Evaluation of Adolescent HIV Surveillance and Testing Program in Uptown Chicago, 2013-2017

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ABSTRACT

Introduction: Adolescent Men who have sex with men (MSM) and transgender women (TW) are currently overrepresented among new HIV cases in the United States. To address this concern, the Adolescent Medicine division of Lurie Children's Hospital has operated an HIV testing program in Uptown Chicago geared towards these individuals. The purpose of this manuscript is to report on the evaluation of the HIV outcome, demographic, and risk behavior information resulting from longitudinal data collection performed as part of this program. The results of this paper will be used to drive future program direction and improve primary and secondary HIV prevention among LGBTQ youth in Chicago.

Methods: From May 2013 to June 2017, 1058 individuals presented for HIV testing in the Adolescent Medicine division and filled out questionnaires detailing demographics, sex behavior and known HIV risk factors. This data was aggregated in R and subsetted by gender and sexual orientation. Bivariate analysis was conducted to compare risk factors among HIV positive and negative MSM and TW as well as compare old MSM to adolescent MSM HIV positive individuals. A logistic regression was performed to analyze risk factors for a positive HIV test among young MSM.

Results: For MSM and TW, those of African American race were at the highest risk for a positive HIV test. In young MSM, social factors such as homelessness and previous incarceration were more salient risk factors than sexual behavior such as condomless sex. The TW tested showed a significantly higher HIV risk than the young MSM tested, but did not show significant differences between positive and negative HIV results. Older MSM individuals were more likely to report having condomless sex with a male or sex with an HIV

positive male partner. Conversely, individuals in the young group were more likely to report having sex with multiple partners and report having sex for drugs or money.

Conclusion: The data presented in this analysis mirrors a trend in the United States; while HIV total infections are decreasing, African American youths show an increasing risk. The results also show the primary difference between those who receive a positive HIV test result and those who receive a negative one are social in nature and not precisely related to sex behavior. The Adolescent Medicine division can use these results to direct their resources towards primary prevention of HIV infection in young MSM and TW.

INTRODUCTION

Men who have sex with men (MSM) and transgender women (TW) are currently overrepresented among new HIV cases in the United States.[1-2] While a significant body of research has been conducted to investigate the relationship between HIV and adult MSM populations, few studies have been dedicated to understanding HIV incidence in young MSM.[3] Even less is known about HIV infection in young TW populations.[4] Since 2013, the Adolescent Medicine Division of Lurie Children's Hospital has operated an HIV testing program funded by the Chicago Department of Public Health (CDPH) that is specifically designed to serve young MSM and TW in the City of Chicago's Uptown neighborhood.

Since its inception, the Adolescent Medicine program has tested over 1,000 participants, greater than 25% of whom are under the age of 21. The clinic has also been successful at testing MSM and TW populations: 68% of the participants are men who report having sex with a male in the 12 months prior to testing and 100 TW have undergone HIV testing. Over the course of the program, over 30 cases of HIV have been identified. At the time of HIV testing, demographic and risk behavior data are collected in the form of an interviewer-administered questionnaire, per CDPH programmatic requirements.

The purpose of this manuscript is to summarize these programmatic data descriptively as well as to analyze correlates of incident infections, including demographic and risk behavior information, to drive future program direction. In order to accomplish this goal, background on known research on HIV in young MSM and TW and the HIV testing program in Adolescent Medicine is presented, followed by methods used to process and analyze the data and, finally, results and conclusions.

HIV in Young MSM

Estimates suggest there are currently 1.1 million people in the United States living with HIV. It is thought that MSM account for over 600,000 of these cases and 70% of new cases each year. According to the Centers for Disease Control and Prevention (CDC), in the early 2000s young MSM aged 13-24 represented the largest growth in national incidence of HIV. Despite new cases stabilizing and then decreasing slightly from 2008 to 2014, young MSM are still disproportionately represented among new HIV cases.[1] While the focus of this paper is young MSM and TW in Chicago, we can learn about the variety of demographic and risk factors for HIV in this group by studying national level data.

Race/Ethnicity

Looking at national data of 20-24 year olds, the age stratification representing the most cases of HIV in young MSM, large racial and ethnic disparities in HIV prevalence are apparent. In 2016, HIV rates (cases per 100,000 people) were: American Indian/Alaska Native, 3.6; Asian, 1.7; Black, 22.4; Hispanic, 6.2; Hawaiian/Pacific Islander, 2.2; White, 2.2.[5] At every age stratification, Black MSM have a higher rate of HIV. Diagnoses in 13-24 year old Black MSM represent the largest group of incident HIV cases of any age, sex and gender combination.[1] An agent-based simulation study on young MSM in Chicago by Beck and colleagues predicts that over a 15 year period, if current social dynamics hold, young Black MSM will continue to be overrepresented in incident cases of HIV. However, the study also suggests that there will be a steep increase in HIV incidence among young Latino and White

MSM.[7] The data from this study indicates that racial/ethnic minority status plays an important role in HIV risk, and understanding how race/ethnicity interacts with social factors is important to elucidating risk patterns in young MSM.

Preventive Behaviors

Recent advances in antiretroviral therapy (ART) and the introduction of a biomedical HIV prevention option, pre-exposure prophylaxis (PrEP), have contributed to changes in individual risk factors for HIV. While the use of these pharmacologics has limited transmission among those who know they or their partner are HIV positive, transmission is still high among those with an unknown status. According to the CDC, lack of awareness of positive HIV status among young MSM contributes to their disproportionate incidence of HIV cases and leads to disparities in access to appropriate care.[1] A 2013 study utilizing the National HIV Behavioral Surveillance System reported that HIV positive individuals aged 18-24 were significantly less likely to know their HIV status than those aged 25-29 (49% vs. 57%). This difference was even more pronounced compared to HIV positive individuals in their 30s and 40s. In addition, the CDC shows that young Black MSM are significantly less aware of their HIV status, perhaps explaining some of the increased burden on this population.[1]

Psychosocial

Multiple studies link incidence of HIV in young MSM to a variety of co-morbid psychosocial factors. Binge drinking, substance abuse and intimate partner violence were all

reported at higher rates in HIV positive young MSM compared to seronegative young MSM.[9,10] In addition, social stigma and community level acceptance patterns are thought to weigh on the risk of HIV in young MSM. While the exact social mechanisms of racial disparities are poorly understood, a 2013 study suggested that young Black men are particularly susceptible to HIV infection due to various social factors. According to one study, the pressure to conform to social expectations caused psychological distress and led to isolation, low self-esteem and reduced access to HIV prevention messages. The authors hypothesized that these social factors influence sexual behavior and HIV risk.[6] In addition, it has been suggested that minority stress associated with racism and poverty interact with sexual minority stress in an additive fashion. For young MSM of racial minorities, or lower social economic status, it is possible that many of the negative psychosocial risk factors for HIV compound to increase risk.[16]

Structural

While multiple structural risk factors are hypothesized to be linked to HIV incidence in young MSM (e.g., access to affordable healthcare, income insecurity), this remains one of the least studied areas of research. Methodological research in this area is particularly difficult because resources are often targeted at low-income neighborhoods. For example, while it is likely the case that structural conditions in Uptown, Chicago have an association with HIV risk, understanding this relationship is difficult because clinics like Adolescent Medicine are located in otherwise resource poor settings. This can lead to paradoxical findings like condom use being reported as higher in neighborhoods with lower

socioeconomic status.[11] However, a 2015 study that attempted to adjust for this factor found that that individuals who lived in closer proximity to an AIDS Service Organization were less likely to test positive for HIV.[11] Determining the ways these structural factors affect HIV risk is important for the Adolescent Medicine division to understand how to best serve its clients.

HIV in Young Transgender Women

Systematic differences in data collection obscure accurate estimates of the burden of HIV on TW and TW who have sex with men in the United States. Many states and local jurisdictions fail to collect information on individual gender identity and sex assigned at birth, leaving surveillance efforts with extremely large confidence intervals. Further, stigma, discrimination and social rejection create large barriers to TW's participation in and access to all the resources of the United States healthcare system. However, information collected does suggest TW are heavily and disproportionately affected by HIV in the United States.[12] A systematic review and meta-analysis published in 2013 estimated that between 18% and 25% of TW in the United States are living with HIV.[13] According to the same study, this number was over 34 times the national average.

Understanding the burden of HIV among young TW is even more limited. A study in 2006 reported a convenience sample of young TW with a 22% HIV prevalence rate, compared to the 14% rate reported in young MSM at the time. More recent data on the burden of disease in this subpopulation is unavailable; however, studies have attempted to understand some of the risk factors for HIV incidence in young TW. Reports indicate that

substance use, sexual risk taking behavior, intimate partner violence and self-esteem all play a role in HIV infection among TW.[14,15] However, small sample sizes and scarce data have impacted the ability to systematically parse these variables and identify where these risk factors might fit in the causal chain. Additional factors such as homelessness, joblessness and lack of access to medical care are hypothesized to play a specific role in HIV development of young TW.[2]

Public Health Relevance

This program evaluation has the potential to alter public health outcomes within the City of Chicago. By analyzing the collected information, investigators will better be able to address HIV trends among young MSM and TW. These data will directly inform future public health interventions and programs targeting these groups. If the data accurately uncover risk factors in these groups, the Adolescent Medicine Division can alter the populations they are targeting accordingly. By disseminating this information, public health resources meant to target HIV treatment and prevention can be distributed more efficiently and better reach their intended populations.

QUESTIONS & HYPOTHESES

To best extract relevant information from the collected data, we asked three questions: 1) within a population of young MSM who seek community-based HIV testing, what are the differences between those who receive positive and negative results; 2) within a population of young TW who seek HIV testing, what are the differences between those who receive

positive and negative results; and 3) within a population of young MSM who tested positive for HIV, what are the differences by age group?

We hypothesize that the results in our sample will be consistent with national data, showing that individuals who test HIV positive are more likely to report social and structural risk factors and to be older.

METHODS

From May 2013 to June 2017, 1058 individuals filled out questionnaires as part of the HIV testing program at the Division of Adolescent Medicine of Lurie Children's Hospital, located in Chicago's Uptown Neighborhood. Clients of the program were a convenience sample of all YMSM and TW. The program was advertised and drew in clients via various outreach efforts, including the use of geo-social networking applications, flyering and community events. Over the 49 months of data collection, multiple outreach events specifically targeted young MSM and TW.

Questionnaires and Initial Coding

Participants who agreed and provided informed consent were given questionnaires in line with Chicago Department of Public Health (CDPH) requirements. Questionnaires were delivered via a trained interviewer and were designed to assess demographic and sexual behavior, using open-ended questions where possible. Gender identity was determined by self-report. MSM were defined as individuals who were assigned male at birth, currently identify as male and report having sex with a male in the last 12 months.

Categorical ordinal scales were used to identify frequency of condom use, needle injections and needle sharing. However, these answers were collapsed to binary for analysis (no use, any use). Number and gender of sexual partners required an open-ended response, but were also coded into categories and collapsed for analysis. Number of testing visits was aggregated using a unique identifier given to each individual based on demographic characteristics.

HIV Tests

Individuals presenting for screening were provided with pre-test counseling. Alere Determine HIV-1/2 Ag/Ab assays were used for point of care screenings. Blood was drawn for individuals with positive results on screening tests. These samples were sent to a laboratory for diagnostic confirmation. Two individuals with a positive screening test that were not confirmed upon laboratory diagnostics were not included in the final analysis.

Data Aggregation

All data were stored, cleaned and analyzed with The R Project for Statistical Computing (R; version 3.4.1) in the RStudio (version 1.0.153) programming environment. Data manipulation and aggregation utilized the dplyr package built for R. Due to differing questions based on CDPH requirements year-by-year, reconciliations were made where possible. For example, those who answered yes to “have you had condomless sex with a male partner” were also marked as yes to “have you had condomless sex.” On the other hand, those who reported engaging in condomless sex were not marked yes to “have you

had condomless sex with a male partner" because the partner's gender could not be inferred from the data. Variables that were not collected over all years and had a large percentage of incomplete information were dropped from analysis. Remaining variables with less than 15% of data missing were imputed for use in the statistical model. Imputation was accomplished with a random forest algorithm provided by the missForest R package. Population level statistics were derived from the Chicago HIV/STI Surveillance Report.[16]

Statistical Analysis

Young MSM

Univariate analysis was conducted, stratifying samples based on HIV status and age. Bivariate association between demographic and risk factors with HIV status was assessed using odds ratios and Fisher's exact test. Significance was determined by an alpha level of .05. A multivariable logistic regression was built to understand the effect of demographics and behavioral factors on HIV positive status. All variables were included except when nesting occurred. In this scenario, the most general variables were included (e.g., "condomless sex with a male" was dropped, but "condomless sex" was included). Due to variability in data collection over time, the model only included complete cases except for homelessness which was imputed due to >90% completeness. The remaining variables analyzed were age, condomless sex, sex with an injection drug user (IDU), sex with a female, sex with a male known to be HIV positive, sex with a transgender individual, sex work, sex

with multiple partners in the last 12 months as well as previous incarceration, self-reported IDU, current housing status and race.

Young TW

Due to low numbers of TW in our tested population, no statistical model was built and results are presented for univariate analysis only. Association between demographic and risk factors with HIV status in TW was assessed using Fisher's exact test.

Analysis by Age

We also compared risk factors and demographics of HIV positive individuals who differed by age. From the total population of individuals who tested positive for HIV, we selected only MSM individuals and split them into categories by age: younger (ages 18-24) and older (ages 25-57) subgroups. Univariate comparisons were made between these groups using Fisher's exact test.

YOUNG MSM

Results

Among adolescents under age 25 who were assigned male sex at birth, identified as male and reported having sex with a male in the last 12 months, 672 completed HIV testing at the Adolescent Medicine Clinic. This testing yielded 20 (3.0%) individuals who tested positive for HIV. Overall, the racial makeup of the positive group differed significantly from the negative group. Post-hoc analysis also shows that African Americans were significantly

more likely to test positive for HIV than Whites. Importantly, we did not see a difference in age between positive and negative individuals.

Sexual behavior between the two groups did show a variety of differences. HIV positive MSM were more likely to engage in sex in exchange for drugs or money, and there was a trend towards being more likely to have sex with an IDU. Condomless sex rates did not significantly differ in either group and, while it trended higher in the HIV positive group, both groups showed statistically similar rates of sex with multiple partners.

The starkest contrasts between the multiple groups were present when comparing structural factors. In addition to the previously mentioned difference in sex work, the HIV positive group was also significantly more likely to report previous incarceration and homelessness. While not significant, injection drug use was also reported more frequently among the HIV positive group. Furthermore, although 9.5% of individuals in the HIV negative group reported 3 or more visits to the clinic for testing, no individuals in the HIV positive group reported more than 2 visits.

The results of the logistic model to assess potential risk factors for a positive HIV indicated that no variables were significant. Multiple variables in the model were trending towards significance including older age, being African American, homelessness and injection drug use. No sexual behavior variables were significant or trending towards significance when accounting for the social or structural variables.

Discussion

Of these results, perhaps the most striking is the extremely high level of reported structural and social risk factors for HIV. Over 50% of individuals in the HIV positive group reported being homeless or living in an at-risk situation and 30% reported engaging in sex for drugs or money. While these data cannot determine a temporal relationship, one can infer that being HIV positive did not contribute to these structural and social circumstances because the majority of the individuals are presenting for testing because they are unaware of their status or are confirming a recent diagnosis. It is more likely that factors surrounding these individuals' lives put them in a position where they were more likely to acquire HIV; their infection was likely due to a combination of factors proximally related to socioeconomic status. However, the exact nature of this relationship is difficult to ascertain, as the questions in this survey were limited.

Perhaps equally as important is the lack of sexual risk behavior differences between the HIV positive and HIV negative groups. Both groups reported similar rates of condomless sex and sex with individuals who were HIV positive. This information suggests that the HIV positive individuals are engaging in some of the same behaviors as their HIV negative counterparts, but due to social differences they may experience worse outcomes. This may be a result of general prevalence of HIV among groups at higher risk. For example, condomless anal sex with a single Black partner may be riskier than condomless anal sex with multiple Asian partners due to disproportionate rates of HIV in Blacks.

Interestingly, the group who would eventually test positive for HIV did not have any individuals who tested 3 or more times in total (2+ times prior to positive result). While this may be an artifact of few individuals in this group, it may also be the result of the social risk

in this group and an inconsistent ability to seek continued care due to issues such as changes in housing, incarceration or other precarious social situations. These may also be individuals who received a positive test at a different clinic and specifically sought testing at Adolescent Medicine for a confirmation of their diagnosis or to be connected to their other HIV support resources.

The logistic model did not produce any significant results. However, because the goal of this study was largely exploratory, trends will still aid in driving programmatic changes. These trends support the idea that social risk factors such as race and homelessness play as large a role in the transmission of HIV as the sexual behavior itself. Here, drug use or sex is necessary to transmit the illness, but it is not sufficient. While we biologically know that one can get HIV from sex with an HIV positive individual, the likelihood of partnering with someone who is HIV positive is substantially higher in an environment with multiple social risk factors.

YOUNG TW

Results

Among adolescents who were assigned male at birth and identify as female, 80 completed testing at the Adolescent medicine clinic. 6 (7.5%) of these individuals tested positive for HIV. Statistical tests were run, but due to extremely low numbers in the HIV positive group they are difficult to interpret.

While there are no statistically different demographic variables between the HIV positive and negative group, there are a few trending differences. First, the HIV positive

individuals were on average 1.5 years older than the HIV negative individuals. However, this data is skewed as there are some individuals in the HIV negative group who are as young as 14. All of the HIV positive young TW in this sample were African American. This compares to only 66% of TW in the HIV negative group. However, over 12% of individuals in the HIV negative group declined to provide or reported not knowing their race.

Reports of sexual behavior were similar across both HIV positive and HIV negative individuals. 50% of individuals in both of these groups report engaging in condomless sex or having sex with multiple partners. However, 100% of those in the HIV positive group report having sex with a male in the last year compared to 84% in the HIV negative group.

Due to low numbers, data were also sparse in understanding structural risk factor differences between the two groups. In the data collected, there were high rates of homelessness and unstable housing totaling over 50% in both the HIV negative and HIV positive groups. Two-thirds of the HIV positive group reported engaging in sex for drugs or money, while only one-third of the HIV negative group indicated this behavior.

Discussion

Low numbers make comparisons of the HIV positive TW to the HIV negative individuals extremely difficult, but there are still important takeaways from this information. 7.5% of young TW in this sample tested positive for HIV, compared to only 3.0% of young MSM. Interestingly, TW had a significantly higher rate of HIV despite reporting lower rates of risk taking behaviors such as condomless sex or sex with multiple partners. One possibility is a higher proportion of underreporting among TW due to

significant stigma associated with being transgender and uneasiness around documenting this behavior. However, this bias is likely not to make up for some of the large differences. Other potential explanations are that the survey did not ask about risk behaviors that TW engage in or that only the most vulnerable TW come into the Adolescent Medicine clinic.

However, the data seem to suggest that increased social risk may partially explain the difference between these two populations. For example, even though reporting exchanging sex for drugs or money was only trending higher in the TW HIV positive versus negative group, the 33% reported in the TW negative group is still higher than the HIV positive group of young MSM. This pattern also exists with extremely high rates of homelessness and unstable housing among TW. In this group of adolescents, the baseline probabilities for these structural risk factors are incredibly high. In the population of MSM analyzed, it appears that there was a baseline risk of HIV transmission from intravenous drug use and unsafe sex which was enhanced by social conditions. In the population of TW, it appears they already experienced the social conditions that created this increased risk.

Younger vs. Older MSM

Results

Over the course of the continuous data collection, 33 (3.1%) MSM individuals tested positive for HIV. As previously mentioned, 20 (1.9%) young MSM HIV positive individuals were identified as well as 13 older MSM. Aside from age differences, these groups of individuals were demographically similar and shared roughly equal race distributions. The low numbers of individuals in this comparison yielded few significant results. However, the

non-significant differences are still important to analyze to properly evaluate the population tested by this program.

The group of older MSM differed from the young MSM on a few variables of sex behavior. While all individuals reported engaging in sex with a male in the last 12 months, individuals in the older group were more likely to report having condomless sex with a male or sex with an HIV positive male partner. Conversely, individuals in the younger group were more likely to report having sex with multiple partners and report having sex for drugs or money.

Some social and structural variables also showed trending group differences. 44% of young individuals reported being homeless compared to 25% of the older individuals. Injection drug use was slightly higher among the older individuals, but both groups reported low levels of engaging in sex with IDUs.

Discussion

Despite previous literature reports that 25 years of age is an appropriate cut-off point for adolescent versus adult individuals, the large variation in age for the older group makes it difficult to draw complete comparisons. The 27 year olds within the older group likely show very different risk profiles than the 50 year olds. However, as a whole, the groups did display interesting differences. While injection drug use was higher among HIV positive older individuals, this may be an artifact of increased exposure. Older individuals could have been using drugs for a longer period of time and had more opportunities to acquire the infection. While the survey recorded the use of injection drugs, the length of time using or

frequency of use was not asked. In the same light, the higher levels of homelessness found among adolescents may be a reflection of their current situation rather than the overall time spent homeless, a metric that was not asked but may show interesting results.

The high levels of reported sex with HIV positive individuals among the older group was also noteworthy. Biologically, each person who tested positive likely had sex or shared a needle with an HIV positive individual, as this is necessary for the transmission of infection. However, only 10% of younger individuals reported knowingly engaging in this type of sex. It is possible the younger individuals are less likely to respond positively to this question for fear of stigma. Another possibility is that younger and older individuals seek testing for different reasons. The younger group may get tested because they are engaging in sex with multiple partners or sharing needles, and feel that these behaviors may increase their chance of exposure to HIV. On the other hand, older individuals report less sex with multiple partners. In this sense, there is a higher likelihood that they know the partners they are engaging in sex with and therefore know that those partners are HIV positive. Sample sizes are too small to make conclusions with this data, but one speculative deduction from this is that younger individuals are more likely to seek testing because they feel generally at risk while older adults get testing in response to a specific and known risk.

LIMITATIONS

There are four primary limitations to this analysis: limited samples, longitudinal change of questions, longitudinal change of conditions and sampling bias. While the overall sample studied was quite large, the number of individuals testing positive for HIV was

extremely small, representing just 3.4% of participants and even less of total tests. This number is significantly higher than the total prevalence of HIV in the U.S. population; a result of the increased risk of the population served by the Adolescent Medicine clinic and the specific conditions faced by the individuals who present to the clinic for testing. The resulting sample was large enough for bivariate analysis of the most salient risk factors, but largely underpowered to test more nuanced risk differences. The study size also made it difficult to complete a significant model and perform subgroup analyses on individuals with specific risk factors.

The second primary limitation of this analysis was the longitudinal change of questions. Each year, Adolescent Medicine received a specific list of questions from the Chicago Department of Public Health. These questions varied each year and were sometimes nested within a previous year's questions. As these questions changed, obtaining a single targeted question from the data was difficult and could be answered multiple different ways depending on the nesting of the questions. This inconsistency made a longitudinal analysis of risk trends impractical and asking singular overall questions difficult.

The third limitation that needs to be addressed is the changing of circumstances over the course of the program. Data were collected from 2013 to 2017, during which time there were substantial decreases in HIV in the United States and in Chicago. Just as importantly, there have been changes in the types of risk factors that lead to HIV. The increase in pre-exposure prophylaxis prescriptions since 2013 mean that the types of behavior that lead to HIV transmission have also changed. Trying to assess risk of behaviors

such as condomless sex for a male over the course of this program is difficult because condomless sex may have meant something very different in 2013 than in 2017.

This program was specifically designed to help identify HIV positive individuals through active surveillance; it was not designed as a research study. With this in mind, practitioners working on the implementation of this program would canvas events and actively seek out individuals who may be interested in testing. The clinic also accepted walk-ins for testing. This means that there is no suitable denominator to analyze trends. In addition, each risk reported must be taken with a grain of salt, as it may be a risk factor for testing at the Adolescent Medicine clinic rather than an HIV diagnosis as a whole. While those who tested negative serve as a comparison group, they are not really suitable controls. For example, it may be that homeless individuals utilize the clinic when they suspect they have HIV while more affluent MSM use it as site for routine testing. Here, homelessness itself would present as a risk factor for HIV when in fact it is just a confounder of groups that share different risk profiles.

CONCLUSIONS

Despite the limitations, there is valuable information to extract from these results. This manuscript aimed to answer three questions with the goal of better understanding the population the program was designed to test. First, within a population of young MSM who seek HIV testing, what are the differences between those who receive positive and negative results? The results of this analysis show the primary difference between those who receive a positive HIV test result and those who receive a negative one are social in nature and not

limited to sex behavior. These populations showed a larger difference in risks such as sex work and having sex for drugs than condomless sex or sex with multiple partners. The second question was within a population of young TW who seek HIV testing, what are the differences between those who receive positive and negative results? The answers were very similar to the first question around MSM. While the numbers were extremely small, all of the HIV positive individuals were African American. In addition, we saw the repeated pattern that social factors were more influential than behavioral ones. Lastly we asked, within a population of MSM who tested positive for HIV, what are the differences between young and old individuals? Here we found that the younger HIV positive individuals were more likely to have sex with multiple partners and older individuals are more likely to report that they had sex with an HIV positive partner. This may indicate that younger individuals are more likely to test in response to a general risk and older individuals test in response to a specific risk.

The primary objective of a program evaluation is to retrospectively look at collected data and processes and see how this information can be used to improve future effectiveness as well as justify current resources. This manuscript very specifically focused on researching the risk factors of the populations that the Adolescent Medicine clinic served to improve the clinic's ability to target its resources.

The program analyzed was designed to test HIV in at-risk adolescents. In this respect, the Adolescent Medicine clinic was highly successful. A large portion of the population tested was under 25 and the incident rate of infection was higher in the group tested than the population at large. This means that the program was successful at

targeting individuals at risk for HIV. On average each year, the program successfully identified 9 cases of HIV. By actively targeting individuals for testing, these cases were caught earlier, which prevented the spread of HIV to additional people.

The program has two opportunities for future improvement. First, the program could integrate the information from this evaluation to actively enhance its ability to identify more cases. Second, the Adolescent Medicine division can use these results to direct its resources towards primary prevention of HIV infection in young MSM and TW. In both cases, when searching for cases of HIV or individuals at risk, resources should be targeted at people who have more social risk factors. This population includes youths who are homeless, formerly incarcerated or injection drug users. Within LGBTQ youth, targeting risky sexual practices is an inefficient strategy. While these practices lead to HIV, there is a much higher chance that it will do so within a subpopulation who are otherwise disadvantaged.

The data presented in this analysis mirror a trend in the United States. While HIV as a whole is decreasing, African American youths still remain at a substantial and growing risk. In both scenarios, comparing those with HIV positive results to those with HIV negative results, being African American put an individual at increased risk for HIV. In addition, every transgender woman who tested positive for HIV was African American. While there is likely a large source of residual confounds that the survey questions were unable to capture, it is important to acknowledge race as a risk for HIV diagnosis. Additional resources for screening and prevention must be directed towards African American individuals, including black LGBTQ youth.

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Table 1. Demographics and Risk Factors of Young MSM by HIV Testing Result	HIV Test Result		
	Positive	**Negative**	**p**
n	20	652	
Client Age (median [range])	22.80 [18.01, 24.93]	22.09 [14.13, 24.99]	0.387
Race (%)			0.055
Am. Indian/Alaskan	0 (0.0)	11 (1.7)	
Asian	0 (0.0)	41 (6.3)	
African American	15 (75.0)	222 (34.0)	
Hawaiian Pacific Is.	0 (0.0)	4 (0.6)	
White	4 (20.0)	257 (39.4)	
Declined	0 (0.0)	14 (2.1)	
Don't Know	1 (5.0)	103 (15.8)	
Client Assigned Sex at Birth (%)			0.999
Male	20 (100.0)	652 (100.0)	
Female	0 (0.0)	0 (0.0)	
Vaginal or anal sex with a Male = Yes (%)	20 (100.0)	652 (100.0)	NA
Vaginal or anal sex with a Male without using a condom (%)			0.820
No	6 (30.0)	218 (33.4)	
Yes	14 (70.0)	433 (66.4)	
Don't Know	0 (0.0)	1 (0.2)	
Vaginal or anal sex with a Male who is HIV positive (%)			0.999
No	18 (90.0)	562 (86.2)	
Yes	2 (10.0)	85 (13.0)	
Don't Know	0 (0.0)	5 (0.8)	
Vaginal or anal sex with a Female (%)			0.719
No	19 (95.0)	586 (89.9)	
Yes	1 (5.0)	65 (10.0)	
Don't Know	0 (0.0)	1 (0.2)	
Vaginal or anal sex with a Transgender person (%)			0.204
No	18 (90.0)	627 (96.2)	
Yes	2 (10.0)	24 (3.7)	
Don't Know	0 (0.0)	1 (0.2)	
Housing Status (%)			0.013
Homeless	4 (44.4)	42 (10.2)	
Unstably Housed At Risk	1 (11.1)	13 (3.2)	
Stably House	4 (44.4)	353 (85.9)	
Not Asked	0 (0.0)	1 (0.2)	
Declined	0 (0.0)	2 (0.5)	
Incarcerated (%)			0.054
No	17 (85.0)	626 (96.0)	
Yes	3 (15.0)	21 (3.2)	
Declined	0 (0.0)	5 (0.8)	
Commercial sex worker = Yes (%)	4 (20.0)	33 (5.1)	0.020
Has the client used injection drugs = Yes (%)	3 (15.0)	28 (4.3)	0.060
Sex with multiple partners = Yes (%)	14 (70.0)	347 (53.2)	0.174
Sex for drugs or money = Yes (%)	6 (30.0)	37 (5.7)	0.001
All variables were compared using Fisher's exact test except for age which was computed with a Student's T test. All variables were accessed for activity in the last 12 months except for injection drug use.			

Table 2. Demographics and Risk Factors of Trans Women by HIV Testing Result	HIV Test Result		
	Positive	**Negative**	p
n	6	74	
Client Age (median [range])	23.11 [20.07, 24.93]	21.85 [14.13, 24.98]	0.104
Average Visits (mean (sd))	1.17 (0.41)	1.42 (0.81)	0.455
Race (%)			0.773
Am. Indian/Alaskan	0 (0.0)	3 (4.1)	
Asian	0 (0.0)	2 (2.7)	
African American	6 (100.0)	49 (66.2)	
White	0 (0.0)	11 (14.9)	
Declined	0 (0.0)	1 (1.4)	
Don't Know	0 (0.0)	8 (10.8)	
Previous HIV Test = Yes (%)	6 (100.0)	69 (93.2)	0.999
Vaginal or anal sex with a Male = Yes (%)	6 (100.0)	62 (83.8)	0.584
Vaginal or anal sex with a Male without using a condom = Yes (%)	4 (66.7)	40 (54.1)	0.685
Vaginal or anal sex with a Male who is HIV positive (%)			0.614
No	6 (100.0)	61 (82.4)	
Yes	0 (0.0)	12 (16.2)	
Don't Know	0 (0.0)	1 (1.4)	
Vaginal or anal sex with a Female = Yes (%)	0 (0.0)	3 (4.1)	0.999
Vaginal or anal sex with a Transgender person = Yes (%)	1 (16.7)	8 (10.8)	0.523
Housing Status (%)			0.596
Homeless	2 (50.0)	22 (48.9)	
Unstably Housed At Risk	1 (25.0)	5 (11.1)	
Stably House	1 (25.0)	18 (40.0)	
Incarcerated = Yes (%)	2 (33.3)	10 (13.5)	0.219
Commerical sex worker = Yes (%)	2 (33.3)	24 (32.4)	0.999
Has the client used injection drugs = Yes (%)	3 (50.0)	26 (35.6)	0.664
Sex with multiple partners = Yes (%)	4 (66.7)	41 (55.4)	0.691
Sex for drugs or money = Yes (%)	4 (66.7)	25 (33.8)	0.182
All variables were compared using Fisher's exact test except for age which was computed with a Student's T test. All variables were accessed for activity in the last 12 months except for injection drug use.			