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Haley Kathryn Adrian Monday, April 27, 2020

Evaluating the Association of Parental Insurance Coverage on Critical Steps to HIV Pre-exposure Prophylaxis Uptake in Young Men Who Have Sex With Men

By

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Degree to be awarded: Master of Public Health

Department of Epidemiology

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Committee Chair

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Abstract

Evaluating the Association of Parental Insurance Coverage on Critical Steps to HIV Pre-exposure Prophylaxis Uptake in Young Men Who Have Sex With Men
By Haley Kathryn Adrian

Background: Parental insurance is associated with decreased uptake of sexual health services in adolescents and young adults. There are no reported studies examining this impact on pre-exposure prophylaxis (PrEP) uptake in young men who have sex with men (YMSM).
Methods: The American Men's Internet Survey (AMIS) is an annual online survey conducted in the United States among MSM aged ≥15 years. Multivariable logistic regression was used to assess parental insurance coverage associations with the prevalence of current PrEP willingness, PrEP conversation with a healthcare provider, and PrEP uptake in the past 12 months among HIV-negative, insured YMSM. Models adjusted for age, race/ethnicity, residential population density, living with parent(s), being out about their sexuality to family member(s) or a healthcare provider, and having a regular healthcare provider.
Findings: Most of 3,360 study-eligible participants were non-Hispanic white, 19-22 years old, from small/medium metropolitan or urban areas, and had a regular healthcare provider. Parental insurance coverage was reported by 71.1% (n=2,390). Parental insurance was not significantly associated with PrEP willingness (84% on parental insurance versus 79.4% on other insurance; adjusted prevalence ratio [aPR]= 1.03; 95% confidence interval [CI]= 0.99, 1.08), but was significantly associated with lower PrEP use (9.0% versus 15.3%; aPR= 0.80; CI= 0.66, 0.97). For YMSM who were not out to a family member(s), parental insurance was associated with a lower prevalence of having a PrEP conversation with a healthcare provider (6.4% versus 11.2%; aPR=0.70; CI=0.52, 0.95). Of YMSM on parental insurance who were unwilling to take PrEP, 41.1% agreed they did not want to take PrEP, because they were worried about privacy on their parent's insurance.
Interpretation: Our study shows that parental insurance and its potential confidentiality concerns may be reducing PrEP uptake among YMSM. Insurance coverage is a critical factor in gaining access to PrEP; however, parental insurance and not being out reduces the likelihood of having a PrEP conversation with a healthcare provider, and being on parental insurance reduces the likelihood of PrEP use. Implementing and communicating improved insurance confidentiality processes for dependents and creating safer spaces to feel comfort to come out to providers may improve PrEP uptake for YMSM.

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Contents

Introduction

Adolescents and young adults seeking sexual health services experience a variety of barriers and hesitancies, one of which is being enrolled as a dependent on parental insurance (1-4). In 2013, approximately half of all young adults in the United States were enrolled on parental insurance plans (5). In 2018, almost 70% of all children under the age of 19 were enrolled on private insurance plans, typically parental coverage, and 36% had public coverage (6). Being a dependent on a parental insurance facilitates access to healthcare services, but also induces both perceived and actual confidentiality concerns arising from fear of parent(s) gaining access to sensitive personal records during the billing and insurance processes (1, 3-4, 7-8).

The Federal Health Insurance Portability and Accountability Act and Title X assist in the protection of patient confidentiality and health records in healthcare settings. However, few legal provisions and regulatory practices exist to protect information in patient billing and insurance records. These records are typically accessible to the policyholder in the explanation of benefits (EOB), a detailed record of healthcare services and charges incurred (7, 9-10). EOBs are not explicitly required by regulation in every state but are pervasive across the country. State statutes, individual insurance contracts and policies, and types of coverage have varying requirements of EOBs (7). Some states have an option to designate an alternate address for EOBs to be mailed directly to the patient rather than the policyholders; however, most states have laws requiring a notice and an EOB be sent to the policyholder when a claim is denied (7). Certain plans, like Medicaid in some states, require EOBs to exclude sensitive information, such as sexual

health services (7). The lack of strong, standardized EOB provisions produces patient confidentiality concerns, particularly when the patient is not the policyholder.

As of April 2020, only 14 states have implemented some provision that serve to protect the confidentiality of the dependent on parental insurance plans (11). Four of those 14 states have specific protections for minors seeking sexually transmitted infection (STI) treatment (11). Also, four of the 14 have protections specific to readdressing the EOB directly to the patient rather than the policyholder (11-12). Providers in New York and Wisconsin are not required to send an EOB to the policyholder when no charges are owed (11). The 36 other states without provisions have little-to-no control of EOBs, allowing policyholders to have at least some access to detail on the services provided and charges incurred by dependents (7, 11-12).

Sexual health services are particularly sensitive healthcare topics and have various barriers to utilization, especially when enrolled on parental insurance (1, 3-4). Approximately 12.7% of sexually experienced 15-25-year-old persons on parental insurance report they would avoid using sexual health and reproductive services, such as sexually transmitted disease (STD) testing, STD treatment, and STD and pregnancy prevention services, specifically in fear of parent(s) finding out (1). Individuals 15-17 are most concerned about conserving sexual and reproductive care confidentiality from parent(s) with a higher prevalence (22.6%), compared to those 20-22 years (8.2%) and 23-25 years (5.4%) (1). Researchers have explored the effects of parental insurance on sexual health services on the general population. However, researchers have not explored how those effects may be different among the queer community.

MSM experience sexual health disparities, particularly black and Hispanic MSM, as well as young MSM (YMSM). All MSM account for approximately 2% of the US population, but more than 70% of all diagnoses of human immunodeficiency virus (HIV) infections (22-23). YMSM are at high-risk for HIV, but infections among this population are difficult to identify due to undefined populations at-risk and YMSM not practicing testing behaviors until later in life (24-25). YMSM are also more likely to engage is some risky sex behaviors, like condomless sex (26). Compared to older age cohorts of MSM, YMSM are not as highly targeted for HIV prevention and intervention efforts, like pre-exposure prophylaxis (PrEP) campaigns (27).

PrEP is a daily pill medication that can reduce MSM's risk of acquiring an HIV infection by 90% when taken as directed (14). Even though PrEP awareness across 20 US urban areas between 2014-2017 has increased from 60% to 90% and PrEP use has increased from 6% to 35%, PrEP use still remains low among black and Hispanic MSM compared to white MSM (28). YMSM have higher PrEP discontinuation rates and lower PrEP adherence rates compared to older MSM age cohorts (25). YMSM PrEP discontinuation rates are most often related to lack of access to a doctor and insurance coverage (29).

PrEP is covered by private insurance plans, but out-of-pocket can cost up to $13,000 a year, which is not affordable for most young adults and adolescents (30). If parental insurance must be used to access PrEP, privacy concerns may arise, including fear of parent(s) discovering their sexual identity, that they are sexually active, or that they are seeking sexual health services. Individuals' willingness to take PrEP, which may be influenced by insurance coverage, is a key piece of the pathway to actual PrEP uptake.

Substantial proportions of gay, bisexual and other MSM experience stigma and discrimination due to sexual orientation. Heightened resistance, hesitation, or fear of seeking sexual health services is likely due to multiple factors. These factors could be any combination of not yet disclosing their sexual orientation with their parent(s) or a healthcare provider, having previously experienced stigma in the healthcare environment, and/or not yet self-identifying with the queer community (13). Resistance, hesitancy, and fear can reduce the quantity and quality of healthcare services sought out by YMSM. Minimizing healthcare visits and suppressing information about sexuality to a healthcare provider can decrease one's awareness of sexual health services, as well as to reduce their access to critical HIV-preventive medication, such as PrEP. Having a conversation with a provider about one's sexuality and willingness to take PrEP is a critical piece of the pathway to actual PrEP uptake.

With nearly two-thirds of all new HIV infections being among MSM, preventive treatments that are available and accessible to vulnerable populations are imperative, as are other components of the HIV prevention package (15-18). Some states have extended access to STI services for the uninsured through Medicaid Family Planning Expansion. HIV-specific services, such as PrEP and HIV counseling, could follow suit, potentially leading to improved reach of vulnerable populations (19). Primary care providers can be an avenue to improving knowledge of and expanding access to PrEP for YMSM (13,17, 20). However, the key is getting YMSM into these offices and having them feel comfortable enough to share their sexuality with a provider. If an individual suppresses their sexuality from provider, then a patient may decline a provider's PrEP recommendation or a provider may not offer a recommendation at all. Since PrEP is

covered by private insurance plans, being on parental insurance could either be a significant facilitator or a significant barrier to PrEP willingness, PrEP conversation with a provider, and actual PrEP uptake.

Researchers have identified and analyzed barriers to PrEP uptake and reasons for discontinuation. Researchers have also identified parental insurance as a barrier for all adolescents to resist or hesitate sexual health services, but have not yet identified the strength of the relationship of parental insurance for YMSM. In this study, we examined whether currently being enrolled on parental insurance is associated with lower willingness to use PrEP, fewer conversations about PrEP with a healthcare provider, and lower PrEP uptake among United States, HIV-negative, YMSM, 15 to 25 years. We also examined whether there are demographic differences in reporting parental health insurance coverage as a barrier to YMSM's willingness to take PrEP.

Methods

Study Population

The American Men's Internet Survey (AMIS), an annual self-administered online survey, has been conducted each year since 2013. AMIS methodology has been previously reported (32). Briefly, AMIS participants are recruited using advertisements on websites and social networking mobile applications. Participants were eligible if they reported being assigned male sex at birth, currently identify as male, resided in the U.S., and were aged ≥15. Eligible participants consent and take the survey online. The AMIS survey includes questions on demographics, sexual behaviors, substance use, HIV and STI testing and diagnosis, and the use of HIV prevention services. The 2019 AMIS survey included questions about whether participants aged <25 year currently had parental health

insurance and whether this played a role in their willingness to take PrEP. Participants are not compensated for taking the survey. The study was conducted in compliance with federal regulations governing protection of human subjects and was reviewed and approved by Emory University's institutional review board.

Measures

We examined three outcome measures: willingness to take PrEP, PrEP conversation with a healthcare provider in the past 12 months (from day of survey completion), and PrEP usage in the past 12 months (from day of survey completion). PrEP questions were only provided to participants who did not report a previous HIV diagnosis (i.e., whose past HIV test was negative, who were never tested for HIV, or who received inconclusive results). These individuals were questioned about awareness of PrEP prior to this explanation and then provided a brief description of PrEP. If individuals were aware of PrEP, then they were asked about having a previous conversation with a healthcare provider about PrEP and PrEP usage. Participants who did not report using PrEP within the past 12 months were asked about their willingness to use it.

Additionally, we examined demographic differences among participants who believed parental insurance is a barrier to PrEP use. Participants who were on parental insurance and were not willing to take PrEP were asked about their level of agreement with the following statement, "I don't want to take PrEP, because I'm worried about my privacy on my parent's insurance".

Participants also reported their insurance coverage. Participants reported insurance coverage by selecting any plan(s) they currently have, including parents' plan,

private plan purchased through an employer, private plan purchased through an exchange, Medicaid or Medicare, TRICARE (CHAMPUS), Veterans Administration coverage, and some other healthcare plan. Participants were also able to answer uninsured, prefer not to answer, and don't know. Participants who reported no insurance, preferred not to answer, or did not know their coverage were excluded from the present analysis. If any parental coverage was reported, participants were categorized as having parental insurance. Parental insurance, regardless of primary or secondary insurance, could have influence over individuals confidentiality concerns. If parental insurance was not reported, then participants were categorized as having other or multiple coverages and utilized as the unexposed group in the present analysis.

Independent measures included age, race/ethnicity, residential population density, living with parent(s), being out about sexuality to family member(s), being out about sexuality to a health care provider, and having a regular healthcare provider. Age categories were determined based on typical high school, college, and work force ages, as age is generally related to type of insurance coverage (parental versus employer/exchange/etc.). Participant's residential population density was assessed at the county-level using the National Center for Health Statistics (NCHS) Rural-Urban classification scheme (31, 33). Additionally, we collapsed these groupings into a four-level population density variable: urban (central), suburban (fringe), medium/small metropolitan and rural (micropolitan and non-core) (31). Participants reported their out status and who they are out to, including friends who identify as queer, friends who do not identify as queer, family member(s,) health care provider, employer, and fellow employees. Out to family member(s) can include any family members, not exclusively

parents. Out to a health care provider can include any provider, not exclusively a regular provider. Participants also reported if they have a regular provider and were provided with the following statement: "'Regular' means a provider you have seen more than one time for a preventive health service (physical exam or check-up) or sick visit".

Analyses

Statistical analyses were conducted in the SAS 9.4 software suite (SAS Institute, Cary, North Carolina). The analytic data set included only completed and unduplicated surveys from participants age 15-25 years, who did not report a previous HIV diagnosis, currently had some type of health insurance, and had data for the PrEP measures. Our entire study population was used to analyze two of our three outcomes: PrEP conversation with a healthcare provider and PrEP uptake. A subset of the study population was used to analyze PrEP willingness, including only those who had not taken PrEP in the past 12 months. Another subset was used to analyze demographic differences among participants who reported parental insurance as a barrier to taking PrEP. For analysis of parental insurance as a barrier to taking PrEP, we evaluated crude prevalence.

Overall chi-square tests were utilized to evaluate if participant characteristics differed significantly by parental insurance coverage. Multivariable logistic regression models were constructed to determine which participant characteristics were independently associated with each PrEP measure. Results are presented as adjusted prevalence ratios (aPR) with 95% confidence intervals (CIs) to denote statistical significance. A SAS-callable SUDAAN code was utilized to obtain the aPR.

Models were crafted using a hypothesis-driven approach. Covariates that have been widely reported as associated with PrEP uptake were included in all three models

(age, race/ethnicity, residential population density, having a regular healthcare provider). Additionally, all three models included whether individuals lived with parent(s), were out to family member(s), and were out to a health care provider, which were selected based on an *a priori* approach. All three variables were included in each model to help further understand the influence of parental insurance on each PrEP measure.

Condition indices and variance decomposition proportions were used to assess collinearity in each model. The model used to assess PrEP willingness, as well as the model used to assess PrEP conversation with a healthcare provider, identified collinearity among the interaction term of age by parental insurance. This interaction term was removed from the model, and no further collinearity was detected in the respective models. There was no evidence of collinearity in the model of PrEP use in the past 12 months.

Interaction was assessed using a hypothesis-driven approach. Interactions between covariates (age, race/ethnicity, residential population density, has a regular healthcare provider) were not considered in the present analysis as the interest of this study is to determine the effect of parental insurance on each outcome. Interactions between living with parent(s), being out to family member(s), and being out to a health care provider by insurance were considered for inclusion in each model and evaluated using likelihood ratio tests and backwards elimination. The first model, used to assess PrEP willingness, included an interaction term of living with parent(s) by insurance. The second model, used to assess PrEP conversation with a health care provider in the past 12 months, included an interaction term of being out to family member(s) by insurance. The

third model, used to assess PrEP use in the past 12 months, did not include any interaction.

All potential confounders were assessed using a 10% cutoff from the gold standard model. In the first model, used to assess PrEP willingness, age was within 10% of the cutoff. Therefore, age could be considered for exclusion from the model. Based on the literature, age is associated with PrEP willingness and uptake, thus should be left in the model. In the third model, used to assess PrEP use in the past 12 months, being out to family member(s) was not collectively outside the 10% cutoff, which could justify exclusion from the model. However, based on our hypothesis-driven approach, out to family member(s) was kept in the model to determine its effect in all three models. All remaining potential confounders in the three models were collectively outside the 10% cutoff and were left in each model. Goodness-of-fit testing was conducted and there was no evidence of poor fit in any of the three models.

Results

There were 3,660 YMSM participants and most were non-Hispanic white, 19-22 years old, and resided in small/medium metropolitan or urban areas (Table 1). More than 70% (n=2390) of participants reported having at least some parental insurance coverage. Compared to YMSM not on parental coverage, YMSM on parental insurance plans were more likely to be younger, non-Hispanic white, from suburban and small/medium metropolitan areas, live with parent(s), not be out to family member(s), not out to a healthcare provider, and have a regular healthcare provider.

PrEP Willingness

Overall, 82.7% of participants were willing to take PrEP (Table 2). The prevalence of PrEP willingness among those on parental insurance was 84.0%, while the prevalence among those on other insurance coverages was 79.4%. Parental insurance alone was not significantly associated with increased PrEP willingness (aPR= 1.03, CI= [0.99, 1.08] (Table 2 for main exposures, Appendix I for full covariates). Living with parent(s), being out to family member(s), and being out to a healthcare provider were not significantly associated with PrEP willingness. Stratified by living with parent(s), there was also not a statistically significant association between parental insurance and PrEP willingness.

PrEP Conversation with a Provider

Overall, 24.5% of participants reported they had a PrEP conversation with a healthcare provider in the past 12 months (Table 3). The prevalence of a PrEP conversation with a healthcare provider in the past 12 months among those on parental insurance was 22.5%, while the prevalence among those on other insurance coverages was 29.4%. Parental insurance alone was not significantly associated a lower likelihood of having PrEP conversation with a healthcare provider in the past 12 months (aPR=0.99, CI=[0.88, 1.12]) (Table 3 for main exposures, Appendix II for full covariates). Those who were out to family member(s) were significantly more likely to report having a PrEP conversation with a healthcare provider in the past 12 months (aPR=1.22, CI= [1.03, 1.44]). Participants who reported being out to a healthcare provider were significantly more likely to report having a PrEP conversation with a healthcare provider in the past 12 months compared to those who were not out to a healthcare provider (aPR=4.87, CI= [3.99, 5.95])

Among YMSM who reported being out to family member(s), parental insurance was not significantly associated with having a PrEP conversation with a healthcare provider in the past 12 months. Among YMSM who reported not being out to family member(s), parental insurance was significantly associated with lower prevalence of a PrEP discussion with a healthcare provider in the past 12 months (aPR= 0.70; CI= [0.52, 0.95])

PrEP Usage

Overall, 10.8% of participants reported they had used PrEP in the past 12 months (Table 4). The prevalence of PrEP use in the past 12 months among those on parental insurance was 9.0%, while the prevalence among those on other insurance coverages was 15.3%. Parental insurance alone was significantly associated with lower prevalence of PrEP use in the past 12 months (aPR= 0.80, CI= [0.66, 0.97]) (Table 3 for main exposures, Appendix II for full covariates).

Participants who reported being out to a healthcare provider were significantly more likely to report having a used PrEP in the past 12 months compared to those who were not out to a healthcare provider (aPR=7.33, CI= [5.07, 10.59]). Living with parent(s) and being out to family member(s) were not significantly associated with PrEP use in the past 12 months.

Parental Insurance as a Barrier to PrEP

There were 326 participants on parental insurance coverage who were unwilling to take PrEP. Of these, 41.1% strongly agreed or agreed (22.1% and 19.0%, respectively) that they did not want to take PrEP, because they were worried about their privacy on their parent's health insurance plan. Overall, 48.2% strongly disagreed or disagreed with

the same statement (28.8% and 19.3%, respectively). The remaining 10.7% neither agreed nor disagreed with the statement. Agreement was greatest among participants who were young (15-18 years), were non-Hispanic white, resided in rural areas, lived with parent(s), were not out to family member(s), and had a regular healthcare provider.

Discussion

These data illustrate that parental insurance is not significantly associated with PrEP willingness, but is negatively associated with PrEP use and having a PrEP conversation with a healthcare provider, particularly when YMSM are not out to a family member(s). There is also data to support that being out to a healthcare provider increases not only the likelihood of having a PrEP conversation with a provider, but also having used PrEP in the past 12 months. These data are the first published analyses assessing the influence of parental insurance on YMSM's pathway to taking PrEP.

Previous research shows parental insurance is negatively associated with willingness to seek out sexual health services for adolescents and young adults, which is not supported by our findings in the YMSM community (1, 3-4, 7-8). Reasons for parental insurance not being significantly associated with PrEP willingness may be attributed to the idea that willingness does not lead directly to uptake. Willingness is a conceptual idea that requires action to actually begin using PrEP. These YMSM have good intentions to take PrEP, which is encouraging. However, the influence of parental insurance may only be one factor influencing the decision for YMSM take the next steps to begin PrEP use.

As our data show, there is a strong association between disclosing one's sexuality to a healthcare provider and having a PrEP discussion. There is an even stronger

association with PrEP use, which may indicate providers are initiating a PrEP discussion regardless of outness. Given, these data suggest the recommendation to start PrEP is only made if an individual is out a healthcare provider.

In regards to PrEP use, other factors affect one's ability to start using PrEP. YMSM typically need to schedule a doctor's visit, share their sexuality with a doctor, have a PrEP conversation with a healthcare provider, request a PrEP prescription, be PrEP eligible, and have insurance/the ability to pay for the visit and the prescription (34-36). Another potential consideration is that providers are initiating a PrEP recommendation and YMSM are declining that recommendation due to continentality concerns or other PrEP uptake barriers. Despite the strong effect of this relationship, there is also a strong independent effect of parental insurance on PrEP use. However, additional barriers and steps to taking PrEP include concerns about side effects, concerns about drug resistance, low perception of risk for HIV, aversion to daily pill taking, and low perceived efficacy of PrEP (31, 37-39).

Other perceived structural, racial, and demographic barriers may also impose on an individual's decision to take PrEP and access to PrEP (20, 22-24, 37, 40, 42). In our model, we addressed the variance by some of these factors including, age, race/ethnicity, area of residence, and having a regular provider to ensure the main exposures are independent of other common associations with PrEP outcomes. As discussed earlier in the paper, younger MSM cohorts are not as frequently targeted for PrEP interventions and are also less frequently aware of PrEP, which could be contributing factors to lower PrEP uptake in younger MSM (27). Health disparities across racial/ethnic groups and residential areas are linked to decreased PrEP uptake (31, 37, 41). Having a regular

provider leads to increased PrEP uptake, as having a regular provider may improve the level of comfort a patient feels. On the contrary, if an individual is not yet out to their family, they may not be initiating these conversations with their healthcare providers.

In this study, there is data to support that not being out to family member(s) plays a significant role in decreased likelihood of a PrEP conversation with a healthcare provider in the past 12 months. There is a weaker association between out to family member(s) and PrEP conversation compared to the association of out to a healthcare provider and PrEP conversation, suggesting outness to exclusively a healthcare provider rather than exclusively family member(s) is more important when predicting PrEP uptake.

It is important to note the prevalence of outness in our sample is much higher than what is estimated in the literature (41-42). When comparing outness of among our study population, 30.5% reported being out to exclusively family member(s), 5.9% reported being out to exclusively a healthcare provider, 43.9% reported being out to both, 19.2% reported being out to neither. It is estimated that approximately 83% of the world's sexual minority population does not disclose their sexual identity (41). It could be speculated that our estimates of outness are higher than other estimates, because of our recruiting methods. AMIS uses targeted social networking ads (gay social networking, general social networking, geospatial networking) to recruit participants. This means the algorithm has associated the user with the MSM community, which could be due to evident outness on that particular platform.

Limitations

Our data have limitations that are typical of online surveys. Our sample of YMSM was a convenience sample, and does not represent all U.S. YMSM, or all internet- or app-using YMSM in the United States (31). Participants could experience recall bias, as participants were required to recall PrEP conversation with a provider and PrEP use across the past 12 months (31).

Our data are also subject to misclassification bias if young men did not accurately report their willingness, occurrence of PrEP conversation with a healthcare provider, or use of PrEP. Our analysis compared each outcome across different sociodemographic groups of YMSM, among whom the actual risks of HIV acquisition vary (31). For example, the risk of HIV infection for black MSM in the United States is higher than for white MSM because of sexual network and structural factors (31, 37). The way in which we conducted our analysis only allowed us to examine for participants that reported similar risks. AMIS collects data that can calculate PrEP eligibility based on the Centers for Disease Control and Prevention recommendation, which could be utilized in a sensitivity analysis to evaluate this limitation.

Additional misclassification bias could occur due to how we coded parental insurance versus all other insurance. Individuals with any parental coverage were categorized having parental coverage and individuals with all other coverages or combinations were categorized as non-parental coverage. In our study sample, 15 unique parental coverage combinations and 13 unique combinations of other types of coverage were reported. We did not inquire about primary or secondary coverage, or which of their plans offers what benefits. Some participants who have multiple types of insurance may not disclose parental insurance coverage when accessing sexual health services and

therefore would be less concerned about their confidentiality. Insurance coverage in our study is also assessed as current coverage and does not include any information on change in coverage over the past 12 months.

PrEP conversation with a healthcare provider and PrEP use were reported if they occurred in the past 12 months. In a 12-month period, insurance coverage could change multiple times due to various factors, including job change or loss, inability to pay, enrollment in a college or university, or a coverage gap. Some participant's PrEP conversation with a healthcare provider and/or PrEP use may have been experienced when a participant was not actually on a parent's plan but has since switched to a parent's plan prior to their participation in AMIS-2019. AMIS does collect data on current PrEP use; however, this sample is small and would have reduced our study's power and ability to achieve statistically significant results.

Conclusions

The importance of our study findings for policy and prevention is that these data suggest a need for increased emphasis on patient-doctor confidentiality, acceptance of the queer community, and increased education efforts of PrEP among YMSM. As some states and insurance policies have implemented recent billing confidently standards, the majority of states and plans have not updated their standards to protect dependents from policyholders gaining sensitivity information (11-12). For those states and plans that have emphasized billing confidentiality, there is likely a need for dependents to become more aware of their health record protection, as these standards are relatively new and may not be widely communicated in marginalized communities, such as YMSM. Health

communication campaigns and programs, as well as providers, can serve as avenues to enlighten YMSM on their healthcare billing protection.

For states or insurance plans that have not emphasized billing protections for dependents and sensitive health records, widely implemented policy is needed. If YMSM know their information is protected, even when enrolled on parental coverage, they would likely be more apt to taking the next steps for PrEP use and other sexual health service.

Complementary to policy change, we recommend more targeted PrEP interventions for YMSM. As discussed in the introduction, YMSM are not a primary target for most PrEP campaigns. However, they are more subject to risky sexual health behaviors, like condomless sex, compared to older MSM (26). Younger MSM are also more likely to be enrolled as a dependent on parental insurance, which can also increase their risk for adverse sexual health outcomes, as parental insurance is negatively associated with some of the steps to PrEP use. Taking both of these considerations into account, YMSM are not well situated to protect themselves from adverse sexual health outcomes and not well prepared to seek out HIV-prevention medicine, such as PrEP.

We recommend future work on this topic. As reported in this study, parental insurance is negatively associated with having a PrEP conversation with a healthcare provider when YMSM are not out to family member(s) and is also negatively associated with PrEP use in the past 12 months. Given, there is a need to better target YMSM in PrEP campaigns, as well as a need to better understand the strength of the influence of parental insurance on each step on the pathway to taking PrEP. We recommend further research to compare the strength of the association between parental insurance and PrEP

willingness and PrEP uptake to strength of the association between other well-reported PrEP willingness and uptake barriers. We also recommendation additional analysis to be conducted to gain a better understand of the influence of parental insurance on each step to PrEP uptake, including steps not reported in the present analysis (PrEP awareness, PrEP continuation, etc.). The YMSM community may also benefit if we can analyze and describe PrEP trends among states or plans that have widely implemented insurance billing protections for dependents. These data could encourage states and insurers to follow suit.

Tables

Table 1. Characteristics of Young HIV-negative MSM Participants with Insurance Coverage in the American Men's Internet Survey, 2019.

			Parental Insurance				
Participant Characteristics	Total		Yes		No		p-value[a]
	N	(%)	N	(%)	N	(%)	
Total	**3360**		**2390**	**(71.1)**	**970**	**(28.9)**	
Age (years)							<0.0001
15-18	851	(25.3)	674	(28.2)	177	(18.3)	
19-22	1554	(46.3)	1189	(49.8)	365	(37.6)	
23-25	955	(28.4)	527	(22.1)	428	(44.1)	
Race/Ethnicity							<0.0001
Black, non-Hispanic	254	(7.6)	135	(5.7)	119	(12.3)	
Hispanic	650	(19.4)	398	(16.7)	252	(26.0)	
White, non-Hispanic	2079	(61.9)	1603	(67.1)	476	(49.1)	
Other or multiple races	341	(10.2)	233	(9.8)	108	(11.1)	
Missing	36	(1.1)	21	(0.9)	15	(1.6)	
Population Density							0.0759
Urban	1090	(32.4)	750	(31.4)	340	(35.1)	
Suburban	761	(22.7)	558	(23.4)	203	(20.9)	
Small/ medium metropolitan	1134	(33.8)	825	(34.5)	309	(31.9)	
Rural	365	(10.9)	252	(10.5)	113	(11.7)	
Missing	10	(0.3)	5	(0.2)	5	(0.5)	
Lives with Parent(s)							<0.0001
Yes	1469	(43.7)	1157	(48.4)	312	(32.2)	
No	1864	(55.5)	1217	(50.9)	647	(66.7)	
Missing	27	(0.8)	16	(0.7)	11	(1.1)	
Out to Family Member(s)[b]							0.8716
Yes	2501	(74.4)	1777	(74.4)	724	(74.6)	
No	841	(25.0)	600	(25.1)	241	(24.9)	
Missing	18	(0.5)	13	(0.5)	5	(0.5)	
Out to a Healthcare Provider							<0.0001
Yes	1672	(49.8)	1112	(46.5)	560	(57.7)	
No	1670	(49.7)	1265	(52.9)	405	(41.8)	
Missing	18	(0.5)	13	(0.5)	5	(0.5)	
Has a Regular Healthcare Provider							0.0006
Yes	2387	(71.0)	1739	(72.8)	648	(66.8)	
No	916	(27.3)	612	(25.6)	304	(31.3)	
Missing	57	(1.7)	39	(1.6)	18	(1.9)	

Abbreviations: YMSM, Young Men Who Sex with Men; PrEP, HIV Pre-exposure Prophylaxis; HIV, Human immunodeficiency virus

[a] Chi-square test for differences in participant characteristics by insurance

[b] Can include any family member(s) (i.e. siblings, parents, etc.)

Table 2. Willingness to Use PrEP by Parental Insurance Coverage Among Young MSM Participants in the American Men's Internet Survey, 2019.

	Prep Willingness				**aPR[a]**	**95% CI**
	Yes		No			
Characteristics	N	(%)	N	%		
	2479	(82.7)	517	(17.3)		
Parental Insurance						
Yes	1826	(84.0)	348	(16.0)	1.03	(0.99, 1.08)
No	653	(79.4)	169	(20.6)	REF	
Lives with Parent(s)						
Yes	1146	(84.5)	210	(15.5)	1.01	(0.98, 1.05)
Parental Insurance- Yes	909	(84.3)	169	(15.7)	0.98	(0.92, 1.04)
Parental Insurance- No	237	(85.3)	41	(14.8)	REF	
No	1308	(81.0)	306	(19.0)	REF	
Parental Insurance- Yes	901	(83.4)	179	(16.6)	1.01	(0.97, 1.05)
Parental Insurance- No	407	(76.2)	127	(23.8)	REF	
Out to Family Member(s)[b]						
Yes	1812	(82.9)	375	(17.2)	1.03	(0.99, 1.07)
No	656	(82.8)	136	(17.2)	REF	
Out to Healthcare Provider						
Yes	1090	(81.3)	251	(18.7)	0.98	(0.94, 1.01)
No	1378	(84.1)	260	(15.9)		

Abbreviations: YMSM, Young Men Who Sex with Men; PrEP, HIV Pre-exposure Prophylaxis; HIV, Human immunodeficiency virus

[a] Adjusted for age, race/ethnicity, residential population density, lives with parent(s), out to family member(s), out to a healthcare provider, and has regular provider

[b] Can include any family member(s) (i.e. siblings, parents, etc.)

Table 3. PrEP Conversation with a Healthcare Provider in Past 12 Months by Parental Insurance Coverage Among Young MSM Participants in the American Men's Internet Survey, 2019

	Prep Conversation				**aPR[a]**	**95% CI**
	Yes		No			
Characteristics	N	(%)	N	%		
	823	(24.5)	2537	(75.5)		
Parental Insurance						
Yes	538	(22.5)	1852	(77.5)	0.99	(0.88, 1.12)
No	285	(29.4)	685	(70.6)	REF	
Lives with Parent(s)						
Yes	272	(18.5)	1197	(81.5)	0.90	(0.80, 1.02)
No	546	(29.3)	1318	(70.7)	REF	
Out to Family Member(s)[b]						
Yes	709	(28.4)	1792	(71.7)	**1.22**	**(1.03, 1.44)**
Parental Insurance- Yes	284	(17.9)	1299	(82.1)	1.06	(0.93, 1.21)
Parental Insurance- No	117	(19.4)	487	(80.6)	REF	
No	109	(13.0)	732	(87.0)	REF	
Parental Insurance- Yes	37	(6.4)	541	(93.6)	**0.70**	**(0.52, 0.95)**
Parental Insurance- No	24	(11.2)	190	(88.8)	REF	
Out to a Health Care Provider						
Yes	704	(42.1)	968	(57.9)	**4.87**	**(3.99, 5.95)**
No	114	(6.8)	1556	(93.2)	REF	

Abbreviations: YMSM, Young Men Who Sex with Men; PrEP, HIV Pre-exposure Prophylaxis; HIV, Human immunodeficiency virus

[a] Adjusted for age, race/ethnicity, residential population density, lives with parent(s), out to family member(s), out to a healthcare provider, and has regular provider

[b] Can include any family member(s) (i.e. siblings, parents, etc.)

Table 4. PrEP Use in the Past 12 Months by Parental Insurance Coverage Among Young MSM Participants in the American Men's Internet Survey, 2019.

	Prep Use				**aPR[a]**	**95% CI**
	Yes		No			
Characteristics	N	(%)	N	%		
	364	(10.8)	2996	(89.2)		
Parental Insurance						
Yes	216	(9.0)	2174	(91.0)	**0.80**	**(0.66, 0.97)**
No	148	(15.3)	822	(84.7)	REF	
Lives with Parent(s)						
Yes	113	(7.7)	1356	(92.3)	0.92	(0.75, 1.13)
No	250	(13.4)	1614	(86.6)	REF	
Out to Family Member(s)[b]						
Yes	314	(12.6)	2187	(87.5)	1.05	(0.80,1.37)
No	49	(5.8)	792	(94.2)		
Out to a Health Care Provider						
Yes	331	(19.8)	1341	(80.2)	**7.33**	**(5.07, 10.59)**
No	32	(1.9)	1638	(98.1)	REF	

Abbreviations: YMSM, Young Men Who Sex with Men; PrEP, HIV Pre-exposure Prophylaxis; HIV, Human immunodeficiency virus

[a] Adjusted for age, race/ethnicity, residential population density, lives with parent(s), out to family member(s), out to a healthcare provider, and has regular provider

[b] Can include any family member(s) (i.e. siblings, parents, etc.)

Table 5. Participants on Parental Insurance and Unwilling to Take Prep, Agreement with, "I don't want to take PrEP, because I'm worried about my privacy on my parent's insurance." Among Young MSM Participants in the American Men's Internet Survey, 2019

	Total		Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
Total	326		72	(22.1)	62	(19.0)	35	(10.7)	63	(19.3)	94	(28.8)
Age (years)												
15-18	64	(19.6)	24	(37.5)	13	(21.0)	10	(15.6)	6	(9.4)	11	(17.2)
19-22	170	(52.2)	37	(21.8)	32	(18.8)	17	(10.0)	34	(20.0)	50	(29.4)
23-25	92	(28.2)	11	(12.0)	17	(18.5)	8	(8.7)	23	(25.0)	33	(35.9)
Race/Ethnicity												
Black, non-Hispanic	11	(3.4)	3	(27.3)	1	(9.1)	2	(18.2)	0	(0.0)	5	(45.5)
Hispanic	56	(17.2)	10	(17.9)	9	(16.1)	5	(8.9)	16	(28.6)	16	(28.6)
White, non-Hisp.[b]	233	(71.7)	49	(21.0)	47	(20.2)	27	(11.6)	45	(19.3)	8	(27.9)
Other, multiple	26	(8.0)	10	(38.5)	5	(19.2)	1	(3.9)	2	(7.7)	8	(30.8)
Population Density												
Urban	100	(30.7)	22	(22.0)	21	(21.0)	14	(14.0)	18	(18.0)	25	(25.0)
Suburban	78	(23.9)	14	(18.0)	9	(11.5)	6	(7.7)	21	(26.9)	28	(35.9)
Small/ med. metro.[a]	113	(34.7)	29	(25.7)	19	(16.8)	9	(8.0)	21	(18.6)	35	(31.0)
Rural	35	(10.7)	7	(20.0)	13	(37.1)	6	(17.1)	3	(8.6)	6	(17.1)
Lives with Parent(s)												
Yes	158	(48.5)	43	(27.2)	24	(15.2)	19	(12.0)	34	(21.5)	38	(24.1)
No	168	(51.5)	29	(17.3)	38	(22.6)	16	(9.5)	29	(17.3)	56	(33.3)
Out to Family Member(s)[c]												
Yes	241	(74.4)	34	(14.1)	37	(15.4)	28	(11.6)	60	(24.9)	82	(34.0)
No	83	(25.6)	37	(44.6)	25	(30.1)	6	(7.2)	3	(3.6)	12	(14.5)
Out to a Health Care Provider												
Yes	155	(47.8)	16	(10.3)	27	(17.4)	17	(11.0)	36	(23.2)	59	(38.1)
No	169	(52.2)	55	(32.5)	35	(20.7)	17	(10.1)	27	(16.0)	35	(20.7)
Has a Regular Health Care Provider												
Yes	227	(70.7)	59	(26.0)	37	(26.0)	19	(8.3)	42	(18.5)	70	(30.8)
No	94	(29.3)	13	(13.8)	22	(23.4)	16	(17.0)	19	(20.2)	24	(25.5)

[a] Small/medium metropolitan
[b] White, non-Hispanic
[c] Can include any family member(s) (i.e. siblings, parents, etc.)

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Appendices

Appendix I: Table 2.1

Table 2.1. Willingness to Use PrEP by Parental Insurance Coverage Among Young MSM Participants in the American Men's Internet Survey, 2019.

	PrEP Willingness				aPR[a]	95% CI
Participant Characteristics	Yes		No			
	N	(%)	N	(%)		
Total	2479	(82.7)	517	(17.3)		
Parental Insurance						
Yes	1826	(84.0)	348	(16.0)	1.03	(0.99, 1.08)
No	653	(79.4)	169	(20.6)	REF	
Age (years)						
15-18	719	(87.4)	104	(12.6)	REF	
19-22	1148	(82.8)	239	(17.2)	**0.95**	**(0.91, 0.98)**
23-25	612	(77.9)	174	(22.1)	**0.91**	**(0.86, 0.95)**
Race/Ethnicity						
Black, non-Hispanic	182	(87.5)	26	(12.5)	**1.09**	**(1.03, 1.14)**
Hispanic	479	(82.4)	102	(17.6)	1.01	(0.96, 1.05)
White, non-Hispanic	1530	(81.8)	340	(18.2)	REF	
Other or multiple races	259	(85.2)	45	(14.8)	1.04	(0.98, 1.10)
Population Density						
Urban	761	(82.6)	160	(17.4)	REF	
Suburban	564	(82.3)	121	(17.7)	0.99	(0.94, 1.04)
Small/ medium metropolitan	856	(82.6)	181	(17.5)	1.00	(0.96, 1.04)
Rural	289	(84.0)	55	(16.0)	1.00	(0.95, 1.06)
Lives with Parent(s)						
Yes	1146	(84.5)	210	(15.5)	1.01	(0.98, 1.05)
Parental Insurance- Yes	909	(84.3)	169	(15.7)	0.98	(0.92, 1.04)
Parental Insurance- No	237	(85.3)	41	(14.8)	REF	
No	1308	(81.0)	306	(19.0)	REF	
Parental Insurance- Yes	901	(83.4)	179	(16.6)	1.01	(0.97, 1.05)
Parental Insurance- No	407	(76.2)	127	(23.8)	REF	
Out to Family Member(s)[b]						
Yes	1812	(82.9)	375	(17.1)	1.03	(0.99, 1.07)
No	656	(82.8)	136	(17.2)	REF	
Out to a Healthcare Provider						
Yes	1090	(81.3)	251	(18.7)	0.98	(0.94, 1.01)
No	1378	(84.1)	260	(15.9)		
Has a Regular Healthcare Provider						
Yes	1724	(83.0)	354	(17.0)	1.00	(0.96, 1.04)
No	710	(82.3)	153	(17.7)		

Abbreviations: YMSM, Young Men Who Sex with Men; PrEP, HIV Pre-exposure Prophylaxis; HIV, Human immunodeficiency virus

[a] Adjusted for age, race/ethnicity, residential population density, lives with parent(s), out to family member(s), out to a healthcare provider, and has regular provider

[b] Can include any family member(s) (i.e. siblings, parents, etc.)

Appendix II: Table 3.1

Table 3.1 PrEP Conversation with a Healthcare Provider in Past 12 Months by Parental Insurance Coverage Among Young MSM Participants in the American Men's Internet Survey, 2019.

	PrEP Conversation				aPR[a]	95% CI
Participant Characteristics	Yes		No			
	N	(%)	N	(%)		
Total	823	(24.5)	2537	(75.5)		
Parental Insurance						
Yes	538	(22.5)	1852	(77.5)	0.99	(0.88, 1.12)
No	285	(29.4)	685	(70.6)	REF	
Age (years)						
15-18	95	(11.2)	756	(88.8)	REF	
19-22	407	(26.2)	1147	(73.8)	**1.57**	**(1.29, 1.91)**
23-25	321	(33.6)	634	(66.4)	**1.73**	**(1.40, 2.13)**
Race/Ethnicity						
Black, non-Hispanic	90	(35.4)	164	(64.6)	1.10	(0.95, 1.27)
Hispanic	154	(23.7)	496	(76.3)	**1.51**	**(1.28, 1.78)**
White, non-Hispanic	480	(23.1)	1599	(76.9)	REF	
Other or multiple races	87	(25.5)	254	(74.5)	**1.22**	**(1.02, 1.45)**
Population Density						
Urban	331	(30.4)	759	(69.6)	REF	
Suburban	176	(23.1)	585	(76.9)	**0.85**	**(0.74, 0.99)**
Small/ medium metropolitan	254	(22.4)	880	(77.6)	**0.83**	**(0.73, 0.95)**
Rural	59	(16.2)	306	(83.8)	**0.72**	**(0.58, 0.90)**
Lives with Parent(s)						
Yes	272	(18.5)	1197	(81.5)	0.90	(0.80, 1.02)
No	546	(29.3)	1318	(70.7)	REF	
Out to Family Member(s)[b]						
Yes	709	(28.4)	1792	(71.7)	**1.22**	**(1.03, 1.44)**
Parental Insurance- Yes	284	(17.9)	1299	(82.1)	1.06	(0.93, 1.21)
Parental Insurance- No	117	(19.4)	487	(80.6)	REF	
No	109	(13.0)	732	(87.0)	REF	
Parental Insurance- Yes	37	(6.4)	541	(93.6)	**0.70**	**(0.52, 0.95)**
Parental Insurance- No	24	(11.2)	190	(88.8)	REF	
Out to a Healthcare Provider						
Yes	704	(42.1)	968	(57.9)	**4.87**	**(3.99, 5.95)**
No	114	(6.8)	1556	(93.2)	REF	
Has a Regular Healthcare Provider						
Yes	650	(27.2)	1737	(72.8)	**1.39**	**(1.21, 1.61)**
No	167	(18.2)	749	(81.8)	REF	

Abbreviations: YMSM, Young Men Who Sex with Men; PrEP, HIV Pre-exposure Prophylaxis; HIV, Human immunodeficiency virus

[a] Adjusted for age, race/ethnicity, residential population density, lives with parent(s), out to family member(s), out to a healthcare provider, and has regular provider

[b] Can include any family member(s) (i.e. siblings, parents, etc.)

Appendix III: Table 4.1

Table 4.1 PrEP Use in the Past 12 Months by Parental Insurance Coverage Among Young MSM Participants in the American Men's Internet Survey, 2019.

	PrEP Willingness				aPR[a]	95% CI
Participant Characteristics	Yes		No			
	N	(%)	N	(%)		
Total	364	(10.8)	2996	(89.2)		
Parental Insurance						
Yes	216	(9.0)	2174	(91.0)	**0.80**	**(0.66, 0.97)**
No	148	(15.3)	822	(84.7)	REF	
Age (years)						
15-18	28	(3.3)	823	(96.7)	REF	
19-22	167	(10.8)	1387	(89.3)	**2.18**	**(1.47, 3.22)**
23-25	169	(17.7)	786	(82.3)	**2.83**	**(1.89, 4.24)**
Race/Ethnicity						
Black, non-Hispanic	46	(18.1)	208	(81.9)	**1.60**	**(1.20, 2.12)**
Hispanic	69	(10.6)	581	(89.4)	1.09	(0.84, 1.39)
White, non-Hispanic	209	(10.1)	1870	(90.0)	REF	
Other or multiple races	37	(10.9)	304	(89.2)	1.24	(0.92, 1.67)
Population Density						
Urban	169	(15.5)	921	(84.5)	REF	
Suburban	76	(10.0)	685	(90.0)	**0.76**	**(0.60, 0.97)**
Small/ medium metropolitan	97	(8.6)	1037	(91.5)	**0.64**	**(0.51, 0.81)**
Rural	21	(5.8)	344	(94.3)	**0.54**	**(0.35, 0.81)**
Lives with Parent(s)						
Yes	113	(7.7)	1356	(92.3)	0.92	(0.75, 1.13)
No	250	(13.4)	1614	(86.6)	REF	
Out to Family Member(s)[b]						
Yes	314	(12.6)	2187	(87.5)	1.05	(0.80,1.37)
No	49	(5.8)	792	(94.2)		
Out to a Healthcare Provider						
Yes	331	(19.8)	1341	(80.2)	**7.33**	**(5.07, 10.59)**
No	32	(1.9)	1638	(98.1)	REF	
Has a Regular Healthcare Provider						
Yes	309	(13.0)	2078	(87.1)	**2.10**	**(1.59, 2.78)**
No	53	(5.8)	863	(94.2)	REF	

Abbreviations: YMSM, Young Men Who Sex with Men; PrEP, HIV Pre-exposure Prophylaxis; HIV, Human immunodeficiency virus

[a] Adjusted for age, race/ethnicity, residential population density, lives with parent(s), out to family member(s), out to a healthcare provider, and has regular provider

[b] Can include any family member(s) (i.e. siblings, parents, etc.)