robertson M, Zerger S, et al. Hepatitis C among clients of health care for the homeless primary care clinics. *J Health Care Poor Underserved* 2012;23(2):811–33.
 25. Hayes B, Briceno A, Asher A, et al. Preference, acceptability and implications of the rapid hepatitis C screening test among high-risk young people who inject drugs. *BMC Public Health* 2014;14(1):645.
 26. Moyer V. Screening for Hepatitis C virus infection in adults: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med* 2013;159(5):349.
 27. Centers for Disease Control and Prevention. Testing for HCV infection: an update of guidance for clinicians and laboratorians. *MMWR Morb Mortal Wkly Rep* 2013;62:362–5.
 28. Shivkumar S, Peeling R, Jafari Y, et al. Accuracy of rapid and point-of-care screening tests for Hepatitis C. *Ann Intern Med* 2012;157(8):558.
 29. McCance-Katz E, Valdiserri R. Hepatitis C virus treatment and injection drug users: it is time to separate fact from fiction. *Ann Intern Med* 2015;163(3):224.
 30. Centers for Disease Control and Prevention. Trends in Tuberculosis – United States, 2012. *MMWR Morb Mortal Wkly Rep* 2013;62:201–5.
 31. Bamrah S, Yelk Woodruff R, Powell K, et al. Tuberculosis among the homeless, United States, 1994–2010. *Int J Tuberc Lung Dis* 2013;17(11):1414–9.
 32. Beijer U, Wolf A, Fazel S. Prevalence of tuberculosis, hepatitis C virus, and HIV in homeless people: a systematic review and meta-analysis. *Lancet Infect Dis* 2012;12(11):859–70.
 33. Tan de Bibiana J, Rossi C, Rivest P, et al. Tuberculosis and homelessness in Montreal: a retrospective cohort study. *BMC Public Health* 2011;11(1):833.
 34. Centers for Disease Control and Prevention. Reported tuberculosis in the United States, 2013. 2014.
 35. Paquette K, Cheng M, Kadatz M, et al. Chest radiography for active tuberculosis case finding in the homeless: a systematic review and meta-analysis. *Int J Tuberc Lung Dis* 2014;18(10):1231–6.
 36. Lutge E, Wiysonge C, Knight S, et al. Material incentives and enablers in the management of tuberculosis. *Cochrane Database Syst Rev* 2012;(1):CD007952.
 37. Sterling T, Villarino M, Borisov A, et al. Three months of rifapentine and isoniazid for latent tuberculosis infection. *N Engl J Med* 2011;365(23):2155–66.
 38. Badiaga S, Menard A, Tissot Dupont H, et al. Prevalence of skin infections in sheltered homeless. *Eur J Dermatol* 2005;15:382–6.
 39. Raoult D, Foucault C, Brouqui P. Infections in the homeless. *Lancet Infect Dis* 2001;1(2):77–84.
 40. Roncarati J, Bernardo J. Community acquired pneumonia. The health care of homeless persons - Part I. In: the health care of homeless persons: a manual of communicable diseases and common problems in shelters and on the streets. Boston: The Boston Health Care for the Homeless Program; 2004.
 41. Wrezel O. Respiratory infections in the homeless. *UWO Med J* 2009;78(2):61–5.
 42. National Institute on Drug Abuse. Nationwide trends. Available at: <http://www.drugabuse.gov/publications/drugfacts/nationwide-trends>. Accessed January 20, 2016.

43. Estrada A. Epidemiology of HIV/AIDS, hepatitis B, hepatitis C, and tuberculosis among minority injection drug users. *Public Health Rep* 2002;117(Suppl 1): S126–34.
44. Lansky A, Books J, DiNenno E, et al. Epidemiology of HIV in the United States. *J Acquir Immune Defic Syndr* 2010;55(Suppl 2):S64–8.
45. Nelson P, Mathers B, Cowie B, et al. Global epidemiology of hepatitis B and hepatitis C in people who inject drugs: Results of systematic reviews. *Lancet* 2011; 378(9791):571–83.
46. Des Jarlais D, Semaan S, Arasteh K. At 30 years: HIV/AIDS and other STDs among persons who use psychoactive drugs. In: Hall B, Hall J, Cockerell C, editors. *HIV/AIDS in the post-HAART Era: manifestations, treatment, and epidemiology*. Shelton (CT): People's Medical Publishing House; 2011. p. 753–78.
47. Deiss R, Rodwell T, Garfein R. Tuberculosis and illicit drug use: Review and update. *Clin Infect Dis* 2009;48(1):72–82.
48. Centers for Disease Control and Prevention. Integrated prevention services for HIV infection, viral hepatitis, sexually transmitted diseases, and tuberculosis for persons who use drugs illicitly: summary guidance from CDC and the U.S. Department of Health and Human Services. *MMWR Morb Mortal Wkly Rep* 2012;61(RR-5):1–46.
49. Tempalski B, Cleland C, Pouget E, et al. Persistence of low drug treatment coverage for injection drug users in large metropolitan areas. *Subst Abuse Treat Prev Policy* 2010;5:23.
50. Des Jarlais D, Semaan S. HIV and other sexually transmitted infections in injection drug users and crack cocaine smokers. In: Holmes KK, Sparling PF, Stamm WE, et al, editors. *Sexually transmitted diseases*. 4th edition. New York: McGraw-Hill; 2008. p. 237–55.
51. Centers for Disease Control and Prevention. Estimated HIV incidence in the United States, 2007–2010. *HIV Surveillance Supplemental Report* 2012;17(4).
52. Kral A, Bluthenthal R, Lorvick J, et al. Sexual transmission of HIV-1 among injection drug users in San Francisco, USA: Risk-factor analysis. *Lancet* 2001; 357(9266):1397–401.
53. Altice F, Kamarulzaman A, Soriano V, et al. Treatment of medical, psychiatric, and substance-use comorbidities in people infected with HIV who use drugs. *Lancet* 2010;376(9738):367–87.
54. Malta M, Magnanini M, Strathdee S, et al. Adherence to antiretroviral therapy among HIV-infected drug users: a meta-analysis. *AIDS Behav* 2008;14(4): 731–47.
55. Cohen M, Chen Y, McCauley M, et al. Prevention of HIV-infection with early antiretroviral therapy. *N Engl J Med* 2011;365(6):493–505.
56. Kitahata M, Gange S, Abraham A, et al. Effect of early versus deferred antiretroviral therapy for HIV on survival. *N Engl J Med* 2009;360(18):1815–26.
57. McCance-Katz EF, Sullivan L, Nallani S. Drug Interactions of clinical importance among the opioids, methadone and buprenorphine, and other frequently prescribed medications: a review. *Am J Addict* 2010;19(1):4–16.
58. Mamani M, Majzoobi M, Torabian S, et al. Latent and active tuberculosis: Evaluation of injecting drug users. *Iran Red Crescent Med J* 2013;15(9):775–9.
59. Getahun H, Gunneberg C, Sculier D, et al. Tuberculosis and HIV in people who inject drugs: Evidence for action for TB, HIV, prison and harm reduction services. *Curr Opin HIV AIDS* 2012;7(4):345–53.
60. Getahun H, Baddeley A, Raviglione M. Managing tuberculosis in people who use and inject illicit drugs. *Bull World Health Organ* 2013;91(2):154–6.

61. Altet-Gomez MN, Alcaide J, Godoy P, et al. Clinical and epidemiological aspects of smoking and tuberculosis: a study of 13,038 cases. *Int J Tuberc Lung Dis* 2005;9:430–6.
62. Selwyn P, Hartel D, Lewis V, et al. A prospective study of the risk of tuberculosis among intravenous drug users with human immunodeficiency virus infection. *N Engl J Med* 1989;320(9):545–50.
63. Wei G, Moss J, Yuan C. Opioid-induced immunosuppression: Is it centrally mediated or peripherally mediated? *Biochem Pharmacol* 2003;65(11):1761–6.
64. Kapadia F, Vlahov D, Donahoe R, et al. The role of substance abuse in HIV disease progression: reconciling differences from laboratory and epidemiologic investigations. *Clin Infect Dis* 2005;41(7):1027–34.
65. Oeltmann J, Kammerer J, Pevzner E, et al. Tuberculosis and substance abuse in the United States, 1997–2006. *Arch Intern Med* 2009;169(2):189.
66. World Health Organization (WHO). Policy Guidelines for Collaborative TB and HIV Services for injecting and other drug users an integrated approach. 2008.
67. Golub JE, Bur S, Cronin WA, et al. Delayed tuberculosis diagnosis and tuberculosis transmission. *Int J Tuberc Lung Dis* 2006;10:24–30.
68. Daniels D, Grytdal S, Wasley A. Surveillance for acute viral hepatitis—United States, 2007. *MMWR Surveill Summ* 2009;58(SS-3):1–27.
69. Amon J, Garfein R, Ahdieh-Grant L, et al. Prevalence of hepatitis C virus infection among injection drug users in the United States, 1994–2004. *Clin Infect Dis* 2008;46(12):1852–8.
70. Page K, Morris M, Hahn J, et al. Injection drug use and hepatitis C virus infection in young adult injectors: Using evidence to inform comprehensive prevention. *Clin Infect Dis* 2013;57(Suppl 2):S32–8.
71. Chu C, Lee S. Hepatitis B virus/hepatitis C virus coinfection: epidemiology, clinical features, viral interactions and treatment. *J Gastroenterol Hepatol* 2008;23(4):512–20.
72. Wicker S, Cinatl J, Berger A, et al. Determination of risk of infection with blood-borne pathogens following a needlestick injury in hospital workers. *Ann Occup Hyg* 2008;52(7):615–22.
73. Doerrbecker J, Friesland M, Ciesek S, et al. Inactivation and survival of hepatitis C virus on inanimate surfaces. *J Infect Dis* 2011;204(12):1830–8.
74. Pouget E, Hagan H, Des Jarlais D. Meta-analysis of hepatitis C seroconversion in relation to shared syringes and drug preparation equipment. *Addiction* 2012;107(6):1057–65.
75. Ebricht J, Pieper B. Skin and soft tissue infections in injection drug users. *Infect Dis Clin North Am* 2002;16(3):697–712.
76. Moss R, Munt B. Injection drug use and right sided endocarditis. *Heart* 2003;89(5):577–81.
77. Kates J, Ranji U, Beamesderfer A, et al. Health and access to care and coverage for lesbian, gay, bisexual, and transgender individuals in the US. Menlo Park (CA): The Henry J. Kaiser Family Foundation; 2015. Issue Brief.
78. Lick D, Durso L, Johnson K. Minority stress and physical health among sexual minorities. *Perspect Psychol Sci* 2013;8(5):521–48.
79. Ostrow D, Stall R. Alcohol, tobacco, and drug use among gay and bisexual men. In: Wolitski R, Stall R, Valdiserri R, editors. *Unequal opportunity: health disparities affecting gay and bisexual men in the United States*. New York: Oxford University Press; 2008. p. 1–60.

80. Centers for Disease Control and Prevention. The National Intimate Partner and Sexual Violence Survey: 2010 findings on victimization by sexual orientation. 2013.
81. Department of Health and Human Services. Patient Protection and Affordable Care Act; standards related to essential health benefits, actuarial value and accreditation. Final rule. *Fed Reg* 2013;78(37):12833–72.
82. Supreme Court of the United States, *United States v. Windsor*, June 26, 2013.
83. Supreme Court of the United States, *Obergefell v. Hodges*, June 26, 2015.
84. Centers for Disease Control and Prevention. HIV among gay, bisexual, and other men who have sex with men. 2013.
85. Centers for Disease Control and Prevention. Sexually transmitted disease surveillance 2014. Atlanta (GA): U.S. Department of Health and Human Services; 2015.
86. Centers for Disease Control and Prevention. HIV among transgender people. 2013.
87. Melendez R, Pinto R. HIV prevention and primary care for transgender women in a community-based clinic. *J Assoc Nurses AIDS Care* 2009;20(5):387–97.
88. San Francisco Department of Public Health. HIV/AIDS epidemiology annual report. San Francisco (CA): HIV Epidemiology Section; 2010.
89. Sevelius J. Transgender issues in HIV. *HIV Specialist* December 2013.
90. Bauer G, Redman N, Bradley K, et al. Sexual health of trans men who are gay, bisexual, or who have sex with men: results from Ontario, Canada. *Int J Transgend* 2013;14(2):66–74.
91. Kwakwa H, Ghobrial M. Female-to-female transmission of human immunodeficiency virus. *Clin Infect Dis* 2003;36(3):e40–1.
92. Chan S, Lupita R, Thornton K, et al. Likely female-to-female sexual transmission of HIV — Texas, 2012. *MMWR Morb Mortal Wkly Rep* 2014;63(10):209–12.
93. Marrazzo J, Stine K, Koutsky L. Genital human papillomavirus infection in women who have sex with women: a review. *Am J Obstet Gynecol* 2000;183(3):770–4.
94. Diamant A, Schuster M, McGuigan K, et al. Lesbians' sexual history with men. *Arch Intern Med* 1999;159(22):2730.
95. Marrazzo J, Koutsky L, Kiviat N, et al. Papanicolaou test screening and prevalence of genital human papillomavirus among women who have sex with women. *J Low Genit Tract Dis* 2002;6(1):61–2.
96. Goldstone S, Palefsky J, Giuliano A, et al. Prevalence of and risk factors for human papillomavirus (HPV) infection among HIV-seronegative men who have sex with men. *J Infect Dis* 2011;203(1):66–74.
97. Frisch M. Cancer in a population-based cohort of men and women in registered homosexual partnerships. *Am J Epidemiol* 2003;157(11):966–72.
98. Frisch M. Human papillomavirus-associated cancers in patients with human immunodeficiency virus infection and acquired immunodeficiency syndrome. *J Natl Cancer Inst* 2000;92(18):1500–10.
99. Centers for Disease Control and Prevention. Viral hepatitis and men who have sex with men. 2012.
100. Scott K, Philip S, Ahrens K, et al. High prevalence of gonococcal and chlamydial infection in men who have sex with men with newly diagnosed HIV infection. *J Acquir Immune Defic Syndr* 2008;48(1):109–12.
101. Evans A, Scally A, Wellard S, et al. Prevalence of bacterial vaginosis in lesbians and heterosexual women in a community setting. *Sex Transm Infect* 2007;83(6):470–5.

102. Vodstrcil L, Walker S, Hocking J, et al. Incident bacterial vaginosis (BV) in women who have sex with women is associated with behaviors that suggest sexual transmission of BV. *Clin Infect Dis* 2015;60(7):1042–53.
103. Fethers K. Sexually transmitted infections and risk behaviours in women who have sex with women. *Sex Transm Infect* 2000;76(5):345–9.
104. Hammett TM. HIV/AIDS and other infectious diseases among correctional facilities: Transmission, burden, and an appropriate response. *Am J Public Health* 2006;96(6):974–8.
105. Bureau, National Inmate Survey (NIS), 2011-12; and the Substance Abuse and Mental Health Services Administration, National Survey on Drug Use and Health (NSDUH). The prevalence of ever having an infectious disease among state and federal prisoners and the general population (2011-12). 2009-2012.
106. Chandler C. Death and dying in America: The prison industrial complex's impact on women's health. *Berkeley Womens Law J* 2003;18:40–60.
107. Acoca L. Defusing the time bomb: understanding and meeting the growing health care needs of incarcerated women in America. *Crime & Delinquency*. Sage Publications 1998;49–69. Available at: <http://cad.sagepub.com/content/44/1/49.Crime & Delinquency 44.1>.
108. Choopanya K, Des Jarlais DC, Vanichseni S, et al. Incarceration and risk for HIV infection among injection drug users in Bangkok. *J Acquir Immune Defic Syndr* 2002;29:86–94.
109. Buavirat A, Page-Shaffer K, van Griensven GJP, et al. Risk of prevalent HIV infection associated with incarceration among injecting drug users in Bangkok: case-control study. *BMJ* 2003;326:308.
110. Dolan K, Kite B, Black E, et al. HIV in prison in low-income and middle-income countries. *Lancet Infect Dis* 2007;7:32–41.
111. Simooya OO. Infections in prison in low and middle income countries: Prevalence and prevention strategies. *Open Infect Dis J* 2010;4:33–7.
112. Gough E, Kempf MC, Graham L, et al. HIV and hepatitis B and C incidence rates in U.S. correctional populations and high risk groups: A systematic review and meta-analysis. *BMC Public Health* 2010;10:777.
113. Marks G, Crepaz N, Senterfitt JW, et al. Meta-analysis of high-risk sexual behavior in persons aware and unaware they are infected with HIV in the United States. *J Acquir Immune Defic Syndr* 2005;39:446–53.
114. National Foundation for Infectious Diseases and the National Coalition for Adult Immunization. A report on reaching underserved ethnic and minority populations to improve adolescent and adult immunization rates. October 2002.
115. Braveman PA, Cubbin C, Egerter S, et al. Socioeconomic disparities in health in the United States: What the patterns tell us. *Am J Public Health* 2010;100(Suppl 1):S186–96.
116. Richardus JH, Kunst AE. Black-white differences in infectious disease mortality in the United States. *Am J Public Health* 2001;91(8):1251–3.
117. Adekoya N. Medicaid/state children's health insurance program patients and infectious diseases treated in emergency departments: U.S., 2003. *Public Health Rep* 2007;122(4):513–20. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/17639655>. Accessed January 19, 2016.
118. Centers for Disease Control and Prevention. HIV surveillance report. Diagnosis of HIV Infection and AIDS in the United States and Dependent Areas. 2009.
119. Available at: <https://report.nih.gov/nihfactsheets/viewfactsheet.aspx?csid=124>. Accessed January 29, 2016.

120. Available at: http://stacks.cdc.gov/view/cdc/20865/cdc_20865_DS1.pdf. Accessed January 29, 2016.
121. Cain KP, Benoit SR, Winston CA, et al. Tuberculosis among foreign-born persons in the United States. *JAMA* 2008;300(4):405–12.
122. Cain KP, Haley CA, Armstrong LR, et al. Tuberculosis among foreign-born persons in the United States: achieving tuberculosis elimination. *Am J Respir Crit Care Med* 2007;175(1):75–9.
123. Bloss E, Holtz TH, Jereb J, et al. Tuberculosis in indigenous peoples in the U.S., 2003-2008. *Public Health Rep* 2011;126(5):677–89. Centers for Disease Control and Prevention, 2012. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/21886328>. Accessed February 3, 2016.
124. Centers for Disease Control and Prevention (CDC). Trends in tuberculosis - United States, 2011. *MMWR Morb Mortal Wkly Rep* 2012;61(11):181–5. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/22437911>. Accessed January 12, 2016.
125. Peck AJ, Holman RC, Curns AT, et al. Lower respiratory tract infections among American Indian and Alaska native children and the general population of U.S. Children. *Pediatr Infect Dis J* 2005;24(4):342–51.
126. Singleton RJ, Holman RC, Folkema AM, et al. Trends in lower respiratory tract infection hospitalizations among American Indian/Alaska native children and the general U.S. child population. *J Pediatr* 2012;161(2):296–302.e2.
127. Kicera TJ, Douglas M, Guerra FA. Best-practice models that work: The CDC's Racial and Ethnic Adult Disparities Immunization Initiative (READII) Programs. *Ethn Dis* 2005;15(2 Suppl 3). S3-17–20.
128. Morita J. Addressing racial and ethnic disparities in adult immunization, Chicago. *J Public Health Manag Pract* 2006;12(4):321–9.
129. U.S. Department of Health and Human Services. *Healthy People 2010 (2nd ed.) [with understanding and improving health (vol. 1) and objectives for improving health (vol. 2)]*. Washington, DC: U.S. Government Printing Office; 2000.
130. Kutner M, Greenberg E, Jin Y, et al. *The health literacy of America's adults: results from the 2003 National Assessment of Adult Literacy (NCES 2006-483)*. Washington, DC: U.S. Department of Education, National Center for Education Statistics; 2006.
131. Berkman ND, DeWalt DA, Pignone MP, et al. *Literacy and health outcomes (AHRQ Publication No. 04-E007-2)*. Rockville (MD): Agency for Healthcare Research and Quality; 2004.
132. Available at: http://health.gov/communication/hlactionplan/pdf/Health_Literacy_Action_Plan.pdf. Accessed February 2, 2016.
133. Kelly PA, Haidet P. Physician overestimation of patient literacy: A potential source of health care disparities. *Patient Educ Couns* 2007;66(1):119–22.
134. Osborn CY, Paasche-Orlow MK, Davis TC, et al. Health literacy: an overlooked factor in understanding HIV health disparities. *Am J Prev Med* 2007;33(5): 374–8.
135. Sentell TL, Halpin HA. Importance of adult literacy in understanding health disparities. *J Gen Intern Med* 2006;21(8):862–6.
136. Song J. *HIV/AIDS and homelessness: recommendations for clinical practice and public policy*. Nashville (TN): National Health Care for the Homeless Council, Health Care for the Homeless Clinician's Network; 1999. p. 14. Available at: www.nhchc.org/Publications/HIV.pdf.

137. Zlotnick C, Zerger S, Wolfe P. Health care for the homeless: what we have learned in the past 30 years and what's next. *Am J Public Health* 2013; 103(S2):S199–205.
138. Medicaid and the uninsured. Medicaid coverage and care for the homeless population: key lessons to consider for the 2014 Medicaid expansion. Washington, DC: The Henry J Kaiser Family Foundation; 2012.
139. Rabiner M, Weiner A. Health care for homeless and unstably housed: Overcoming barriers. *Mt Sinai J Med* 2012;79(5):586–92.
140. Inungu J, Beach E, Skeel R. Challenges facing health professionals caring for HIV-infected drug users. *AIDS Patient Care STDs* 2003;17(7):333–43.
141. Comprehensive HIV prevention for people who inject drugs, Revised guidance. Washington, DC: The U.S. President's Emergency Plan for AIDS Relief (PEPFAR); 2010.
142. Poteat T, Keatley J. Transgender people and HIV: policy brief. Geneva (Switzerland): World Health Organization (WHO); 2015.
143. Valdiserri R, Khalsa J, Dan C, et al. Confronting the emerging epidemic of HCV infection among young injection drug users. *Am J Public Health* 2014;104(5): 816–21.
144. Piper T, Rudenstine S, Stancliff S, et al. Overdose prevention for injection drug users: Lessons learned from naloxone training and distribution programs in New York City. *Harm Reduct J* 2007;4:3.