CDC’s approach to preventing HIV/AIDS, viral hepatitis, STDs, and TB and protecting the health of the nation’s youth from these diseases is focused and multi-faceted. Our goals are to prevent infections, reduce morbidity and mortality, and improve health equity.

CDC saves lives and money. We prioritize cost-effective, scalable programs, policies, and research to achieve the greatest impact on reducing the incidence of HIV, viral hepatitis, STDs, and TB and preventing related illness and death. CDC saves lives, prevents disease, identifies and stops outbreaks, and educates young people about how to reduce risk and stay healthy.

Over the past 20 years, public health efforts prevented up to an estimated 319,000 cases of TB disease and averted $14.5 billion dollars in TB-related costs. Over 15 years, CDC’s work in STDs prevented an estimated 5.7 million cases of gonorrhea, syphilis, and chlamydia and 3,300 cases of HIV, saving $2.4 billion in lifetime medical costs. Over the course of one year, CDC’s work to prevent an estimated 21,000 cases of pelvic inflammatory disease and 4,000 cases of infertility due to STDs saved $77 million in healthcare costs. Over a period of 10 years, HIV prevention efforts, including diagnosis and effective treatment, prevented more than 300,000 HIV cases, saving almost $150 billion in healthcare costs, compared with the years before the advent of antiretroviral treatment in 1996. CDC’s work and that of its public health and education partners saves lives, improves health, and saves money.

In this publication, we have included 10 brief stories about the work we do 365 days a year. I hope this sampling highlights how CDC protects and ensures the health of the nation.

Jonathan Mermin, MD, MPH
RADM and Assistant Surgeon General, USPHS
Director, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
1. **Using New Lab Tools to Track Outbreaks**
   CDC has accelerated use of advanced molecular detection in its labs -- combining genetic information, supercomputers, and web-based technologies to track infections more quickly and prevent or stop outbreaks of HIV, viral hepatitis, STDs, and tuberculosis.

2. **Using Surveillance Data to Guide Prevention Activities**
   CDC supports health departments in finding more innovative and powerful ways to use public health surveillance – including data-to-care programs that help link people with HIV to medical care. Linking to and staying in care are key to keeping one’s HIV infection under control.

3. **Preventing HIV in America: No New Infections**
   Investments in high-impact HIV prevention are helping to prevent more than 30,000 new HIV infections a year.

4. **Protecting American Youth from Infectious Disease and Risky Behaviors**
   CDC-funded school-based programs reach approximately 2 million students with quality health education, connection to health services, and safer and supportive environments to help youth avoid STDs. CDC maintains the nation’s dashboard for adolescent health to help guide national, state, and local prevention programs.

5. **Envisioning a TB-free America**
   The United States has one of the lowest TB disease case rates in the world, thanks to investments in domestic TB programs. However, too many people still suffer from TB disease. Ending TB in the United States requires maintaining and strengthening current TB control priorities while increasing efforts to identify and treat latent TB infection among high-risk populations.
Controlling Resurgent Syphilis
CDC is working hard to fight a resurgence of syphilis by investing in Disease Intervention Specialists, raising awareness among the general public and healthcare providers, and reinforcing STD prevention systems. CDC-funded STD/HIV Prevention Training Centers provide training to more than 25,000 clinicians a year to better prevent, diagnose, and treat STDs.

Protecting Babies from Congenital Syphilis and Perinatal Viral Hepatitis
Congenital syphilis and perinatal viral hepatitis B and C are increasing threats to our nation's babies. CDC protects infants—and their moms—by supporting public health and healthcare interventions specifically to combat these diseases and making sure healthcare providers know how to screen and treat patients to reduce risk and improve health.

Tackling a Major Cause of Liver Cancer—Chronic Hepatitis B and C
CDC is vigilantly working to stop viral hepatitis outbreaks, intervene where communities are at greatest risk, and help the millions of people living with hepatitis B and C in the United States connect to care and treatment. One CDC-funded, community-based project has performed 175,000 hepatitis C tests, diagnosed 12,700 people with hepatitis C infection, prescribed treatment for 2,400 of those diagnosed, and trained 250 providers to treat hepatitis.

Overcoming Antimicrobial Resistance
CDC combats antimicrobial resistance by ensuring healthcare providers know how to correctly treat patients for HIV, viral hepatitis, TB, or sexually transmitted infections (especially gonorrhea) stopping resistance before it begins, saving lives and money. For example, direct treatment costs for a case of drug-susceptible TB costs about $19,000, while direct treatment costs for a case of multidrug-resistant TB costs about $164,000. For gonorrhea, current infections account for $162.1 million in direct medical costs annually; however, emerging drug resistance could increase this cost by about $37.8 million per year due to an increased number of infections. Additional resistance-related treatment costs could increase the economic burden of resistance beyond this estimate.

Targeting Health Disparities
CDC invests in prevention that brings the right tools to the right people to achieve the greatest impact in preventing new HIV infections. Evidence suggests that we are seeing improvements in the epidemic associated with these targeted efforts. Over a five-year period, there has been a 25 percent decrease in the diagnosis rates for African American women relative to those of white women, signaling a reduction in a measure of health disparities.
CDC uses advanced molecular detection methods, including use of genetics, supercomputers, and web-based technologies, to better detect outbreaks or clusters of infections and respond to them more quickly. CDC’s Advanced Molecular Detection program promotes scientific innovations in these areas to better detect and track infectious disease outbreaks.

For example, CDC identifies potential hepatitis C clusters using Global Hepatitis Outbreak and Surveillance Technology (GHOST), a novel web-based system that analyzes the unique “fingerprints” of hepatitis C virus samples. In a small rural community in Indiana, this type of technology helped CDC more quickly identify clusters of people with hepatitis C virus infection in an outbreak of hepatitis C and HIV.

GHOST has the potential to reduce the cost of molecular testing, making it more affordable to many laboratories and increasing the rate of detection of hepatitis C virus transmission. CDC has expanded GHOST access to state and local health departments through a cloud-based web service. Health departments can submit hepatitis C virus genetic information to GHOST to help identify any common sources of infection. CDC and the Association of Public Health Laboratories have hosted several laboratory training workshops about GHOST to provide hands-on experience to laboratory staff from more than 12 states.

CDC has been using advanced molecular detection to identify and stem TB outbreaks for a number of years, and it has been used more recently for STDs. In 2016, molecular detection was used to identify a cluster of Neisseria gonorrhoeae isolates from seven patients in Hawaii that had evidence of increased resistance to the only effective treatment for gonorrhea. Through molecular identification, the cluster was quickly identified, and a rapid response was mobilized to prevent further spread of the antibiotic-resistant strain on the Hawaiian Islands and to the mainland.

In 2017, CDC established the National Tuberculosis Molecular Surveillance Center at the Michigan Department of Health and Human Services Bureau of Laboratories. This Center performs whole genome sequencing for all isolates of Mycobacterium tuberculosis received from newly diagnosed patients. Whole genome sequencing is a type of genotypic testing that provides a full picture of an isolate’s entire genome. This gives CDC and state partners the ability to more efficiently identify and investigate TB outbreaks, and it strengthens surveillance of drug-resistant TB. This allows CDC and state partners to target public health interventions and better respond to emerging resistance. The United States is one of a handful of countries to offer whole genome sequencing on a national level.
Data-to-care programs use data to identify people who need care.

**USING SURVEILLANCE DATA TO GUIDE PREVENTION ACTIVITIES**

CDC supports states and localities using surveillance data in innovative ways to help find people with HIV who are not receiving care and to assist them in getting care. Treatment is essential to keeping those with HIV healthy and ensuring the virus is under control.

**HIV treatment** has dramatically improved the health, quality of life, and life expectancy of people with HIV. Treatment has also transformed the HIV prevention landscape, as research has shown that HIV treatment is effective prevention. Nearly half of the people in America who have HIV have undetectable viral loads. Not only does having undetectable viral loads allow people with HIV to live longer, healthier lives; it also means they have effectively no risk of transmitting HIV to their HIV-negative sexual partners. Data-to-care programs use data (e.g., from HIV lab tests) to identify people who need medical care and link them to care and other services.

In Louisiana, surveillance data are used to provide **real-time electronic alerts** to clinicians when a patient with HIV may be unaware of their HIV status or out of care. Clinicians can then link the patients to treatment. Among those in Louisiana who were living with HIV and in medical care, the percentage who had suppressed viral loads increased from 70 percent in 2014 to 79 percent in 2015.

Nationally, **congenital syphilis surveillance data** are critical to identifying missed prevention opportunities in both the public and private healthcare sectors. With increasing rates of congenital syphilis, these data are helping guide congenital syphilis prevention interventions, such as timely screening and adequate treatment of maternal syphilis.

Learn more about HIV, STDs, viral hepatitis, and TB in your area by using CDC’s interactive website, [NCHHSTP AtlasPlus](https://www.cdc.gov/nchhstp/atlasplus/).

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**“HIV, you have no power here. And if it’s between you and me, I guarantee I’ll win.”**

James - Atlanta, GA
Living with HIV since 1984
HIV investments are helping prevent more than 30,000 HIV cases a year.

PREVENTING HIV IN AMERICA: NO NEW INFECTIONS

We have better tools today to fight the HIV epidemic, thanks to the advancements in scientific research, surveillance, and evaluation that CDC and other federal agencies and partners have funded. These HIV prevention investments have led to major successes. From 2008 through 2017, compared with the years before the advent of antiretroviral treatment in 1996, HIV prevention efforts—including diagnosis and treatment—prevented an average of more than 30,000 HIV cases annually. By year end 2017, more than 300,000 HIV cases had been prevented, saving almost $150 billion.

CDC data are also part of data-to-care programs that identify people who need care. CDC is working toward a goal of no new HIV infections by using evidence-based strategies that are the most effective. CDC’s tools to fight HIV include:

- Increasing knowledge of status through routine and targeted HIV testing.
- Reducing HIV transmission through antiretroviral therapy for those with HIV and intensive data-to-care programs to assist in keeping people in care.
- Preventing new infections through behavior change, pre-exposure prophylaxis (PrEP), and syringe services programs.
- Using advanced molecular methods to more quickly respond to HIV outbreaks.

A person with HIV who takes HIV medicine as prescribed and gets and stays virally suppressed or undetectable can stay healthy and has effectively no risk of sexually transmitting HIV to HIV-negative partners.
We know what to do to help youth avoid the behaviors that put them at increased risk for STDs and HIV. Despite this, half of new STD infections that occur in the United States annually are among those aged 15 to 24, and young people aged 13 to 19 accounted for about five percent of new HIV infections in 2016. CDC reaches approximately 2 million of the 26 million middle- and high-school students in the country. Funding supports school districts to establish supportive school environments where youth receive quality sexual health education and are linked to health services necessary to prevent risky behaviors associated with HIV and STD infection.

For example, Duval County, Florida, increased the number of school-based health centers and expanded its youth health services, such as HIV and other STD testing and treatment, reaching more than 11,000 students. From 2013 to 2015, Duval County saw a 15 percent decrease in sexual activity and a decrease in the percentage of teens who had ever had sex from 46 percent to 37 percent.

CDC tracks health risk behaviors among U.S. high school students through its *Youth Risk Behavior Surveillance System (YRBSS)*, which has surveyed more than 3.8 million students since 1991. Data from this survey identifies important health trends among youth, such as a decrease in the percentage of students who ever had sexual intercourse from 48 percent in 2007 to 40 percent in 2017. YRBSS provides state and local education agencies with data they use to guide program activities.

CDC also monitors the status of school health policies and practices to help education and health officials plan, track programs, and identify needs. In most states, less than half of schools require that students receive education on key sexual health topics. However, from 2014 to 2018, CDC-funded state agencies increased adoption of middle- and high-school sexual health curricula in their priority districts by 93 percent and 91 percent respectively.

*The New Mexico Public Education Department (PED) has strengthened content and performance standards to align with a new graduation requirement for health education that was passed in 2010. Since then, New Mexico has seen a decrease in the percentage of high-school students who had sexual intercourse with four or more partners (14.5 percent to 9.6 percent), who were currently sexually active (31.9 percent to 27.0 percent), who were ever physically forced to have sex (8.7 percent to 8.0 percent), or who drank or used drugs before last sexual intercourse (22.3 percent of sexually active students to 19.5 percent of sexually active students).*
The U.S. domestic TB program is a model program for the world. The United States has one of the lowest TB disease case rates in the world, thanks in part to investments in domestic programs for TB prevention, control, and treatment. CDC’s domestic TB program invests approximately $80 million for TB prevention, control, and treatment in all 50 states, U.S. territories, U.S.-affiliated Pacific Islands, and eight big cities.

However, too many people still suffer from TB disease, and progress toward elimination has slowed. In 2017, the United States reported 9,105 new TB cases, the lowest number on record, but only a 1.6 percent decrease from the previous year. CDC studies suggest that the United States can only reach its goal of TB elimination if the strategy includes a major increase in latent TB infection (LTBI) testing and treatment. More than 80 percent of U.S. TB disease cases result from longstanding, untreated LTBI.

Up to 13 million people in the United States have LTBI. Without treatment, they are at risk for developing TB disease. People with LTBI do not feel sick, do not show symptoms, and cannot spread TB bacteria to others. Without treatment, about five to ten percent of people with LTBI will develop TB disease at some point in their lives. For some people, that risk is higher. Testing and treating people who are at risk for LTBI is the most effective way to prevent TB disease.

CDC and the U.S. Preventive Services Task Force (USPSTF) recommend testing populations who are at increased risk for TB infection. The USPSTF recommendation, published in 2016, provides an opportunity for private healthcare providers to offer LTBI testing to persons who may not previously have been included in public health or employee testing programs. CDC works with clinicians, communities, and health organizations to provide guidance, educational resources, and training on LTBI testing and treatment.

Shorter treatment regimens can help patients complete treatment faster and with fewer side effects. CDC is at the forefront of researching new treatments for LTBI, investing $17 million in clinical trials and epidemiologic studies carried out in academic institutions and state health departments in the United States and around the world. CDC’s research identified a 12-week regimen of rifapentine and isoniazid to treat LTBI. Previous regimens lasted 9 months. Looking ahead, CDC is working to develop even shorter, more effective treatment regimens and less resource intensive ways to ensure treatment completion.
CONTROLLING RESURGENT SYPHILIS

Two decades ago, syphilis numbers in America were falling, and health officials were hopeful that we could eliminate the disease in the United States. In 2000, the number of syphilis cases dropped to below 32,000, a new low for a disease that had affected more than 135,000 Americans just 10 years earlier. But syphilis struck back, and the number of reported cases has climbed almost every year since then, with 88,042 reported cases in 2016, up 18 percent from the previous year.

CDC is working to push back against syphilis by bringing a sharper focus to the disease and raising both public and healthcare provider awareness, by working with disease intervention specialists across the country, and by maintaining and strengthening STD prevention systems. CDC provides support to state and local health departments for STD-fighting activities, such as contact tracing for people with STDs, linking those who are infected to timely treatment, and gathering vital network data to better track disease transmission and inform resource allocation and future directions as they relate to interventions to reduce syphilis.

CDC funding and training supports disease intervention specialists who work in state and local health departments to help stop the spread of syphilis by investigating outbreaks, notifying partners of patients with syphilis so they can also be tested, and educating those who are infected about the disease. More than 1,600 disease intervention specialists work in communities across all 50 states.
Babies are increasingly at risk from congenital syphilis and perinatal viral hepatitis B and C.

When a pregnant woman becomes infected with syphilis or hepatitis B or C, it puts not only her health at risk, but also that of her unborn child. A child born with congenital syphilis may have blindness, deafness, severe anemia, bone deformities, developmental delays, or other major health problems. Newborns who are infected with the hepatitis B virus have an 80 to 90 percent chance of developing chronic hepatitis B. This can eventually lead to serious health problems, including liver damage and liver cancer.

**Syphilis:** Up to 40 percent of babies born to women with untreated syphilis may be stillborn or die from the infection as a newborn. Congenital syphilis cases increased 28 percent from 2015 to 2016, with 628 reported cases of congenital syphilis in 2016.

In 2017, CDC awarded supplemental funds to nine state and local health departments to help them fight congenital syphilis in their communities. These areas accounted for 70 percent of congenital syphilis cases in the United States in 2017.

**Viral Hepatitis:** Babies are at risk of viral hepatitis infection if they are born to mothers with hepatitis B virus or hepatitis C virus. Mother-to-baby transmission of hepatitis B can be prevented, but new cases are still occurring. Hepatitis C is increasing in incidence among young women of childbearing age, likely due to the opioid crisis in the United States.

Protecting babies from these diseases is a priority for CDC. CDC recommends prenatal syphilis testing and hepatitis B surface antigen (HBsAg) testing for all mothers and hepatitis B vaccination for all infants within 24 hours of birth. It also recommends that healthcare providers assess all pregnant women for risk factors for hepatitis C and test those at risk.

To help improve identification of pregnant women currently infected with hepatitis B, CDC and numerous partners have worked together to include pregnancy status in laboratory test reports sent to health departments by commercial and hospital laboratories. In Georgia, Michigan, New York, Pennsylvania, and Wisconsin, increased capacity to identify hepatitis B-infected pregnant women has led to increased testing and anti-viral treatment for pregnant women with high viral loads in the third trimester.
CDC assists in outbreaks of viral hepatitis and supports state prevention efforts.

TACKLING CHRONIC HEPATITIS B AND C

CDC is working to reduce liver cancer in America by tackling two major causes—chronic hepatitis B and chronic hepatitis C. New hepatitis C infections have nearly tripled over the last five years, and the rate is highest among young adults ages 20 to 29. The increase is attributed in large part to the opioid crisis in the United States.

CDC is supporting state and local efforts to promote prevention and respond to outbreaks. CDC has also developed guidelines for prevention, such as recommending hepatitis B vaccination for those at risk for hepatitis C infection, recommending hepatitis C screening for people born between 1945 and 1965, and using innovative ways to track viral hepatitis incidence and prevalence. CDC works with states to collect data to inform the epidemiology of acute and chronic hepatitis. CDC has funded improved surveillance in the 14 states with the highest incidence of hepatitis B and/or C to obtain data to support implementation of effective prevention strategies. Strong surveillance capacity is required to monitor the impact of prevention as new and innovative strategies are put in place to control and eliminate hepatitis B and C.

Some Americans are particularly at risk for chronic hepatitis B or C infection and its consequences. Baby boomers, born from 1945 through 1965, are six times more likely to have chronic hepatitis C infection than are other adults. Asian Americans and Pacific Islanders account for more than 50 percent of Americans with hepatitis B, and these groups are historically the most affected by liver cancer.

CDC strives to ensure those with hepatitis B or C are tested, know their status, and receive treatment if indicated. Increasing the proportion of people with viral hepatitis who know their status helps promote prevention and helps people live longer, healthier lives. Forty-six states, three cities, and the District of Columbia receive CDC funds to detect and respond to viral hepatitis threats, reduce new infections, and improve both the diagnosis of people living with viral hepatitis and their linkage to care and treatment. Implementing CDC’s recommendations for hepatitis C testing and linkage to care and treatment could save an estimated 320,000 lives.

CDC is also advancing strategies for addressing hepatitis C in communities. One community-based project funded by CDC provided a model for test and cure strategies for the nation, performing 175,000 hepatitis C tests and diagnosing 12,700 people with hepatitis C infection over two years. Of those, 2,400 have already been prescribed treatment. This funding also supported training for 250 providers in treating hepatitis C.
OVERCOMING ANTIMICROBIAL RESISTANCE—GONORRHEA AND TB

Gonorrhea is one of the most common sexually transmitted infections, with more than 460,000 infections reported each year in the United States. Due to antimicrobial resistance, our arsenal of treatments that are effective against gonorrhea has dwindled to only one antibiotic.

Antimicrobial resistance is also a concern in the treatment of TB. Drug-resistant TB is complex and costly to treat. Although multidrug-resistant TB and extensively drug-resistant TB are relatively rare in the United States, treatment is expensive, takes a long time to complete, disrupts lives, and has potentially life-threatening side effects. The cost of treating a person with TB disease increases with greater resistance. Average direct treatment costs range from $19,000 to treat one case of drug-susceptible TB to $526,000 to treat one case of extensively drug-resistant TB.

CDC’s TB laboratory serves as the National Tuberculosis Reference Laboratory. Health departments send M. tuberculosis isolates and patient samples to CDC’s Molecular Detection of Drug Resistance Service, where they are examined for drug resistance, and results are returned within 48 hours. CDC sequenced more than 1,200 isolates for drug resistance in a 14-month period.

CDC monitors antimicrobial resistance trends in N. gonorrhoeae through several projects, including its Gonococcal Isolate Surveillance Project and its Strengthening the United States Response to Resistant Gonorrhea Project (SURRG). Initiated in 2016, SURRG funds nine local jurisdictions to enhance antibiotic-resistant gonorrhea surveillance and infrastructure and build capacity for rapid detection and response to stop the spread of antibiotic-resistant gonorrhea infections. CDC also makes timely recommendations on drug therapies based on the U.S. antimicrobial susceptibility surveillance data and encourages healthcare providers to follow CDC’s STD Treatment Guidelines. Preventing the emergence of antibiotic resistance can potentially avert hundreds of millions of dollars in direct medical costs from gonorrhea and gonorrhea-attributable HIV infections.
TARGETING HEALTH DISPARITIES

Working to decrease health disparities associated with HIV, STDs, viral hepatitis, and TB is a key CDC priority. CDC is focusing efforts on disparities through high-impact prevention strategies, which use the most effective evidence-based interventions and align resources with disease burden in geographic areas and populations. Learn more about high-impact prevention at the High-Impact Prevention website.

**CDC’s Expanded Testing Initiative** provided funds for HIV screening to increase diagnoses of HIV infections among those disproportionately affected by HIV, particularly African Americans. The initiative conducted 2.8 million tests over three years and diagnosed more than 18,000 HIV infections in people who previously did not know they were infected. This averted an estimated 3,400 HIV infections and saved approximately $1.2 billion in direct medical costs.

Evidence suggests there are improvements in the epidemic associated with these targeted efforts. One major improvement has been a 25 percent decrease in the HIV diagnosis rates of African American women relative to those of white women over five years, signaling a decrease in a measure of health disparities. There have also been substantial declines in HIV diagnoses among African Americans overall, and, after years of increases, diagnoses among African American gay and bisexual men have leveled.

CDC also effectively engages communities that have high rates of STD disparities in the design, implementation, and evaluation of community-level interventions that improve long-term sustainability. Using community engagement methods and partnerships to build local STD prevention and control capacity, the Community Approaches for Reducing STDs (CARS) Project increased STD screening services in low-income communities by more than 25 percent. Among men at increased risk for STDs, screening and treatment rates have increased by more than 50 percent. Learn more about the CARS Project at the website.

Despite these successes, improvements in the HIV and STD epidemics have been uneven. For example, new HIV infections increased 20 percent among Latino gay and bisexual men, and rates of syphilis among gay, bisexual, and other men who have sex with men are 122 times higher than among men who have sex with women only. CDC will continue to combat health disparities with targeted intervention strategies.