2017 Oklahoma HIV Continuum of Care

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The UN program on HIV/AIDS specified objectives stating that 90% of infected individuals be diagnosed, 90% take Antiretroviral therapy, and 90% achieve viral suppression worldwide. The HIV Continuum of Care Initiative was launched in the United States by executive order in July of 2013. The goal of the HIV Continuum of care is to link patients to care for HIV testing, primary care, and antiretroviral therapy to attain viral suppression.
Oklahoma is comprised of 77 counties, and geographically contains approximately 70,000 square miles. Oklahoma is ranked 35th in population with nearly 4 million individuals. Oklahoma also contains three metropolitan statistical areas: Oklahoma City, Tulsa, and Lawton.
The 2015 population in Oklahoma was comprised of approximately 75% White, 9% American Indian/Alaskan Native, 8% Black, 6% other/multirace, 2% Asian, and less than 0.2% Hawaiian/Pacific Islander and approximately 10% are Hispanic.
2015 Population by age: 75% aged 18 and older, 58% between 20 and 64 years old, 8% under the age of five, and approximately 17% were 13 to 24 years old.
HIV/AIDS surveillance began in 1982 in Oklahoma. 2015 was the last update to the Oklahoma HIV Care Continuum, and as of the 31st of December 2015 there were 5,756 individuals living with HIV and 315 newly diagnosed cases of HIV.
HIV related health disparities exist by sex, race and ethnicity, age, geographic location, and sexual orientation.
Those who use drugs are found to have reduced access to antiretroviral therapy, tend to initiate therapy later in their HIV infection, and have problematic adherence. It is important to identify these disparities so funding resources may be allocated appropriately.
The CDC set forth five steps for the HIV Continuum of Care. These five HIV Care Continuum categories are defined to describe patient status. “Diagnosed individuals” includes a denominator of HIV prevalence which uses total number of diagnosed and undiagnosed infection. This is estimated through statistical modeling of the National HIV Surveillance System (NHSS) data from all of the states in the United States and the District of Columbia. “Linked to care” is defined as the percentage of individuals who receive a diagnosis in a calendar year who have one or more documented viral load or CD4 test within 30 days of diagnosis. “Retained in care” is the percentage of individuals diagnosed with two or more viral load or CD4 tests performed at least three months apart. “Antiretroviral therapy”, or ART, is the percentage of diagnosed individuals who are receiving it to treat their HIV infection. Finally, “viral suppression” is defined as a viral load of less than 200 copies/mL.
Data from the 2017 HIV surveillance was used to create a diagnosis-based HIV Care Continuum for Oklahoma. A diagnosis-based approach shows each step of the continuum as a percentage of the number of persons living with HIV, who have been diagnosed, as opposed to a prevalence-based approach in which each step is the percentage of the total number of persons living with HIV (diagnosed and undiagnosed infection). Oklahoma chose the diagnosis-based continuum because this is the most accurate data available and this approach is beneficial for infection service delivery planning. As diagnosed persons are known to the health department, they are the persons that can be most effectively targeted for interventions to help link and retain in care.

The 2017 Oklahoma HIV Care Continuum includes three of the four recommended steps for a diagnosis-based approach. The first step in the Oklahoma HIV Care Continuum is linkage to care, which is defined as the percentage of persons diagnosed with HIV who also had one or more viral load or CD4 tests performed within three months after diagnosis. This step has a different denominator than the other two steps of the continuum. The second step is retained in care which is defined as the percentage of diagnosed persons living with HIV at the end of 2017 who had two or more documented viral load or CD4 tests performed at least three months apart in 2017. The third step of the care continuum is viral load suppression defined as the percentage of individuals living with HIV at the end of 2017 whose most recent HIV viral load within the year of 2017 was less than 200.
copies/mL. The omitted step is antiretroviral use because this information is only available for Ryan White clients, which is a program that helps those who are uninsured and underserved receive care and medications for HIV. A measure of only these clients would severely underestimate antiretroviral use in Oklahoma in 2017.
I looked at descriptive proportions for 2017 in Linked to Care, Retained in Care, and Viral Suppression. Additionally, linked to care, retained in care, and viral suppression were explored among race/ethnicity, sex, behavioral risk and age group.
For the comparison of 2015 to 2017, I compared proportions of linked to care, retained in care, and viral suppression.

The Pearson Chi square test was used to compare the proportions between 2015 to 2017 in each category. I pre-defined the alpha limit of 0.05 and SAS 9.4 was used for all comparisons.
2017 HIV Continuum of Care Results

- Newly Diagnosed Cases
  - 302 persons
  - 292 had a date of birth
  - Mean Age: 37 years
  - Standard Deviation: 12.5
  - Min Age: 18
  - Max Age: 81
Results

- Persons living with HIV by the end of 2017
  - 6,163 persons
  - 6,136 had a date of birth
  - Mean Age: 46
  - Standard Deviation: 12.7
  - Min Age: 2
  - Max Age: 90
Remember when examining the following graphs, linkage to care measures the percentage of people diagnosed with HIV in 2017 who had at least one viral load or CD4 test within three months of diagnosis. It is calculated differently and cannot be directly compared to other steps.
84% of the 302 newly diagnosed HIV infections were linked to care. 47% of the 6,163 living with HIV were retained in care, while 49% of those living with HIV were virally suppressed.
Asian/Pacific Islanders (100%) had the highest percentage of persons linked to care, however this group also accounted for the smallest number of new HIV cases in 2017. Multi Race had the second highest percentage (91%) of linked to care, followed by American Indian/Alaskan Natives (89%), and Whites (84%). Blacks (83%) and Hispanics (83.0%) had the lowest percentages of persons linked to care.

Asian/Pacific Islanders had the greatest proportion retained in care at 62% (Figure 2). This was followed by Multi Race (54%), American Indian/Alaskan Native (53.5%), and Whites (50.2%). Hispanics (41.4%) and Blacks (40.1%) had the lowest percentage of persons retained in care.

Asian/Pacific Islanders had the highest percentage of virally suppressed (62.2%) followed by Multi Race (54.0%), American Indian/Alaska Native (53%), and Whites (52%) as shown in Figure 2. Hispanics (43.3%) and Blacks (42%) had the lowest percentage of persons virally suppressed.
Males and females had similar proportions across the continuum of care.
MSM/IDU (men who have sex with men and intravenous drug use) had the highest percentage of linkage to care at 93%. This was followed by MSM (87%), NIR (81%), and IDU (80.0%). Cases classified as heterosexual contact (77%) had the lowest percentage of cases linked to care.

MSM/IDU had the highest percentage of cases retained in care (52%), which was followed closely by MSM (51%). Heterosexual contact (45%), IDU (44%), followed with NIR (30%) containing the lowest percentage of retained in care.

Among risk groups, MSM (53%) had the highest percentage of virally suppressed. This was followed by MSM/IDU (47%), and Heterosexual Contact (47%). IDU (44%) and those with no identified risk (35%) had the lowest percentages of virally suppressed.
Young adults who were 20-29 years old also had the lowest percentage of linkage to care (82%), but this group also had the highest number of new HIV cases in 2017. Those 13-19 years of age had the highest percentage of linkage to care (100%), but accounted for the smallest number of new HIV cases in 2017. This group was followed by those 50 to 59 years (90%), 60 and over (88%), 30 to 39 years (85%), and 40 to 49 years (83%). Those 60 and over and 50 to 59 years of age had the highest proportion of those retained in care (80% and 78% respectively), while those 13 to 19 years of age and 20 to 29 years of age had the lowest proportion retained in care (58% and 59% respectively). Those 50 to 59 and those 60 and over remain the groups with the highest proportions of virally suppressed persons with HIV (63% and 58% respectively). Those 13 to 19 years and 20 to 29 years old remain the groups with the lowest proportions of viral suppression (37% and 45% respectively).
When comparing 2017 Oklahoma HIV Continuum of Care data to 2015, linked to care (84% and 74%) was significantly increased in 2017 compared to 2015 (p=0.0014)
When comparing those retained in care, there was a significant decrease (p<0.0001) from 2015 (65%) to 2017 (47%).
When comparing viral suppression in 2015 to 2017 (48% and 49%), there was no difference (p=0.4402).
Ryan White Clients 2017

- 91 total New Cases
- 1,615 total Living with HIV
94.5% of Ryan White clients were linked to care within three months while 80% of those not on Ryan White were linked to care within three months. This was a statistically significant difference with a p value of less than 0.0015.
In 2017, 81% of those on Ryan White were retained in care while of those not receiving Ryan White, only 35% were retained in care. There is a statistically significant difference in retention in care between those on Ryan White versus those who are not, p<0.0001.
80% of those receiving Ryan White were virally suppressed while of those not receiving Ryan White only 38% were virally suppressed. This was a statistically significant difference, \( p<0.0001 \).
Racial disparities remain a barrier to care and treatment of HIV in Oklahoma in 2017. When data were stratified by race, Hispanics and Blacks remained at the lowest percentage in each step of the HIV Continuum of Care. Blacks are often at the greatest risk for acquiring HIV, especially if they are also young men who have sex with men.\textsuperscript{18,19} Those in the age groups of 13 to 19 years and 20 to 29 years both had lower proportions retained in care and virally suppressed. The 20 to 29 year old group also had the lowest proportion linked to care while those 13 to 19 years of age had the highest proportion linked to care of all the age groups, but they also had the lowest number. The youth, approximately aged 15 to 24 are a key target as about half of them are aware of their HIV diagnosis, and not quite 70\% of them are linked to care.\textsuperscript{21} According to a study by Kurth et al., it is a worldwide issue to provide services to youth that will test for HIV and from there link to care and retain in care to achieve viral suppression, which is effective when other issues, such as developmental and socio-political issues, are also addressed.\textsuperscript{22} One study found that an integrated multilevel, youth and community focused intervention for youths infected with HIV was feasible and potentially effective and may aid in addressing age-related health disparities.\textsuperscript{23}
Discussion

- MSM/IDU and MSM highest percentages linked, retained in care, and virally suppressed
  - Consistent results found in literature

Individuals with risk factors of MSM/IDU had the highest percentages of linked to care and retained in care; however, individuals with MSM as the only risk factor had the highest percentage of viral suppression. This aligns with findings that when MSM disclose sexual orientation to a medical provider, they had over eight time’s greater odds of receiving a recommendation for HIV testing.20
Mobile health includes the use of mobile devices to streamline care and link patients to specialists faster. Various avenues of technology and social media have been examined as a means to keep individuals in the HIV Continuum of Care. According to Muessig et al., the advantages of internet and mobile-based interventions include the potential to provide consistency in the delivery of an intervention, potential low cost once developed, and the ability to disseminate the intervention to a wider population. Kalichmann et al. conducted a randomized control trial to test a mobile health behavioral intervention designed to enhance HIV treatment as prevention by simultaneously increasing combination antiretroviral therapies adherence and improving the sexual health of people living with HIV. In this study, viral load suppression for HIV was significant. Another method for retaining individuals infected with HIV and to increase medication adherence is a peer support text messaging intervention which was found to be feasible by Senn. Using online platforms to educate individuals on testing for HIV and condom use has also been shown to be as effective as those who use a clinic to test.
Mental health also plays a large role in adherence to care and treatment in the HIV Care Continuum. Sexual and injection drug risks were significantly more likely in those with three or more psychosocial issues, and they were also less adherent to HIV treatment. One study noted body dissatisfaction has been associated with negative outcomes in sexual minority men living with HIV, including psychological distress, poor adherence to antiretroviral therapy, and increased HIV sexual transmission risk behaviors. This study went on to find that elevated body dissatisfaction was associated with more condomless sex acts, and the results further suggested that the relationship between body dissatisfaction and condomless anal sex varied at different levels of appearance investment. MSM with lower socioeconomic status and those with poor body image did not test as frequently as those with higher socioeconomic status and better body image in another study in Hong Kong. Depression and misuse of substances play a significant role in preventing people with HIV from sustaining HIV control, and these factors interact to lower the chances of achieving virologic suppression, yielding a more detrimental effect in patients with moderate to severe symptoms of depression than in those without. Implementation of Harm Reduction Services can also play a large role in minimizing transmission of infectious diseases, such as HIV, among people who use drugs. These services may include, but are not limited to, syringe service programs, cleaning kits for drug works, and condoms. Addressing the mutual lack of trust and suspicion between providers and persons who use drugs, which delays entry into care, may also help link and retain
individuals in care. According to Bradley et al., improvements in prevention and treatment coverage is vital to achieve reductions in incidence. Building trust between providers and patients will also aid in improving communication and better behavioral interventions and adherence to the care continuum among those infected with HIV. Harm reduction services often employ or partner with individuals who are current or former users to help bridge the relationship to others who currently use drugs to build trust and keep those individuals engaged in minimizing harm. Health care access and tools must be modified to fit the needs of persons who inject drugs. An example of this includes mobile harm reduction service units to meet those who may not have the ability to commute and those who are homeless.
One of the goals to aid in decreasing HIV transmission can be greater access to mental health services and de-stigmatizing mental illnesses. Individuals have been shown to lose autonomy when diagnosed with HIV, but by providing appropriate resources to regain one’s autonomy they may successfully re-engage in care to stay in the HIV Care Continuum. Reducing the stigma of HIV itself has been shown to increase participation in the continuum of care for patients, which leads to better outcomes. Other factors may also impact each step in the HIV Continuum of Care, such as lack of health insurance, poverty, unemployment, homelessness, food insecurity, lack of transportation, lack of social support, and lower education in addition to some of those previously discussed such as substance abuse and mental health. While one study showed that mentoring had an impact, it was not enough to overcome the stigma of HIV. Medical case management (MCM), which is defined as a set of services which link clients with mental health, health care, and other services that may be vital to their well-being, have been shown to significantly keep individuals in care. A study conducted by Birger in Newark, New Jersey found that by improving treatment adherence and improving frequency and coverage for testing, incidence of HIV was reduced.
We rely on them to report, and when called I often find incomplete records because the data is not collected for our surveillance purposes. Ways to improve upon the HIV Care Continuum for Oklahoma is to track those receiving antiretroviral therapy and also compare those on the Ryan White program to those who are not.

Discussion

- Data limited to accuracy of information provided by labs, providers, and patients
- Track those receiving ART
Significant increases in linkage to care and retention in care from 2015 to 2017 is a positive step forward for Oklahoma and the HIV epidemic. There was also a significant decrease in those retained in care from 2015 to 2017. This may play a key role in why there was no change in viral suppression, which is a vital step towards ending transmission to new cases, minimizing health complications, and increasing life span. Further investigation into why there was a significant decrease in retention is needed so changes can be made and/or funds re-allocated into programs that are successful versus those that are unsuccessful.
When comparing those on Ryan White to those who are not, there is a significant decrease in those who do not receive it linking to care, being retained in care, and reaching viral suppression.
References

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