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Conceptualizing and quantifying access to HIV care among people living with HIV in Atlanta, Georgia

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An abstract of
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Conceptualizing and quantifying access to HIV care among people living with HIV in Atlanta, Georgia

By Sharoda Dasgupta

Regular medical care utilization among people living with HIV (PLWH) is important in maintaining viral load suppression and reducing transmission to others. Access to medical care affects healthcare-seeking behaviors among PLWH, and encompasses both spatial accessibility (characterized by travel-related factors, such as proximity and travel mode) and provider-related characteristics. In this dissertation, we examined different facets of access to HIV care resources in Atlanta, Georgia.

In the first study, we assessed usability of a Google map question embedded in a Web-based survey as a valid and reliable alternative to collecting address-based data on important HIV-related locations, such as residence and last attended HIV provider. The map tool demonstrated strong validity but varying reliability by recruitment mode in identifying these key locations.

In the second study, we investigated whether using public transportation, an aspect of spatial accessibility, is a barrier to accessing HIV care, and examined differences in trends by geographic region. Public transportation use was associated with lower rates of HIV care attendance in south Atlanta. Participants in south Atlanta also lived in areas with lower household vehicle access and were more likely to use public transportation.

In the third study, we more extensively quantified spatial accessibility to HIV providers with respect to case count, poverty, and household vehicle access. The findings suggested that census tracts with poorer accessibility coincided with areas of high case burden, high poverty, and lower household vehicle access in urban south Atlanta.

In the fourth study, we combined dimensions of spatial accessibility and provider-related characteristics in a novel tool to (1) comprehensively quantify access to HIV services (supply) by mode of transportation, and (2) identify underserved areas with respect to HIV cases (demand) in Atlanta. Access to HIV primary care was greater in urban areas. Overlapping areas of high HIV case burden (demand) and low access (supply) were observed in parts of urban south and northeast Atlanta.

These results demonstrate that access to HIV care varies spatially and by factors related to socioeconomic status. Identifying areas with poor access can help address gaps in HIV care engagement and improve important HIV clinical outcomes.

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Table of Contents

List of Tables

List of Figures

Chapter 1: Background and Significance

HIV incidence and prevalence in the United States

By the end of 2011, nearly 1.2 million individuals aged 13 years and older were living with HIV in the United States. HIV transmission is disproportionately higher among men who have sex with men (MSM), particularly those of color [1, 2]. Rates of HIV infection are higher in the south compared to any other region in the US [1]. The state of Georgia ranks second highest in the nation in the total number of new HIV diagnoses in 2012, where Atlanta bears a majority of the burden of cases in the state. [1, 3].

HIV treatment cascade

Regular HIV care engagement and adherence to antiretroviral therapy (ART) are important in maintaining viral suppression, improving survival, and reducing transmission to others [4-9]. The HIV treatment cascade (Figure 1.1) was created as a framework to identify and address specific barriers to care appropriately. The common sequence of steps of the HIV treatment cascade, or care continuum, are as follows: HIV diagnosis, linkage to care, retention in care, ART initiation and adherence, and viral suppression [10-12].

Barriers to care engagement can occur at any one or more of these stages [10, 11], and compounded over the entire cascade, can result in a number of poor outcomes, such as unsuppressed viral loads, development of comorbidities, and early death [4-9]. In 2013, in the establishment of the HIV Continuum of Care Initiative, the Obama administration released an executive order for federal health agencies to prioritize addressing issues related to poor HIV care engagement [13]. Each stage of the continuum is described below.

HIV diagnosis

HIV infection is characterized by a laboratory-confirmed diagnosis of HIV. An estimated 14% of people living with HIV in the US are unaware of their infection [2], and thus, cannot be linked to medical care. These individuals may unknowingly participate in risky sexual and injection drug

use behaviors, increasing risk of transmission to others [14, 15]. Therefore, reducing the number of undiagnosed infections through early diagnosis is crucial in improving treatment outcomes.

Linkage to care

Linkage to HIV care refers to initiation of care upon diagnosis, and is often measured by the evidence of an initial visit to a medical care provider to obtain CD4 and viral load measurements [16]. The Centers for Disease Control and Prevention recommends that individuals be linked to HIV care within 3 months of diagnosis [17]. However, a large proportion of people living with HIV enter care after progressing to AIDS [18]. Because care initiation is associated with reduced risky sexual behavior [19], those who are not linked to care may have an increased risk of transmission to others. An estimated 80% of people living with HIV in the US were linked to care within 3 months of diagnosis [20].

Retention in care

Retention in HIV care refers to regular engagement in medical care for HIV infection after being linked [10]. It is often characterized through the number of attended HIV primary care visits associated with a clinical assessment (e.g. through viral load or CD4 tests) or the proportion of scheduled visits that were not missed, but there is no standard measure for retention [6, 21, 22]. Generally, continuity in care decreases the need for expensive emergency care visits and hospitalizations, reducing healthcare costs in the long term [23]. In addition, poor engagement in HIV care may be associated with decreased access to ART, and thus, poor ART adherence and increased likelihood of virologic failure and other poor HIV outcomes [5, 10, 24]. Retention in HIV care is a dynamic measurement, as people living with HIV can cycle in and out of care after initially being linked [11]. Approximately 40% of people living with HIV in the US are engaged in care [20].

ART initiation / adherence

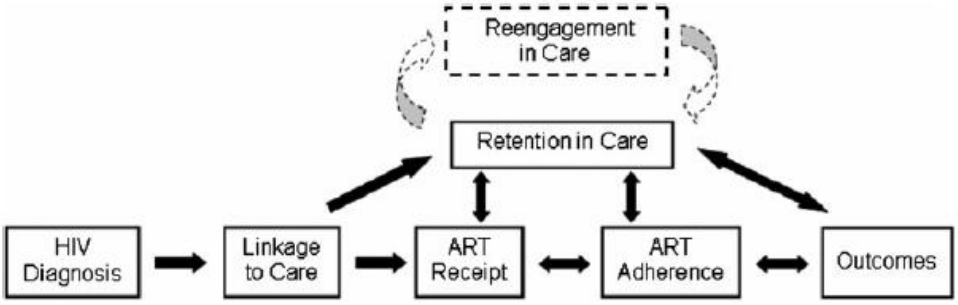
Initiating and remaining adherent to ART are critical in achieving and sustaining viral suppression [4, 24]. As such, a “test-and-treat” approach in which a patient seamlessly transitions from a positive HIV test to ART initiation has received much attention and is currently

being evaluated as a potential for standard of care for HIV [25]. An estimated 37% of HIV-positive individuals in the US have initiated ART [20].

Viral suppression

Achieving and sustaining viral suppression is crucial in reducing transmission to others and improving survival outcomes [10, 24, 26]. Sustained viral suppression is only achievable through strict adherence to ART. Intermittent adherence can increase the likelihood of developing resistance to medications, making it more difficult to achieve and maintain viral suppression [24]. Approximately 82% of those who have initiated ART have achieved viral suppression [20].

Figure 1.1. A modified version of the HIV treatment cascade, in which people living with HIV can cycle in and out of care at any point after being linked, and subsequently, may need to be re-initiated on ART [11]. Important outcomes in the box on the far right may include sustained viral suppression, improved survival, and reduced transmission to others.



Access to medical care

Access to medical care, which refers to the fit or match between consumers of medical services and the healthcare system, is inherently spatial in nature. Healthcare access is characterized through entry into the healthcare system and use of healthcare services. Equitable access represents a perfect match between available services in the community and client needs. Inequitable access represents a mismatch between the two, which can be explained by one or more barriers to medical care [27-29]. *Potential access* refers to the composite sum of all factors which explain the match or mismatch between client needs and the healthcare system serving the population [28, 30]. *Realized access* represents the use of available healthcare services, given potential access [31].

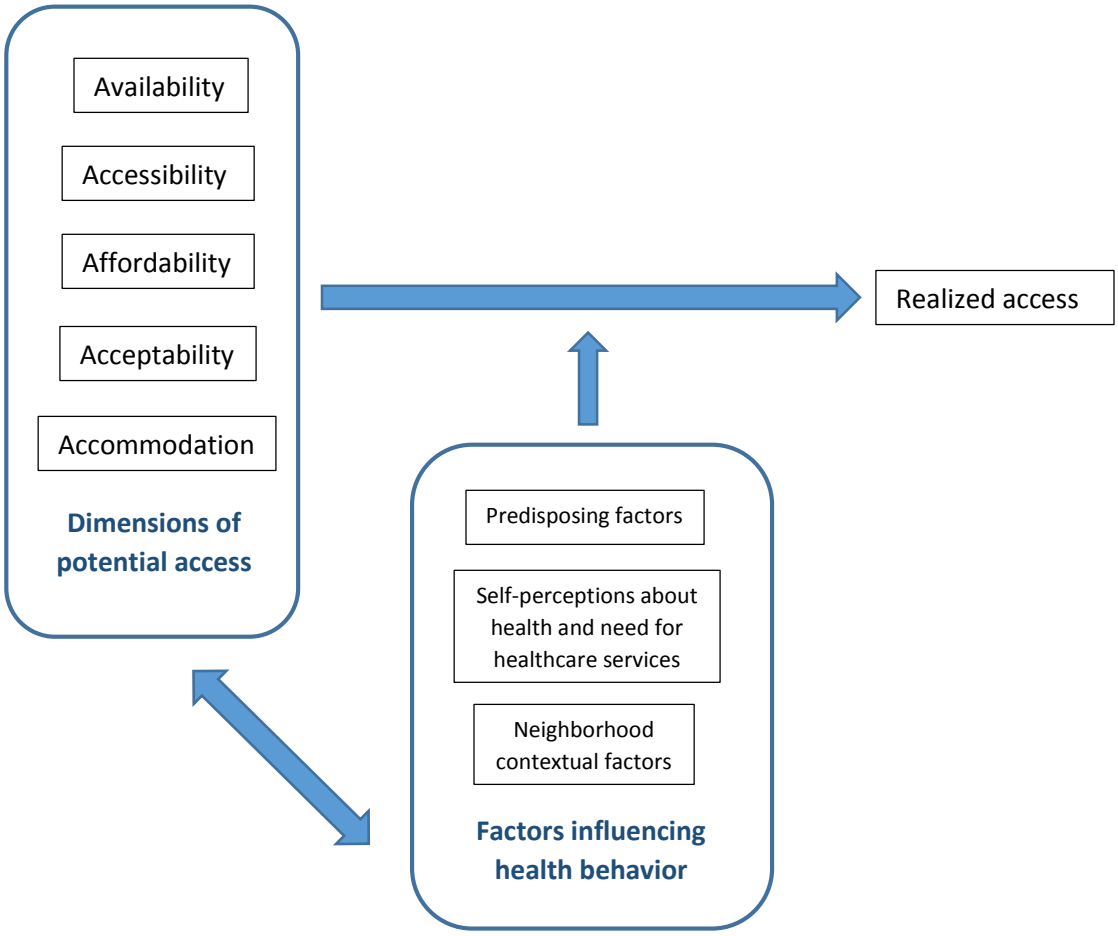
One commonly used framework developed by Penchansky and Thomas cites five dimensions of potential access, including availability, accessibility, affordability of services, acceptability, and accommodation, each of which are explained below [28].

Availability refers to the distribution of existing medical services with respect to location of clients who needs them. *Accessibility*, which is closely related to availability, is defined by the density of available medical practices or clinics and spatial proximity to services, and is characterized by travel distance, commute time, mode of travel, and associated travel costs. *Affordability* refers to whether clinics can accommodate clients based on their income and health insurance status. *Acceptability* refers to provider-patient interactions, including healthcare worker-related stigma and comfort level of the patient with providers at a particular clinic. *Accommodation* is the ability for clinic locations to accept patients based on provider availability and clinic hours [28].

Additional factors which influence patient health behavior, including individual predisposing factors, self-perceptions about health and the need for healthcare services, and neighborhood contextual factors [32-34], are examples of barriers between potential and realized access [11, 27]. Individual predisposing factors might include mental and physical health state and frequency of partaking in risky behaviors, such as drug use and condomless sex. Examples of neighborhood contextual factors might include structural factors, such as available means of travel, and sociocultural factors, such as self-perceived stigma, resilience, and social norms [27]. Some components influencing health behaviors are inherently captured in aspects of potential access. For instance, risky behaviors related to injection drug use may affect healthcare-seeking behaviors, but can also be addressed in substance abuse treatment if offered at a particular clinic.

Using elements from Andersen's modified health services use model, Millman's model for monitoring access, and Penchansky and Thomas's framework for access, Figure 1.2 depicts factors related to potential and realized access [27, 28, 35]. In contrast to the models previously described, the framework we use more explicitly distinguishes between client needs and the characteristics of surrounding resources.

Figure 1.2. A framework which relates factors pertaining to potential access, health behavior, and realized access, based on the Andersen, Millman, and Penchansky and Thomas models [27, 28, 35].



Barriers to accessing healthcare among people living with HIV

Each step of the HIV treatment cascade is an opportunity for people living with HIV to drop out of care. Many individual, community, and policy factors [11] have been shown to be associated with poor HIV care engagement and negative clinical outcomes [5, 6, 36-38]. Delayed or intermittent care can also result in increased healthcare costs through emergency care visits and worsened health states at clinical presentation [39]. In order for us to understand the reasons for people cycling in and out of the HIV treatment cascade, we must consider a framework relating potential access, realized access, and health behavior, such as the one described above.

Study motivation

This dissertation primarily focuses on exploring different dimensions of spatial access to HIV care among people living with HIV in Atlanta. In regards to spatial accessibility and availability, we explored travel-related barriers, such as distance, commute time, mode of travel, and car ownership. In addition, we made connections between spatial accessibility and availability and some neighborhood-level characteristics important in health research, such as socioeconomic status (SES). We also incorporated measures of affordability and accommodation to quantify spatial access to HIV care in Atlanta.

Travel-related barriers have been shown to be associated with delayed linkage and sub-optimal engagement in HIV care [40-44]. However, the use of public transportation as a potential barrier to seeking medical services has been rarely considered in studies. Specifically in Atlanta, the availability of (proximity to) public transportation is greater in the urban core and in neighborhoods of lower SES in south Atlanta [45, 46]. Using public transportation may result in longer commute times and increased number of modes of travel [47, 48]. Because HIV and reliance on public transportation are both highly correlated with poverty [49, 50], mode of transportation used to attend HIV medical visits should be considered as a potential impedance to care engagement.

We directly address gaps in the literature related to spatial access to HIV care in Atlanta in four dissertation aims. In **Study Aim 1**, we assessed the usability of a map tool to identify important

locations related to HIV (e.g. residence, last attended HIV provider) in order to estimate road distances and commute times associated with attending HIV care. This is especially relevant in identifying locations for which street address cannot easily be recalled by participants. In **Study Aim 2,** we investigated the relationship between public transportation use and attendance of HIV medical visits (a proxy for realized access), and examined potential differences in the association by region of residence in the city. **Study Aim 3** focused on quantifying spatial accessibility to major HIV providers by mode of transit (travel by car versus public transit) and identifying pockets of poor accessibility across Atlanta.

Dimensions of potential access have been explored individually as obstacles to HIV care engagement. However, few studies have considered the dimensions compositely in a single model describing spatial access to HIV care. In **Study Aim 4**, we expanded on work from Study Aim 3 to develop a comprehensive measure of spatial access which incorporates availability, accessibility, affordability, and accommodation together in a single model. Spatial access to HIV primary care was then assessed to identify underserved areas in Atlanta.

Primary objective and aims

The objective of this dissertation was to explore and quantify different aspects of access to HIV medical care in Atlanta, Georgia. We accomplished this objective through the following aims, which are summarized below and are described in depth in the chapters that follow:

1. Assess the validity and reliability of a novel map tool embedded in a Web-based questionnaire to identify important locations related to HIV outcomes, in the absence of geocoded address data.
2. Examine the effect of commuting patterns on the frequency of HIV care attendance, and identify differences in this association by region of residence in Atlanta.
3. Quantify spatial accessibility to major HIV providers, by mode of transit, in Atlanta.
4. Develop and apply a novel and comprehensive measure of spatial access to HIV providers in Atlanta to identify underserved areas.

Structure of dissertation

First, data sources used to accomplish the four aims of this dissertation are described (**Chapter 2**). In **Chapters 3-6**, each research aim is explored in the format of an original manuscript. Finally, the results of these research questions are synthesized in a concluding chapter (**Chapter 7**), which describes the contribution of the research findings to the current literature and future directions. The appendices include additional documents which are referenced throughout the text.

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Chapter 2: Data sources

The Engage Study

A majority of the data presented in this dissertation comes from the Engage Study, a cross-sectional study designed by Emory University staff to explore how structural and psychosocial factors affect HIV care engagement among HIV-positive MSM in Atlanta. Design of the study methodology, development of the survey instrument, recruitment, and data analysis were primarily completed by the Principal Investigator, Sharoda Dasgupta. These activities fulfilled departmental requirements for data collection during the PhD program.

Significance

The Engage Study aimed to address knowledge gaps related to barriers to HIV care through the following study objectives:

- Primary Aim 1: Investigate any associations between structural and psychosocial factors and HIV care engagement among self-reported HIV-positive MSM in Atlanta.
- Primary Aim 2: Explore how these associations may vary by residential neighborhood.

Although the study objectives more generally explored barriers to HIV care, the Principal Investigator and author (Dasgupta) was primarily interested in spatial access and structural barriers to care for this dissertation.

Study population and recruitment

The study sample was generated from two sources: (1) based on participation in previous research studies conducted within the Programs, Research, and Innovation in Sexual Minority (PRISM) Health team at Emory University, Involve[men]t and MAN Project, and (2) through Facebook. Individuals eligible for recruitment include those who reported: (1) being HIV-positive, (2) being male at birth, (3) being aged 18 years or older, (4) having had at least one lifetime male sex partner, and (5) living in the Atlanta area. In addition to these criteria, participants included in this study had to be able to complete the survey instrument in English and electronically using

SurveyGizmo. HIV status was only verified for individuals recruited from Involve[men]t and MAN Project. We relied on self-report for those recruited through Facebook.

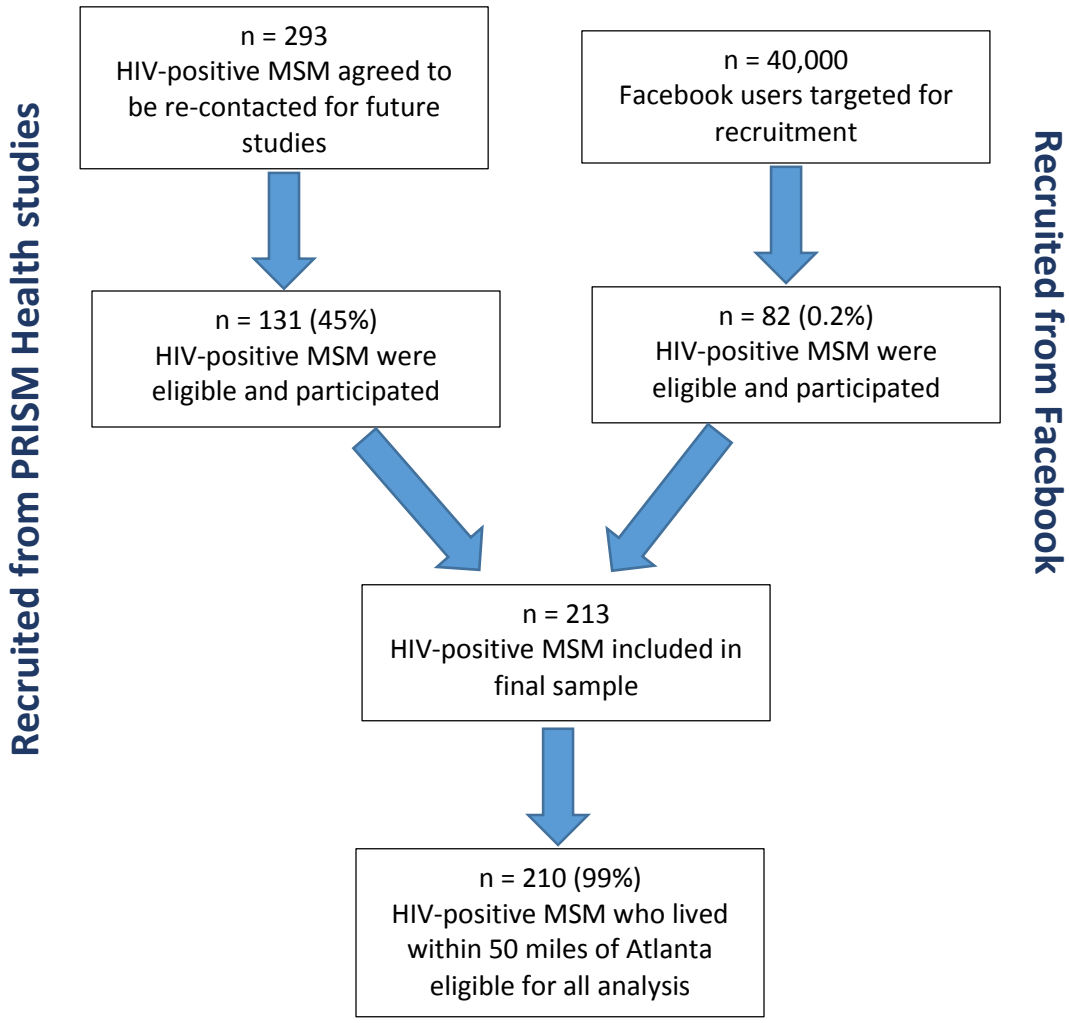
Men who were previously enrolled in other research studies (Involve[men]t, MAN Project) who were verified to be HIV-positive were contacted by phone for recruitment into the Engage Study. Email contact information was verified by phone and a link to the Web-based eligibility screener and informed consent form was sent to prospective respondents. Phone calls were made to potential participants approximately a week after the introductory email has been sent to confirm receipt of the email and update contact information. More information about the study procedures were provided to the participant at this time.

For Facebook recruitment, banner advertisements for study participation were targeted to men who were interested in other men living in the Atlanta area. Those who clicked on the advertisement were directed to the Web-based eligibility screener and informed consent form.

The SurveyGizmo-administered consent form described the purpose of the study, what was required of respondents to participate, and the risks and benefits of participation. Those who agreed to participate clicked a check box. Those who were deemed eligible and provided informed consent were directed to the online study questionnaire, also administered through SurveyGizmo. Those who completed the survey were offered a $20 Amazon gift card incentive for participating. Total respondent burden for completing the eligibility screener, consent form, and study questionnaire totaled about 45 minutes.

Out of the 293 HIV-positive men from PRISM Health studies who agreed to be re-contacted for other research studies, 131 (45%) participated. Approximately 40,000 Facebook users were targeted for recruitment based on the criteria described above, out of which 82 (0.2%) met the eligibility criteria and participated in the study. Thus, a total of 213 self-identifying HIV-positive MSM participated in the Engage Study. Of these, 210 (99%) lived within 50 miles of Atlanta and were eligible to be included in all dissertation analyses. Figure 2.1 below summarizes study recruitment details in a flowchart.

Figure 2.1. Flowchart describing participant recruitment for the Engage Study.



Data elements

The study questionnaire collected information on demographic characteristics, residential location, location of the last three attended HIV care providers in the previous 12 months, frequency of risky behaviors, HIV care-seeking behaviors, and potential barriers to care, including: social support and stigma associated with having an HIV-positive status, general health beliefs and perception of one's own health status, quality of HIV care received, and travel distance and commute times associated with attending HIV care visits.

Many of the Engage Study data elements pertaining to HIV care were modified based on questions from the Centers for Disease Control and Prevention (CDC) Medical Monitoring Project

(MMP), a national surveillance project which focuses on issues related to HIV care. Some data elements related to sociocultural constructs, such as community perceptions of HIV, were taken from other PRISM Health study questionnaires, including Involve[men]t and MAN Project. A copy of the final questionnaire can be seen in Appendix A. A summary of data domains included in the questionnaire can be seen in Table 2.1.

Table 2.1. Categories of data elements collected from participants enrolled in the Engage Study.

Category	Examples of data elements collected
Demographic information	• Race • Age • Income • Health insurance status
Location-based data	• Location of residence / place of stay the previous night • Place of employment • Location of last 3 HIV providers in the previous 12 months • Location of last antiretroviral treatment (ART) pick-up • Ideal location of HIV care (if not linked to care) • Location of last ancillary service received
Risky behaviors	• Smoking habits • Information on last sexual partnership in previous 12 months
Timing	• HIV diagnosis (month/year) • Linkage to HIV care (month/year) • Number of scheduled versus attended HIV care appointments in the previous 12 months for the last 3 HIV providers • Last CD4 test (month/year) • Last viral load test (month/year)
Experiences with HIV care	• Met versus unmet needs, adapted from CDC MMP • Results of last CD4 and viral load tests • Services received from past 3 HIV providers in previous 12 months • Transportation taken to attend visits • Quality of care • Healthcare worker-related stigma
Other potential barriers to HIV care	• Social support and stigma associated with HIV-positive status • Self-perceptions of health • Community perceptions of HIV

Data security and confidentiality

Survey data were entered online by participants, and subsequently stored, on a HIPAA-compliant survey at the main SurveyGizmo office in Boulder, CO. Only the project investigators and a select number of researchers on the study team had access to data on SurveyGizmo. Data were downloaded onto a secure share drive, and de-identified analysis datasets were constructed and

stored securely. Only project investigators and a limited number of researchers analyzing the data have access to these datasets.

US Census data

Significance

Since HIV disproportionately affects those of lower socioeconomic status (SES) [1], data obtained from the US Census Bureau were used to examine spatial overlaps between markers of SES, HIV prevalence, and measures of access. Each data element used is described below.

Data elements

Table 2.2. Population-based data elements obtained from the US Census Bureau.

Measure	Description	Data source	Application
Poverty (by zip code tabulated area (ZCTA))	2013 American Community Survey 5-year estimates for number living in poverty. *<u>**Note**</u>: Poverty is explicitly defined by the US Census Bureau, varies by year, and is dependent on household income and the number of children under the age of 18 living in the household.	DP05 S1701 table	Study Aim 3
Household vehicle ownership (by ZCTA and Census tract)	2013 American Community Survey 5-year estimates for household vehicle access, a proxy for household vehicle ownership. Calculated using the number of occupied households and number of households with access to at least one vehicle.	DP04 table	Study Aim 2, Study Aim 3 Study Aim 4
Total population (by Census block)	Total population counts by 2010 Census blocks were used to calculate population-weighted centroids of each ZCTA	SF1 P1	Study Aim 3 Study Aim 4

Population-based HIV prevalence data

Significance

We obtained population-based HIV case counts in Atlanta to assess differences in burden of disease across Atlanta (Study Aim 3) and to quantify demand of HIV care services in the six county area (Study Aim 4).

Data elements

Data on HIV case counts by Atlanta ZCTA were obtained from AIDSVu.org, an online mapping tool which illustrates HIV counts and rates for several cities across the US.

Database of HIV providers in Atlanta

Significance

In order to quantify spatial access to HIV care, we cataloged a database of major HIV providers based in the six county Atlanta area using the following five sources of data:

- Southeast AIDS Training and Education Center (SEATEC) Key Contacts booklet for the metro Atlanta area (accessible here: http://content.yudu.com/A1zr5o/SEATECNov2012Editi17/resources/index.htm?referrerUrl=http%3A%2F%2Fwww.seatec.emory.edu%2Fresources%2Fkey_contacts.html)
- AIDS.gov HIV testing and care services locator (accessible here: https://locator.aids.gov/)
- Health Resources and Services Administration (HRSA) HIV treatment site locator (accessible here: http://findhivcare.hrsa.gov/Search_HAB.aspx)
- Georgia Care and Prevention in the United States (CAPUS) resource directory compiled by CDC (accessible here: https://www.gacapus.com/p/resource-directory/)
- Private practices and clinics attended by Engage Study participants for HIV care

We called every practice/clinic listed in each resource to verify that HIV primary care was offered through at least one physician, physician's assistant, and/or nurse practitioner. After excluding all facilities that did not provide HIV care, 41 practices/clinics remained in the database. We also

collected additional information about each provider to account for provider-level characteristics in our assessment of spatial access to HIV medical resources in Atlanta. Because this was an extremely time-intensive process, compiling information about HIV providers served as part of the data collection requirement in the PhD program.

Data elements

Information related to the clinic structure and available resources for HIV patients was collected based on the CDC MMP facility attributes survey, which is administered biennially to a nationally representative sample of HIV providers in the US [2]. Data elements collected from each provider can be seen in Table 2.3 below. A full list of the questions is provided in Appendix B.

Table 2.3. Categories of data elements collected from each major HIV provider in the six county Atlanta area.

Category	**Data elements**
General characteristics	• Provider location and contact information (information verified) • Facility type • Types of services offered to patients
Patient eligibility	• Payment options available for patients • Qualification as a Ryan White clinic, and if yes, types of funding received
Demand/supply of each clinic	• Number of full-time and part-time providers (physicians, nurse practitioners, and physician's assistants) available for patients • Hours during the week when patients are seen for appointments • Walk-in hours during the week, if applicable • Approximate number of HIV patients seen / year

References

1. Vaughan AS, Rosenberg ES, Shouse RL, Sullivan PS. Connecting Race and Place: A County-Level Analysis of White, Black, and Hispanic HIV Prevalence, Poverty, and Level of Urbanization. American Journal of Public Health: July 2014, Vol. 104, No. 7, pp. e77-e84.

2. Centers for Disease Control and Prevention. Medical Monitoring Project (MMP) 2013 Facility Attributes Worksheet; 2013. URL: http://www.cdc.gov/hiv/pdf/research_mmp_facilityattributes_2013.pdf

Chapter 3: Use of a Google Map Tool Embedded in an Internet Survey Instrument: Is it a Valid and Reliable Alternative to Geocoded Address Data?

Abstract

Introduction: Men who have sex with men (MSM) in the United States are at high risk for HIV and poor HIV clinical outcomes. Maps can be used to identify, quantify, and address gaps in access to HIV care among HIV-positive MSM, and tailor intervention programs based on patient needs. We assessed the usability of a Google map question embedded in a Web-based survey among Atlanta-based, HIV-positive MSM to determine whether it is a valid and reliable alternative to address-based data on residence and last HIV care provider.

Methods: Men were recruited through Facebook and from two ongoing studies recruiting primarily through venue-based sampling or peer referral (VBPR). Participants were asked to identify the locations of their residence and last attended HIV care provider using two methods: (1) by entering the street address (gold standard), and (2) "clicking" on the locations using an embedded Google map. Home and provider addresses were geocoded, mapped, and compared with home and provider locations from clicked map points to assess validity. Provider location error values were plotted against home location error values, and a kappa statistic was computed to assess agreement in degree of error in identifying residential location versus provider location.

Results: The median home location error across all participants was 0.65 miles (interquartile range, IQR, 0.10, 2.5 miles), and was lower among Facebook participants (P<.001), whites (P<.001), and those reporting higher annual household income (P=.04). Median home location error was lower, although not statistically significantly, among older men (P=.08) and those with higher educational attainment (P=.05). The median provider location error was 0.32 miles (IQR, 0.12, 1.2 miles), and did not vary significantly by age, recruitment method, race, income, or level of educational attainment. Overall, the kappa was 0.20, indicating poor agreement between the two error measures. However, those recruited through Facebook had a greater level of agreement (κ=0.30) than those recruited through VBPR methods (κ=0.16), demonstrating a greater level of

consistency in using the map question to identify home and provider locations for Facebook-recruited individuals.

Conclusion: The map tool demonstrated strong validity but varying reliability by recruitment mode. Further work is needed to improve and compare map tool usability with the results from this study.

Publication

Dasgupta S, Vaughan AS, Kramer MR, Sanchez TH, Sullivan PS. Use of a Google Map Tool Embedded in an Internet Survey Instrument: Is it a Valid and Reliable Alternative to Geocoded Address Data? *JMIR Research Protocols*. 2014;3(2):e24. doi:10.2196/resprot.2946.

Introduction

Internet-Based Questionnaires

Internet-based questionnaires have become more popular as a mode of data collection because of the expansive connectivity of individuals in the United States to the Internet overall, and across different social strata, such as education and income [1-3]. Internet-based sampling and data collection have become more practical over the years, as they have the potential to increase responses rates through improved convenience of participation, improved quality of data through programmed validated checks, and decreased costs associated with printing and postage in sending paper-based questionnaires [4,5].

In the context of HIV research, Web-based surveys may provide a sense of anonymity for men who have sex with men (MSM) in the United States, potentially reducing misclassification bias for sensitive questions pertaining to risky sexual behavior and history of HIV testing, diagnosis, and care engagement patterns [4]. Internet recruitment is also an attractive option in studies of MSM who are at high risk for HIV or poor HIV-related outcomes. In a longitudinal study conducted by author PSS, 432/483 (89.4%) Atlanta-based MSM, recruited primarily through venue-based sampling, reported using Facebook, Twitter, or another social media site in the previous six months; 328/483 (67.9%) accessed such sites at least once a day (oral personal communication with Nicole Luisi, MPH, and Eli Rosenberg, PhD, July 2013). Further, a meta-analysis showed that an estimated 40% of MSM in the United States reported finding sex partners on the Internet [6]. Finding partners on the Internet may be associated with an increased risk of unprotected anal intercourse [6-8], and potentially sexually transmitted infections such as HIV [9].

Geographic Information Systems

Recently, there has been a growing emphasis on how certain contextual factors can affect disease; specifically, trends in disease incidence or prevalence, or potential predictors of poor outcomes, may vary based on an individual's environment or setting. Quantifying such differences across neighborhoods and community-level factors using a geographic information systems (GIS)-based approach can impact public health programs and policy [10,11]. In the context of HIV, maps may

be important in discerning hot spots of disease, high risk behaviors, such as illicit drug use and unprotected sex, and the level of health care access and utilization once diagnosed. GIS analyses can also examine how certain neighborhood-level characteristics affect the dynamics of HIV transmission and patterns in HIV care engagement, which may lead to tailored interventions based on individual characteristics and needs [12,13]. For instance, using maps to quantify accessibility (in relation to proximity to different health services) may be helpful in identifying and addressing gaps in access to care, and tailoring intervention programs based on the needs of the patients being served [14].

However, map tools embedded in Internet surveys used to identify key locations for study participants are not widely used currently, and to our knowledge, have never been evaluated for usability in the context of validity and reliability. In the absence of address data, the development of a valid and reliable map tool to identify key locations, such as patient's residence and location of the patient's HIV care provider office, may be important in quantifying place-based barriers to care attendance, including travel distance and proximity to public transportation. Alternatively, such a map tool can be used to identify where people test for HIV or might be finding high risk sex partners (it may not be easy to obtain a valid address for the latter location). Even given a known address, however, automated geocoding systems vary in the degree of accuracy, result in nonnormally distributed errors, and may be less accurate outside of urban areas [15,16].

We conducted a cross-sectional study of Atlanta-based, HIV-positive MSM, called "The Engage Study", to explore potential place-based barriers to care, including proximity to HIV care provider and neighborhood level characteristics, such as socioeconomic status (SES). In this analysis, we assess the level of usability of a Google map question embedded in a Web-based survey, and determine whether it is a valid and reliable alternative to a geocoded address in identifying residence and last attended HIV care provider.

Methods

Study Population

The Engage Study is a cross-sectional study of self-identifying HIV-positive MSM living in the Atlanta area. The study was designed to examine potential structural and psychosocial barriers to accessing HIV care and treatment. Men were recruited from October 2012 to June 2013 through two sources: (1) based on participation in prior studies of MSM conducted by Emory University, and (2) from Facebook.

Men documented to be HIV-positive through HIV testing in two other Emory-based studies of MSM were re-contacted by phone and email for participation in The Engage Study. These two prior studies aimed to examine racial/ethnic differences in black and white HIV epidemics in Atlanta, so only black and white MSM were eligible to participate in these two studies. Participants from the two studies were originally recruited in Atlanta, primarily through venue-based sampling or peer referral (VBPR). Men who agreed to participate in the present study were sent an email with a link that directed them to the eligibility screener and informed consent form.

Facebook advertisements for the study were targeted toward men who were interested in other men and lived within 50 miles of Atlanta. Those who clicked on the advertisement were directed to the survey and presented with a Web-based eligibility screener (including assessment of self-reported HIV status) and informed consent form. Men recruited from Facebook were not restricted by race. However, since very few Facebook-recruited participants reported another race, those who did not identify as black or white were excluded from all analyses to avoid sparsely populated data by race and maintain comparable groups across recruitment method.

Men from both methods of recruitment were deemed eligible to participate in the present study if they reported being at least 18 years of age, ever having sex with another man, being told they are HIV-positive by a health care provider, and currently living in the Atlanta area. All consenting participants were directed to the one-time, Web-based survey instrument, administered using the Internet survey software platform, SurveyGizmo [17]. Participants were asked to take the survey on a personal computer or tablet to minimize issues with the display and layout of the

questionnaire that might have occurred on a smartphone or simple mobile device. The Emory University Institutional Review Board approved the protocol (approval number, IRB00060430).

Measures

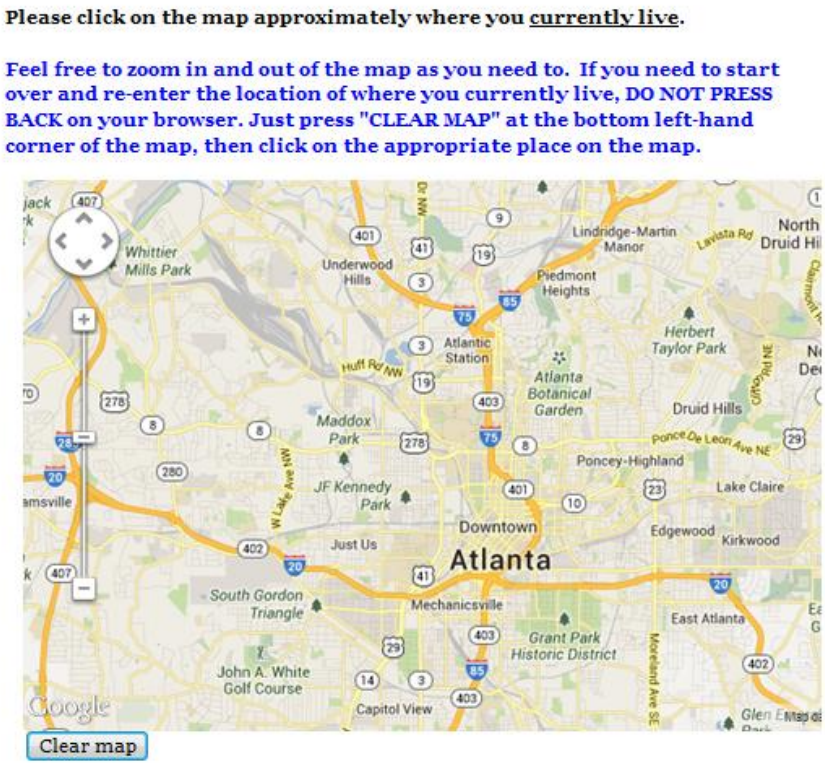
The questionnaire collected detailed information on demographic characteristics, where participants lived and sought HIV care, and potential structural and psychosocial barriers to HIV care engagement, such as transportation, travel distance, and HIV related stigma. For two key locations, their home and the provider or clinic where they last received HIV care, respondents were asked to provide location information in two ways: (1) using a text address field (or name of the provider or clinic, to allow research staff to find the street address), and (2) by clicking on the location in the Google map embedded in the survey.

For their residential location, participants first entered address data using text fields for street address, city, state, and zip code. Next, they were asked to click on their residential location on a Google map embedded in the survey. For the HIV care provider location, respondents first selected from a checkbox menu of providers located in, or close to, Atlanta, based on information from the Southeast AIDS Training and Education Center (SEATEC) Key Contacts booklet [18]. Addresses for each of these HIV care providers were also available in the SEATEC booklet. If participants reported receiving care from a provider outside of the SEATEC network (e.g., a private infectious diseases provider practice), they were asked to report the name of their doctor and the address or area of town where his or her office was located. The research staff then determined the exact address of the provider's office. Next, participants clicked on the approximate location of their provider's office using the Google map.

Detailed instructions on how to specify a location on the map were provided in each map question. Address and map-derived locations were collected independently (i.e., the physical address provided in one section did not change the initial map focus for the map derived location). The map allowed the user to zoom in as much as needed to click on the appropriate location, but the initial zoom level allowed users to view major streets in Atlanta (approximately 1:127,000, or an inch representing approximately 2 miles). Participants had the option to clear

the map and click on another point on the map, if they incorrectly identified the location. Figure 3.1 shows a screen shot of this survey question.

Figure 3.1. A screenshot of the survey question asking participants to identify, using the Google map, the location of their residence.



Analytic Methods

Using the residential address and the address of the last attended HIV care provider or clinic as gold standards, we assessed the validity of using map-derived information by examining how the locations specified using map-based technology differed from the gold standard locations. Further, to assess reliability, we examined the consistency in the level of error in identifying residential location versus the location of the most recent HIV care provider. All analyses were restricted to participants who were of black or white race, did not report being homeless at the time of the survey, and lived more than 50 miles away from the center of Atlanta, and were conducted using ArcGIS 10.1 and SAS 9.3.

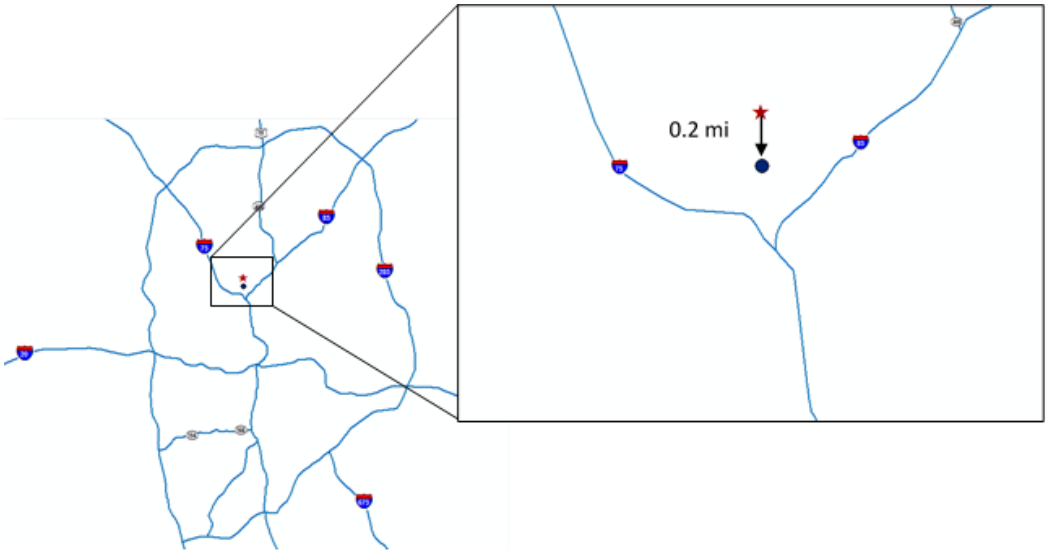
Descriptive Statistics

Descriptive statistics for demographic characteristics of respondents were computed using counts and frequencies. Differences in demographic characteristics were evaluated across recruitment method using the Mantel-Haenszel chi-square test.

Analysis of Validity

Respondents' text-based residential and HIV care provider addresses were geocoded (defined by geographic coordinates corresponding to address data) [19] using ArcGIS 10.1. Geocoded addresses and the latitude and longitude coordinates corresponding to the clicked map points for both the residence and HIV care provider were then mapped (using the North American Albers Equal Area Conic projection) [19], and geodesic distances (the shortest distance between two points on a sphere or curved surface) between the address data ("the gold standard") and the clicked map coordinates were calculated. These geodesic distances represent the "error" between the gold standard location and where participants identified them to be on a Google map. Figure 3.2 shows a visual example of this calculation. To distinguish between the residential and HIV care provider validation analyses in this paper, we will refer to the comparison of map-based versus gold standard locations for patient's residence as home location error, and the comparison of map-based versus gold standard locations for last attended HIV care provider as provider location error.

Figure 3.2. A visual example of how home and provider location errors were calculated among Engage Study participants. The starred point represents the gold standard, geocoded address, and the dot is where the participant perceived the location to be on the map. Geodesic distance (the shortest distance between two points, or "as the crow flies") was then computed between these two points.



We computed descriptive statistics for the two primary outcomes (home and provider location errors) using medians and interquartile ranges (IQR), because both were continuous, but nonnormally distributed. Because we hypothesized, a priori, that participants have greater Internet literacy and might be better able to navigate through the map questions, we assessed differences in the home and provider location errors across both recruitment method and demographic characteristics using the Wilcoxon-Mann-Whitney test. An alpha cutoff of 0.05 determined statistical significance.

Analysis of Reliability

To examine whether home and provider location errors were consistent within participants, the provider location error values were plotted against home location error values; results were stratified by recruitment method. Further, geodesic distances were dichotomized as either less than one mile or at least one mile, and a kappa statistic was computed to assess "agreement" or "reliability" of degree of error in identifying the patient's residential location versus the HIV care provider location. A kappa statistic less than or equal to 0.20 indicated poor agreement, 0.21-0.40 indicated fair agreement, 0.41-0.60 indicated moderate agreement, and greater than 0.60

indicated substantial agreement [20] in degree of error between identifying the residential location versus the provider location. In this portion of the analysis, we hypothesized, a priori, that the residential and provider location errors are consistent within each participant and expect at least fair to moderate agreement between the two measures.

Results

Descriptive Statistics

Out of the 293 HIV-positive, VBPR-recruited MSM who agreed to be recontacted for other research studies, 131 (44.7%) participated. Approximately 40,000 Facebook users were targeted for recruitment based on the criteria described above, out of which 82 (0.21%) met the eligibility criteria and participated in the study. Thus, a total of 213 self-identifying HIV-positive MSM participated in The Engage Study. There were 3 (1.4%) participants that were excluded from all analyses because they lived more than 50 miles outside Atlanta.

For the home location error analysis, 35/210 (16.7%) participants were further excluded because they did not respond to the map-click question to identify their residential location, 27/210 (12.9%) participants were excluded because they did not report a valid text version of the home address, and 6/210 (2.9%) participants were excluded because both of these were missing. Thus, out of 210 participants living in the Atlanta area, 142 (67.6%) were included in the patient's home error analysis. For the HIV care provider location error analysis, 8/210 (3.8%) participants were excluded because they reported never receiving HIV care, 33/210 (15.7%) participants were excluded because they did not complete the map click question to identify their provider location, 12/210 (5.7%) participants were excluded because they listed a provider whose office location could not be geocoded, and 3/210 (1.4%) participants were excluded because neither provider address nor clicked points were available. As such, 154/210 (73.3%) respondents were included in the HIV care provider error analysis. A total of 112 (53.3%) out of the 210 participants living within 50 miles of Atlanta completed all four questions related to their home and HIV care provider locations and were used in the analysis of reliability.

The distribution of demographic characteristics of study participants is described in Table 3.1. Median age of participants was 34 years old. Almost half of the participants reported an annual household income of less than US $20,000, a majority of participants reported being of black/African American race, and about a third of the sample reported having a college degree. Demographic characteristics varied across method of recruitment.

Table 3.1. Demographic characteristics of Engage Study participants living in the Atlanta area, overall and by recruitment method (n = 210).

		All participants (n = 210)	Online recruitment (n = 81)	VBPR recruitment (n = 129)	*P* [b]
		n (%)[a]	n (%)[a]	n (%)[a]	
Age					<.001
	18-35 years	117 (56)	24 (30)	93 (72)	
	> 35 years	93 (44)	57 (70)	36 (28)	
Race					<.001
	White/Caucasian	73 (37)	45 (63)	28 (22)	
	Black/African-American	125 (63)	26 (37)	99 (78)	
Household income					<.001
	< $20,000 / year	111 (54)	31 (39)	80 (65)	
	≥ $20,000 / year	93 (46)	49 (61)	44 (35)	
Education					.06
	High school education or less	41 (20)	14 (18)	27 (21)	
	Some college, Associate's degree, and/or Technical school	99 (48)	33 (41)	66 (52)	
	College, post graduate, or professional school	68 (33)	33 (41)	35 (27)	
Location type [c]					
	Home location error	142 (68)	63 (78)	79 (61)	.01
	Provider location error	154 (73)	57 (70)	97 (75)	.44

[a]Whole percentages may not sum to 100 due to rounding.
[b] Mantel-Haenszel chi-square test was used to determine statistical significance.
[c] These rows indicate counts of data available to calculate home and provider location errors.

Analysis of Validity

Out of 142 participants included in the home location error analysis, 80 (56.3%) clicked within a mile of their home address; however, a greater proportion of Facebook-recruited individuals clicked within a mile of their reported residential address, compared to VBPR-recruited

participants (47/63, 74% vs. 33/79, 41%; P<.001). Figure 3.3 shows a detailed plot of the distribution of home location error by recruitment method. The median home location error across all participants was 0.65 miles (IQR, 0.10, 2.5 miles), but was also significantly higher among VBPR participants (P<.001), as well as among blacks (P<.001), and those reporting lower annual household income (P=.04). Younger age (P=.08) and lower educational attainment (P=.05) were also associated with greater median home location error, but not statistically significantly (Table 3.2).

Out of 154 participants included in the provider location error analysis, 109 (70.8%) clicked within a mile of their HIV care provider. Figure 3.4 shows a detailed plot of the distribution of provider location error by recruitment method. The median provider location error was 0.32 miles (IQR, 0.12, 1.2 miles), and did not vary significantly by recruitment method, race, income, or level of educational attainment. Although not statistically significant (P=.06), the median provider location error was notably lower among older participants compared to younger participants (0.46 miles compared to 0.23 miles) (Table 3.2).

Table 3.2. Level of home and provider location error among Engage Study participants by demographic characteristics.

		Home location error (miles)			Provider location error (miles)		
		Median	IQR	*P*[a]	Median	IQR	*P*[a]
Overall		0.65	(0.10, 2.47)		0.32	(0.12, 1.15)	
Age				.08			.06
	18-35 years	0.79	(0.11, 5.56)		0.46	(0.12, 1.74)	
	> 35 years	0.56	(0.08, 1.95)		0.23	(0.11, 1.02)	
Race							.58
	White/Caucasian	0.20	(0.05, 0.68)	<.001	0.26	(0.11, 1.00)	
	Black/African American	1.53	(0.30, 5.02)		0.32	(0.11, 1.15)	
Household income				.04			.92
	< $20,000	1.22	(0.15, 5.34)		0.39	(0.11, 1.15)	
	≥ $20,000	0.44	(0.08, 1.55)		0.30	(0.12, 1.34)	
Education				.05			.55
	High school or less	1.28	(0.17, 4.43)		0.36	(0.12, 2.12)	
	Some college, associate's degree, or technical school	0.85	(0.16, 4.77)		0.34	(0.11, 1.05)	
	College, post graduate, or professional school	0.35	(0.08, 1.33)		0.19	(0.11, 1.07)	
Recruitment mode				<.001			.31
	VBPR	1.71	(0.24, 5.34)		0.38	(0.12, 1.51)	
	Online	0.30	(0.06, 1.17)		0.29	(0.11, 1.12)	

[a] Mantel-Haenszel chi-square test was used to determine statistical significance.

Figure 3.3. The probability density function and cumulative distribution function of home location error among a convenience sample of HIV-positive men who have sex with men who reported their home address and identified the location on a map (n=142) by recruitment mode, Atlanta, Georgia, 2012-2013. Δ mi=geodesic distance between geocoded location of home address and where participants identified their home on the map. VBPR=venue-based sampling or peer referral.

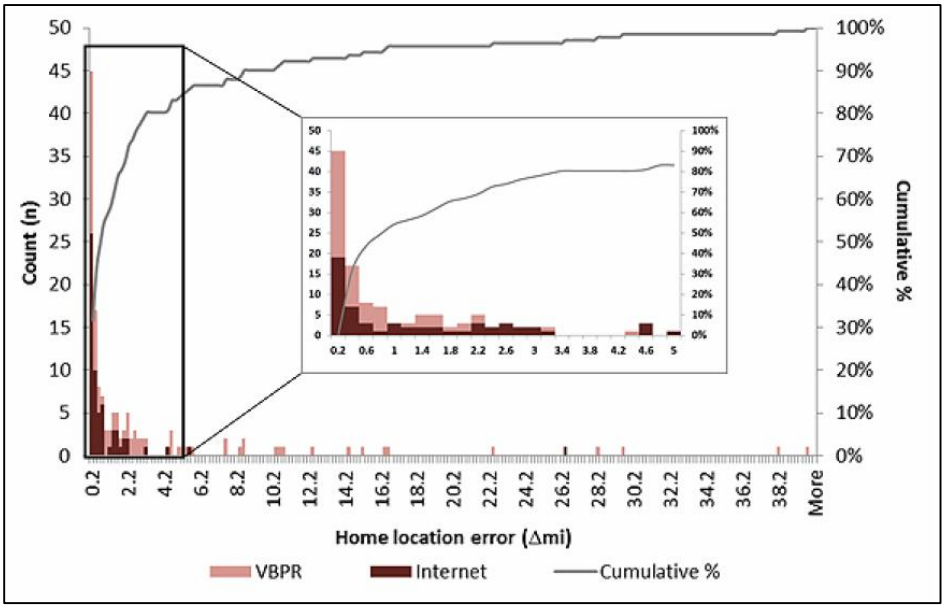
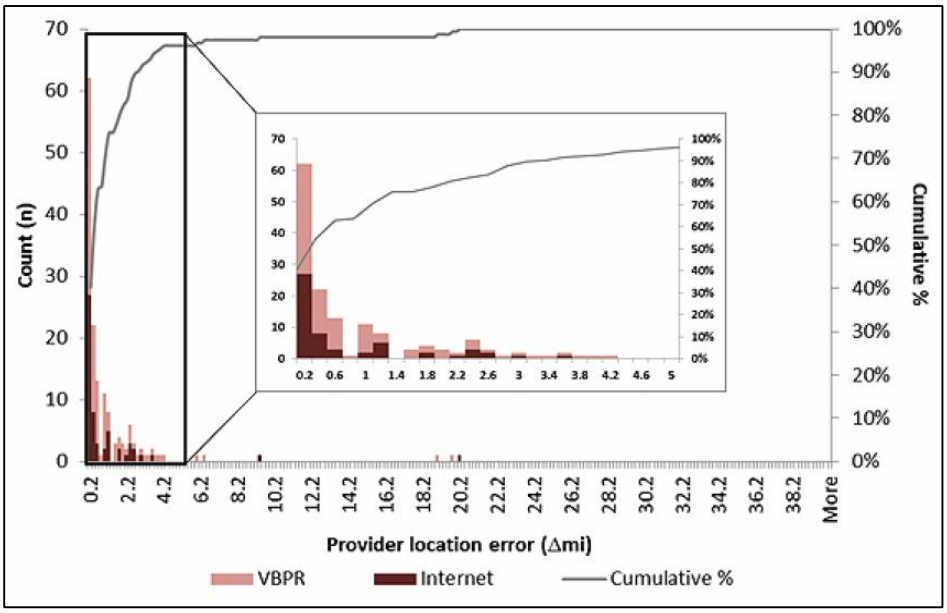


Figure 3.4. The probability density function and cumulative distribution function of provider location error among a convenience sample of HIV-positive men who have sex with men who reported where they last received HIV care and identified the location on a map (n=154) by recruitment mode, Atlanta, Georgia, 2012-2013. Δmi=geodesic distance between geocoded location of the HIV care provider address and where participants identified their provider on the map. VBPR=venue-based sampling or peer referral.



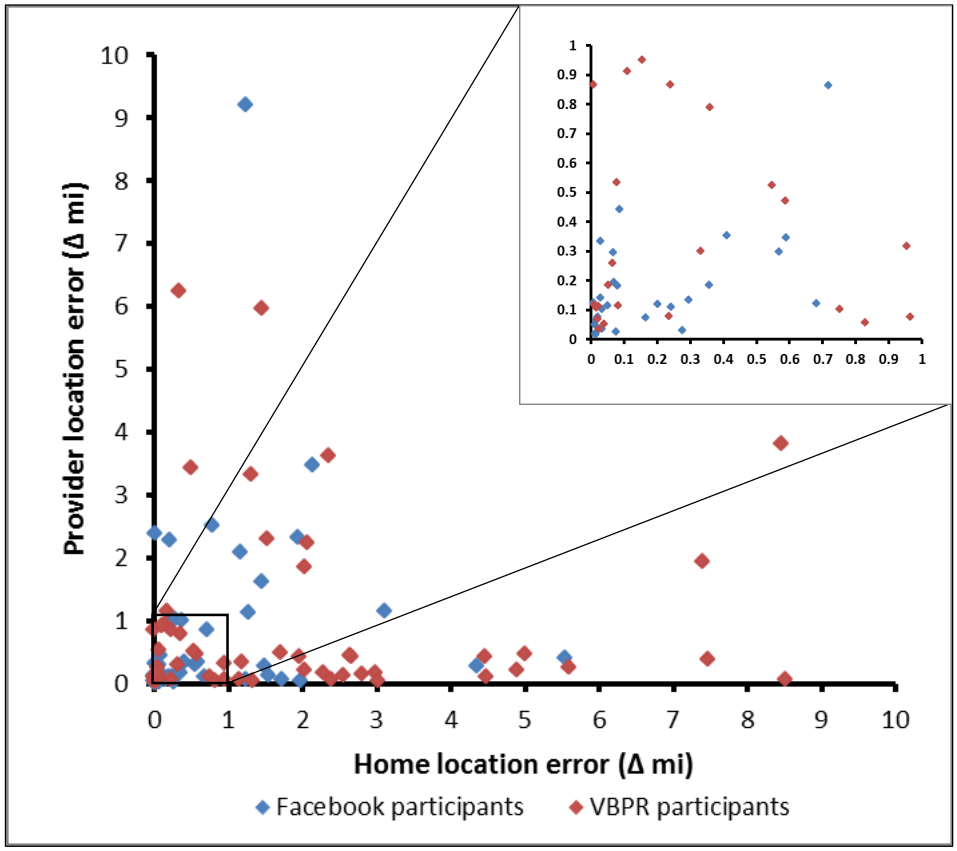
Analysis of Reliability

The plot of the provider location error against home location error in Figure 3.5 illustrates that, among VBPR-recruited individuals, the spread of the home location error (range, 39.8 miles) is much greater than that of the provider location error (range, 19.7 miles). Further, the range of errors overall were smaller and more consistent among Facebook participants (home location error range, 26.2 miles; provider location error range, 20.1 miles), compared to VBPR participants. Only 23/64 (35%) VBPR participants clicked within a mile of the gold standard locations for their residence and HIV care provider, while 27/48 (56%) Facebook-recruited participants clicked within the same distance of the gold standard locations. R-squared values were calculated to measure the correlation between home location error and provider location error, but were not significant, and therefore are not reported. Because the plot of the two error measures was restricted to observations for which all four location-based questions were answered, we examined, in a post-hoc analysis, the demographic characteristics of those who answered all four questions versus those who did not, to address any potential concerns related to

selection bias. There were no statistically significant differences in age, race, income, or educational attainment across these two groups.

A simple kappa coefficient was also computed to assess the level of reliability between home location error and provider location error. Overall, the kappa statistic was 0.20, bordering on poor to fair agreement between the two error measures. However, those recruited through Facebook had a greater agreement (κ=0.30) than those recruited through VBPR methods (κ=0.16), demonstrating a greater level of consistency in using the map question to identify the patient's home and the HIV care provider locations for Facebook-recruited individuals.

Figure 3.5. Plot of home location error versus provider location error among all Engage Study participants who answered all four location questions (n = 127), color coded by recruitment method.



Discussion

Principal Results

In this study, we aimed to assess, among a convenience sample of Internet-using, Atlanta-based, HIV-positive MSM, the validity (i.e., the degree of error between map derived location information and the gold standard) and reliability (i.e., the consistency in the degree of error in locating the patient's home vs. the HIV care provider location) of using a Google map question embedded in an Internet survey instrument to identify the patient's residential and the HIV care provider location, as compared to the geocoded address information. The results demonstrate the map tool's validity, as a majority of the study participants were able to click within a mile of their home and most recently attended HIV care provider. However, the reliability and usability varied by recruitment method.

Although most participants were able to click within a mile of their residence, there were observed differences in home location error by recruitment method and markers of SES, such as race and household income, which may be attributed to differences in the intensity of Internet use among participants. Though a majority of US residents have access to the Internet [2,21], population-based estimates in the United States show that Internet use varies by race, education, and income [2,22]. Specifically, blacks, those with lower educational attainment and those reporting a lower household income, are less likely to report using the Internet either at home or elsewhere [22,23]. Further, by 2012, nearly half of all Americans reported owning a smartphone, a potential indicator of the level of connectivity to the Internet through multiple devices. This proportion is lower among those reporting a lower household income and lower educational attainment, suggesting possible differences in the level of connectivity and intensity of Internet use across markers of SES [24]. Participants recruited through Facebook in the present study were more likely to be older, be of white race, report a higher annual household income, and report a higher level of educational attainment, and thus, may have had greater connectivity to the Internet than VBPR participants.

Higher intensity of Internet use, especially through multiple devices, may also be associated with a greater ability to navigate through the mapping questions successfully. In addition, eligible Facebook users who check their accounts more frequently may have been more likely to view the recruitment advertisement, and thus, may have been more likely to click through the advertisement and participate. Therefore, Facebook-recruited participants, who were more likely to accurately and consistently identify their residence and provider's office, may also have been more frequent Internet users and, therefore, more likely to be able to navigate through an interactive, Internet-based mapping tool.

Observed differences in consistency by recruitment method may also be explained by the order in which the mapping questions were presented in the survey. The map asking participants to identify their residence was shown first in the questionnaire, whereas the HIV care provider map was presented later on in the survey. If participants were more likely to have trouble initially orienting themselves to the mapping questions, but became accustomed to the format of the question for the HIV care provider map, there may have been a "learning effect", resulting in a higher patient's home location error and a lower HIV care provider location error. Conversely, those individuals already accustomed to using Google maps may have been more consistently and accurately able to identify both residence and place of care in the survey. This may be why a greater level of consistency was observed among Facebook-recruited participants, if they are more frequent Internet users than VBPR-recruited individuals. It may also be important to note that the zoom level on each map question was not fixed. The participant could zoom in and out as needed to identify each location; therefore, those who utilized the zoom level may have been more likely to click closer to the gold standard location than those who did not. Again, perhaps frequency of Internet use may be associated with the level of comfort and usability of the mapping question format and zoom feature, which may explain why this "learning effect" trend may have been observed to a lesser extent among Facebook-recruited participants.

Limitations

There are several limitations to this analysis. First, we recruited a convenience sample that may not be representative of the target population of Internet-using, HIV-positive MSM in Atlanta.

Homeless individuals were excluded from the analysis, further limiting generalizability of the results. Even among those recruited, a large proportion of participants did not provide both map-based location and address data for their home and HIV care provider, respectively, and thus, had to be excluded from the validation analysis. The reliability analysis was underpowered, as almost half of the participants did not complete all four questions related to residential and care provider locations. There is also a potential for selection bias in excluding participants in the reliability analysis, but no statistically significant differences in age distribution, race, annual household income, and level of educational attainment were observed between those who answered both location-based questions for the patient's residence and the HIV care provider's office and those who did not. The reasons for not answering these survey questions should be further explored by convening a small post-test focus group.

In addition, the zoom level at which participants clicked on the map questions was not recorded during data collection, which may be associated with the level of accuracy of clicked map points in relation to the gold standard location. Either implementing a fixed zoom level or capturing information on the zoom level used for each participant would be helpful in controlling for any potential variability caused by this factor. The usability of the map tool could vary by the type of device used to take the questionnaire, but information on the exact device type used was not collected, and participants were encouraged to take the survey on a personal computer or tablet instead of a phone. Future studies should highlight device type as a potential source of variation in usability, validity, and reliability of a map-based tool.

Last, one minor limitation of using geodesic distances as a metric for assessing home and provider location error is that they may actually underrepresent the difference in actual distance between the map-based locations and the address data. Further, for subsequent neighborhood level analyses using these data, even small values for home or provider location errors may point to a different neighborhood with different community level characteristics from those of the gold standard location.

Despite these limitations, future studies incorporating improvements to the zoom level, information on the device type used, feedback from pre and post-test focus groups, and training sessions to assess feasibility and usability could add to the results from this study and existing knowledge on the usability of a map tool to evaluate location-based information.

Conclusion

Despite the observed differences in the patient's home and the HIV care provider location errors across certain markers of SES and recruitment method, the map tool proved to be a valid alternative to geocoded addresses, as most participants were able to click within a mile of their home address and their HIV care provider's office. However, the tool bordered on poor to fair reliability between home location error and the HIV care provider location error, although those recruited on the Internet generally had better agreement, or consistency, between their home and HIV care provider location errors.

Although there are improvements to be made in this map tool, it may serve as the basis for a valid and reliable tool to identify important locations in the absence of geocoded address data. The limitations in the usability of the tool should be addressed by offering a short training session for participants prior to taking the survey. Other problems related to the layout, functionality, or usability of the tool can also be identified and addressed in a small focus group. An improved version of this Google map-based survey question can be used to capture important data on health care utilization and neighborhood level risk factors for poor health outcomes, which can have important implications in intervention planning.

Acknowledgments

We acknowledge the work of Pete Grigg, who developed the Google map question for the SurveyGizmo platform. We are also grateful for the work of Eli Rosenberg and Nicole Luisi, who provided additional technical support when needed. The Engage Study was financially supported by the National Institute of Mental Health (grant number R01MH085600), Eunice Kennedy Shriver National Institute for Child Health and Human Development (grant number R01HD067111), Emory University Center for AIDS Research (grant numbers P30AI050409,

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Conflicts of Interest

None declared.

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Chapter 4: Effect of commuting patterns on HIV care attendance among HIV-positive Atlanta-based MSM

Abstract

Introduction: Travel-related barriers to HIV care, such as commute time and mode of transportation, have been reported. We investigated the association between public transportation use and HIV care attendance among a convenience sample of Atlanta-based, HIV-positive men who have sex with men (MSM), evaluated differences across region of residence, and estimated the relationship between travel distance and time by mode of transportation.

Methods: A Poisson regression model was used to examine the association between use of public transportation to attend HIV-related medical visits and frequency of care attendance over the previous 12 months. The relationship between travel distance and commute time was quantified using linear regression. Kriging was used to interpolate commute time to visually examine geographic differences in commuting patterns in relation to access to public transportation and household vehicle ownership.

Results: Using public transportation was associated with lower rates of HIV care attendance compared to using private transportation, but only in south Atlanta (South: aRR: 0.75, 95% CI: 0.56, 1.0, North: aRR: 0.90, 95% CI: 0.71, 1.1). Participants living in south Atlanta were more likely to have longer commute times associated with attending HIV visits, have greater access to public transportation, and live in areas with low car ownership. Estimated commute times per mile traveled were three times longer among public transit users compared to private transportation users.

Conclusion: Improving local public transit and implementing use of mobile clinics could help address travel-related barriers to HIV care.

Publication

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attendance among men who have sex with men (MSM) in Atlanta, Georgia. Journal of the International Association of Physicians in AIDS Care. *Submitted*.

Introduction

Men who have sex with men (MSM) accounted for 67% of all new HIV infections in the US in 2012, despite accounting for only 2% of the population [1, 2]. By the end of 2012, an estimated 54% of approximately 47,000 people living with HIV were MSM in the state of Georgia [3]. Regular medical care utilization among HIV patients is important in maintaining viral load suppression, reducing transmission to others [4-6], and improving survival over time [6, 7]. Among newly diagnosed cases in Georgia in 2011, an estimated 46% were regularly engaged in HIV care in the previous year and 45% had achieved viral suppression [3]. Similar estimates in HIV care engagement were observed among a large cohort of MSM in Atlanta [7].

Transportation-related factors, such as travel distance and commute time, have been reported as substantial barriers to general medical care and attending HIV appointments [8-15]. Transportation assistance was reported as an unmet need among 16% of those who needed it in a cross-sectional, nationally representative study of HIV-positive individuals engaged in care [16]. Travel distance and mode are both important predictors of commute time [17] and can influence travel times differentially by neighborhood, depending on availability of public transportation, household vehicle ownership, and traffic congestion patterns [18, 19].

Compared to traveling by car, using public transportation is often associated with longer commute times and reduced convenience and flexibility in travel [17, 20]. This is especially important in cities like Atlanta with limited public transportation and a strong dependence on travel by car [21]. Longer commute times can be a deterrent to attending care visits, especially with competing household and job responsibilities [8]. In Atlanta, the Metropolitan Atlanta Rapid Transit Authority (MARTA) has been the primary source of public transportation infrastructure for both bus and rail since the 1970s. MARTA, as well as other transit systems in the metro area, serves mostly urban areas in the city [22, 23].

Atlanta has historically been a highly segregated city [24], with differential access to public transportation. A general north-south pattern exists, with more predominantly black neighborhoods in south Atlanta and mostly white neighborhoods in north Atlanta. Neighborhood

contextual factors, such as socioeconomic deprivation, have been shown to be associated with negative physical and mental health outcomes [25-27]. In this study, we investigated whether public transportation use is associated with HIV care attendance and whether the association varies by region of residence (north versus south) in Atlanta. Because taking public transportation can strongly affect commute times, we also estimated the relationship between travel distance and commute time by mode of transportation. Identifying areas where travel-related factors are barriers to HIV care can be beneficial in planning targeted structural interventions to improve healthcare utilization.

Methods

Study methodology

Recruitment

The Engage Study, a cross-sectional study of self-identifying HIV-positive MSM, was designed to investigate structural and psychosocial barriers to HIV care among MSM living in the Atlanta area. Details on recruitment have been previous described [28]. All consenting participants were directed by email to the questionnaire administered using a HIPAA-compliant online survey software platform, SurveyGizmo (Boulder, Colorado) [29]. The Emory University Institutional Review Board approved the study protocol (approval number: IRB00060430).

Measures

Measures

The web-based questionnaire collected information on demographic characteristics, potential structural (e.g. public transportation use) and psychosocial barriers (e.g. perceived HIV-related stigma, disclosure of HIV status) to HIV care engagement, and characteristics related to HIV care experiences (e.g. health insurance status, number of attended care appointments with the most recently attended HIV provider). We also collected information about home address at the time of the interview and location of the last HIV care provider, which was used to estimate travel distance and commute time to attend care visits. We geocoded all addresses using ArcGIS 10.2 (Redlands, CA). Participants were also asked about mode of transportation used to regularly

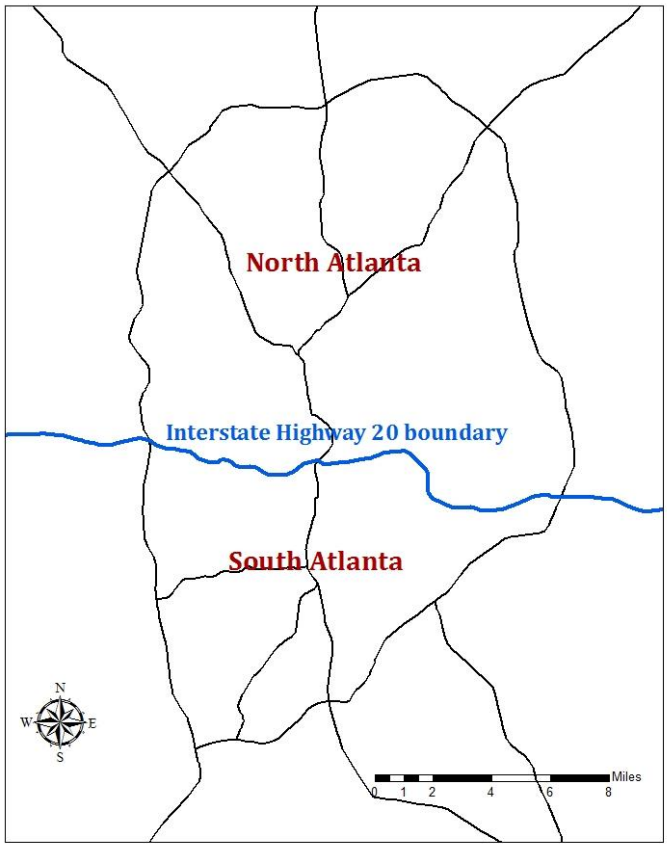
attend care. Those reporting normally traveling by train, bus, or foot were considered to be public transportation users; otherwise, they were considered private transportation users.

To estimate travel distance and commute time between participant residence and last attended HIV provider, we used the Google Maps Directions application programming interface (API). Distance and commute time were calculated for each pair of origin-destination points (i.e. residence and provider locations) based on the most optimal route chosen by Google maps. Travel parameters were calculated separately for those who used public transportation versus those who did not. Those who did not take public transportation were assumed to travel by car. All travel parameters were calculated assuming a departure day and time of Friday, March 7, 2014 at 10:00 AM. Latitude-longitude coordinates for residence were anonymized before entered into Google maps to protect confidentiality of participants.

Since our research objectives focused on assessing differences in effect estimates across area of residence, we stratified the results by residence in north versus south Atlanta. Interstate highway 20 (I-20) served as a coarse boundary for these regions, as it is often used to distinguish between areas of differing socioeconomic status, such as racial composition and average household income [24] (Figure 1).

We obtained information on household vehicle access, which we used as a proxy for car ownership, from the US Census Bureau [30] and data on availability of public bus and train routes from the Atlanta Regional Commission [31].

Figure 4.1. Geographic boundaries defining regions of residence used in analyses.



Analytic Methods

Descriptive statistics

We reported descriptive statistics for transportation-related factors, including travel distance, commute time, and use of public transportation to attend HIV care appointments, demographic characteristics, and the number of attended HIV care appointments in the previous 12 months, overall and by area of residence.

Modeling

Public transportation and HIV care attendance

A Poisson regression model estimated the rate of attended HIV care-related visits with the most recent provider in the past 12 months (using attended HIV care appointment counts) as a function of whether or not public transportation was taken to attend care, and examined whether

the association was modified by region of residence in the city. The offset variable represented eligible days to receive HIV care in the past 12 months, and was coded as the natural log of 365 days unless date of diagnosis was less than a year before the survey was completed, in which case it represented the number of days between the date of diagnosis and the date of the survey.

Race was considered an important control variable, and thus was included, a priori, in the final, multivariable model. Mode of transportation, region of residence, and the interaction between the two variables, were also retained in the final model, since they were the primary explanatory variables of interest. For other covariates, backward selection was used to determine which variables should be included in the final model, using a cutoff of $p < 0.05$. The multivariable Poisson model was built using SAS 9.3 (Cary, NC).

In a post-hoc analysis, we examined spatial relationships between commute time, network of available public transportation routes in Atlanta, and areas with low household vehicle ownership. Using ArcGIS 10.2, we utilized kriging to spatially interpolate commute time associated with traveling to the last attended HIV provider. Because we did not ask participants directly about household vehicle ownership, we used US Census data as a marker for study areas with poor access to a vehicle. We defined vehicle ownership as having access to one or more vehicles in the household; Census tracts with < 87% household vehicle access were considered areas of low ownership. We based this cutoff on results from the 2009 National Household Travel Survey (NHTS), which estimated that approximately 13% of US households were without access to a vehicle in large urban areas [32]. Using GeoDa (Tempe, AZ), local Moran's I statistics with significance testing ($\alpha = .05$) evaluated local spatial autocorrelation to identify clusters of low vehicle ownership.

Travel distance and commute time

We used a linear regression model to describe the relationship between travel distance and commute time, stratified by mode of transportation used to attend appointments. For each mode of travel, the intercept represented initial time investment; the slope provided information on the

increase in commute time for each mile traveled. No other covariates were of interest, and therefore, were not included in the final model.

Results

Descriptive statistics

A total of 213 eligible MSM participated; 205 (96%) participants reported ever receiving HIV care, among which 184 (90%) reported valid location data on home address and last HIV provider to enable calculation of road distance and commute time between the two. A total of 178 (97%) respondents who traveled less than 100 miles and lived within 50 miles from the center of Atlanta were used in the final analysis dataset.

The median age of participants was 34 years, over half of participants reported an annual household income of less than $20,000, and about two-thirds identified as Black/African American race (Table 4.1). Participants attended a median of 3 appointments with the most recent HIV care provider in the previous 12 months, and about a third of participants reported missing at least one appointment. Forty percent reported using some form of public transportation to attend HIV care visits; median commute time was 22 minutes, and median travel distance was about 9 miles.

Participants living in south Atlanta were significantly more likely to report black race (79% vs. 52%), lower annual household income (62% vs. 48%), and not having health insurance at the time of the survey (54% vs. 37%). Greater reported use of public transportation (58% vs. 33%), travel distance (median of 12.1 miles vs. 8.1 miles), and commute times (median of 43.8 vs. 19.0 minutes) associated with attending HIV care visits were observed in south Atlanta, compared to north Atlanta. Participants in south Atlanta were also more significantly more likely to live in census tracts with low car ownership (44% vs. 33%).

Table 4.1. Demographic, clinical, and travel characteristics of among a convenience sample of HIV-positive MSM in Atlanta, Georgia, 2012-2013.

	Overall			North Atlanta			South Atlanta		
	Summary statistic			Summary statistic			Summary statistic		
Continuous variables	Median	IQR		Median	IQR		Median	IQR	
Travel time (minutes) to most recent provider †	22.3	12.6, 51.5		19.0	11.7, 42.5		43.8	21.2, 60.3	
Travel distance (miles) to most recent provider †	9.0	5.0, 14.2		8.1	4.1, 13.3		12.1	7.5, 17.6	
*Categorical variables**	n	%	Mean visits	n	%	Mean visits	n	%	Mean visits
People living in tracts with low household vehicle ownership †									
< 87%	64	36	3.5	41	33	3.5	23	44	3.3
≥ 87%	114	64	3.2	85	67	3.1	29	56	3.6
Taking public transit (bus, train, foot) to attend care visits †									
Yes	72	40	3.4	42	33	3.4	30	58	3.3
No	106	60	3.3	84	67	3.1	22	42	3.8
Age in years									
< 35 years	91	51	2.9	65	52	3.0	26	50	2.7
≥ 35 years	87	49	3.7	61	48	3.4	26	50	4.3
Race †									
White	60	34	3.3	52	41	3.1	8	15	4.5
Black/African American	107	60	3.4	66	52	3.4	41	79	3.3
Education									
High school or less	32	18	3.2	20	16	2.9	12	23	3.6
At least some college	144	81	3.4	104	83	3.3	40	77	3.5
Annual household income †									
< $20,000	93	52	3.3	61	48	3.2	32	62	3.6
≥ $20,000	79	44	3.2	62	49	3.1	17	33	3.6
Current health insurance status †									
Yes	102	57	3.3	78	62	3.2	24	46	3.6
No	74	42	3.3	46	37	3.2	28	54	3.4

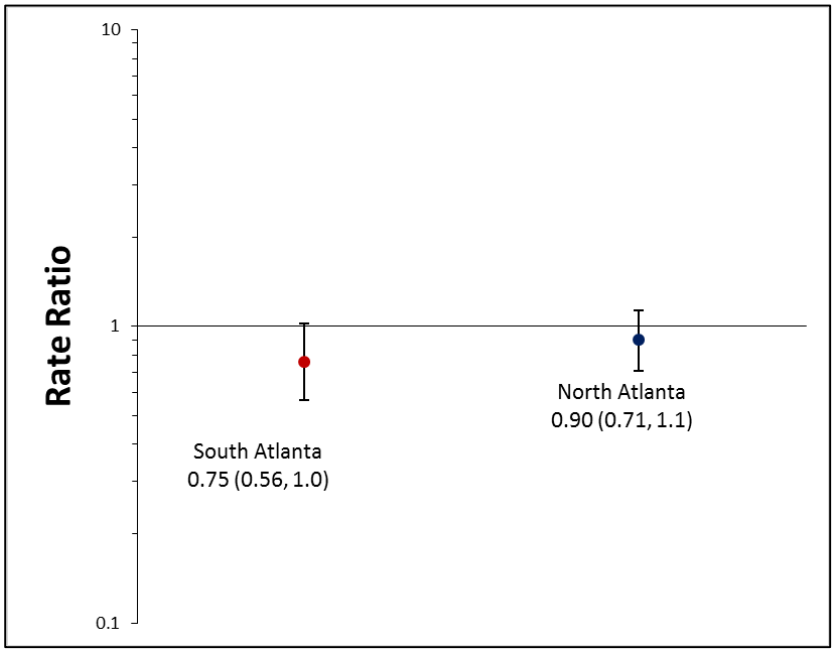
* Numbers may not sum to total because of missing values. Percentages may not add up to 100 due to rounding.
† Statistically significant differences in distribution of travel or demographic characteristic observed across region of residence ($\alpha = 0.05$).

Modeling

Public transportation and HIV care attendance

After adjusting for self-reported race, annual household income, and health insurance status at the time of interview, the rate of HIV care attendance was 25% lower among those who took public transportation to attend care visits, compared to those who took private transportation, among those living in south Atlanta (aRR: 0.75, 95% CI: 0.56, 1.0; see Figure 4.2). No significant association was observed among those living in north Atlanta (aRR: 0.90, 95% CI: 0.71, 1.1). Although the interaction between region of residence and use of public transportation was not significant, stratified results are presented because we hypothesize that factors related to socioeconomic status (SES), such as motivation for taking public transportation to attend visits, might vary depending on region of residence.

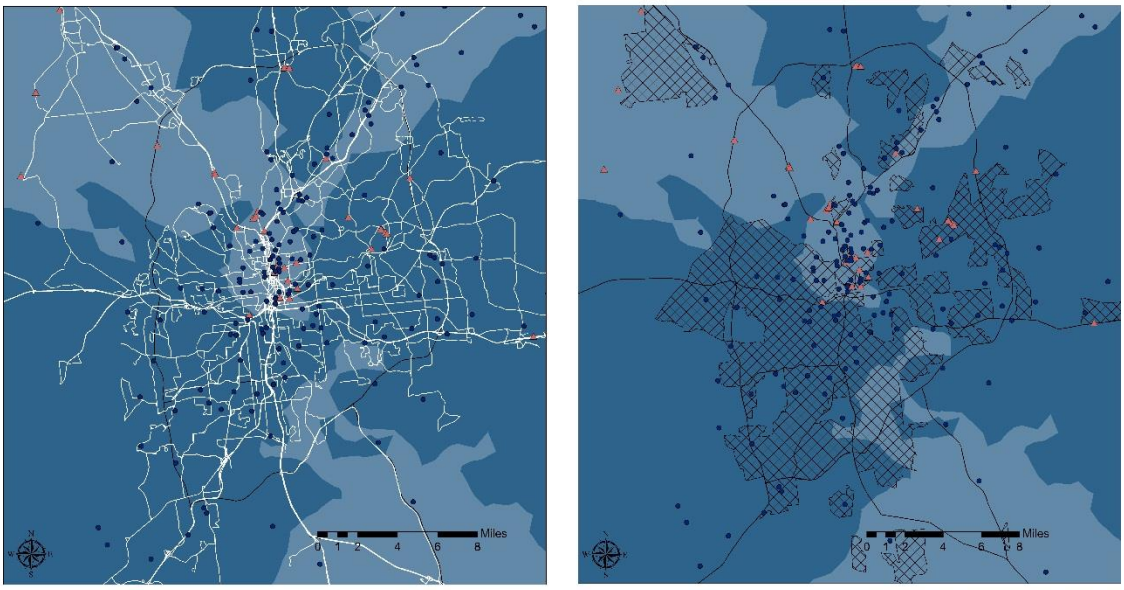
Figure 4.2. Adjusted association between public transportation use and rates of HIV care attendance in the previous 12 months, by area of residence, among a convenience sample of HIV-positive MSM linked to care, Atlanta, Georgia, 2012-2013. The final multivariable model controls for race, income, and health insurance status at the time of interview.



To explore this hypothesis, we examined interpolated commute times across urban areas of Atlanta with respect to census tracts with low car ownership and the network of available public transportation in the city (Figure 4.3). Interpolated commute times greater than the overall mean

(34 minutes) were observed in much of south Atlanta. Further, positive spatial autocorrelation was observed in a cluster of census tracts with low car ownership in south Atlanta. Within the auxiliary interstate highway 285 (often used as a boundary for urban versus suburban / rural areas of Atlanta), there are 6.6 miles of available public transportation per 1000 population in south Atlanta and 4.4 miles of available transit per 1000 population in north Atlanta.

Figure 4.3. Relationships between commute time and network of public transportation routes (left), and commute time and low car ownership (right) among a convenience sample of HIV-positive MSM, Atlanta, Georgia, 2012-2013. Locations of attended HIV providers are denoted in pink triangles. Residential locations of Engage Study participants are shown in dark blue dots.



Travel distance and commute time

The modeled estimates showed that the relationship between travel distance and commute time varied significantly by mode of transportation taken to attend HIV care visits (Figure 4.4, Table 4.2). The model explained 93% of the variance of the data around the estimated regression equation. The estimated initial time investment was over 4 times higher among public transportation users (27 minutes), compared to private transportation users (6 minutes). Among those who took private transportation, each mile of travel resulted in an additional minute of commute time; by contrast, the rate of increase in commute time per mile traveled was 3 times higher among those who took public transportation. Estimated commute times were consistently longer for public transportation users; differences in commute times for key distance values are provided in Table 4.2.

Figure 4.4. Linear regression model describing the estimated association between travel distance (miles) and commute time (minutes), stratified by use of public transportation to attend HIV care appointments, among a convenience sample of HIV-positive MSM in Atlanta, Georgia, 2012-2013.

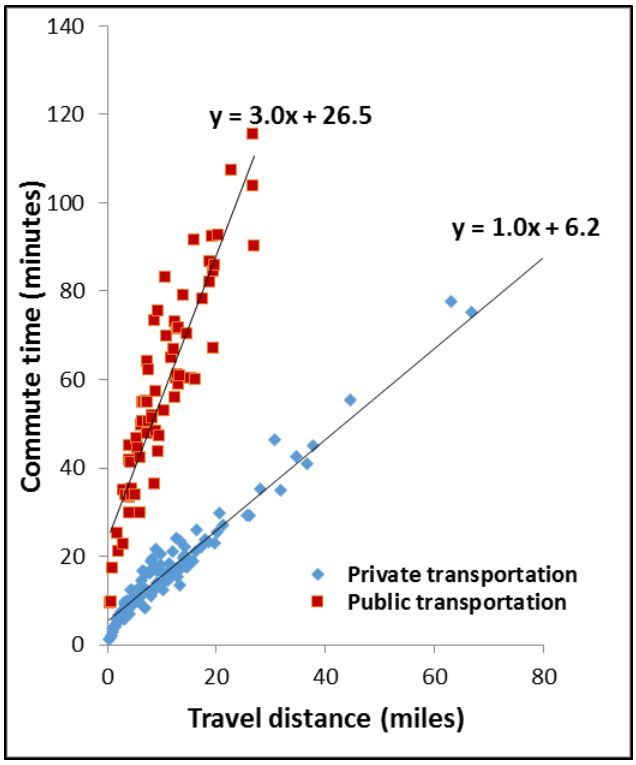


Table 4.2. Modeled estimates for initial time investment, rate of increase in commute time per mile traveled, and differences in overall commute time by mode of transportation taken to attend HIV care visits among a convenience sample of HIV-positive MSM in Atlanta, Georgia, 2012-2013.

			Modeled commute time (minutes) for miles traveled			
Mode of transportation	**Initial investment (minutes)**	**Δ Commute time per mile traveled (minutes)**	**1 mile**	**5 miles**	**10 miles**	**15 miles**
Public	26.5 (23.6, 29.5)	3.0 (2.8, 3.3)	29.5	41.7	56.9	72.0
Private	6.2 (4.5, 7.9)	1.0 (0.9, 1.1)	7.2	11.4	16.5	21.7
Δ Commute time (minutes) between public and private transportation			22.3	30.3	40.3	50.4

Discussion

Principal findings

In this study, we investigated commuting patterns related to attending HIV care visits, a topic which has not been extensively explored among HIV-positive MSM in Atlanta. Among those living in south Atlanta, using public transportation was associated with lower rates of HIV care attendance compared to using private transportation. Participants in south Atlanta had greater access to public transportation (miles/1000 population) and were more likely to live in areas with low vehicle ownership. Both initial time investment and rate of increase in commute time per mile traveled were significantly higher among those who took public transportation, compared to private transportation, to attend HIV care visits.

Although not statistically significant, geographic differences in the association between public transportation use and care attendance could signify that transportation was more of a barrier to attending HIV care visits in south Atlanta. Because the Engage Study sample size was limited, a larger study may have detected statistically significant differences in the association.

We hypothesize that potential geographic differences in effect estimates may be driven by factors related to SES, such as differing motivations for taking public transportation. Although using public transportation is often associated with longer and more variable commute times and reduced flexibility in travel, there may be many reasons why public transportation is preferred, including: (1) concerns related to traffic congestion and pollution, (2) cost reductions associated

with traveling by car, (3) convenience, if one's residence is in an urban area with easy access to public transit and limited space for private vehicle parking, and (4) not having another means of travel [17, 20, 33, 34]. Out of these four reasons, the first three are related to convenience, or choice to take public transportation, while the fourth is out of necessity because of lack of vehicle ownership or unreliable private transportation. Because levels of household vehicle ownership may be higher in north versus south Atlanta, we hypothesize that those living in south Atlanta may be more likely to take public transportation out of necessity and people living in north Atlanta may be more likely to choose public transportation out of convenience. Further exploring differences in motivations for taking public transportation may be helpful in understanding complex patterns and dynamics between travel and medical care utilization.

When we examined other population-based transportation-related factors to get a clearer picture of reasons for taking public transportation across Atlanta, we found that south Atlanta had overlapping geographic areas of longer commute times, low car ownership, and greater access to public transportation. Historically, south Atlanta also has majority black population and greater levels of poverty, compared to other areas of Atlanta [24], and along with downtown and midtown Atlanta, has a greater burden of HIV compared to other areas of the city [36]. National data also show disproportionately greater use of public transportation among minorities and individuals from low-income households, suggesting socioeconomic differences in travel behaviors [35]. Therefore, transportation-related barriers to HIV care may be more prevalent in economically disadvantaged communities in south Atlanta where there is a greater need for HIV medical care utilization.

Although reasons for taking public transportation are highly correlated with SES, controlling for census tract-level car ownership and individual-level race and income in this analysis did not explain the observed association between public transportation use and HIV care attendance in south Atlanta. Individual-level household vehicle ownership could have explained the association if the participants are not representative of their census tract of residence. However, information on individual-level vehicle ownership was not available. Alternatively, there may have been one or more unmeasured factors associated with neighborhood economic disadvantage and

deprivation which explain the differential results between north and south Atlanta, and this should be further explored.

Although this is a small, hypothesis-generating study with exploratory objectives, the results justify exploring in the future whether travel-related barriers affect medical care attendance differentially by region of residence among Atlanta-based, HIV-positive MSM. Larger studies which collect information on individual car ownership and any unmeasured factors which could potentially explain the differential effect estimates would help inform whether interventions related to improving spatial access might be beneficial. For instance, if transportation did, indeed, differentially affect HIV care attendance, the use of mobile clinics, as well as expansion of public transportation networks and more frequently operating bus and train routes, could be helpful in mitigating travel-related barriers.

Mobile vehicles used for HIV testing have been accepted by patients both in and out of the United States [37-39], but have rarely been used to administer HIV care, despite such an option being suggested to reduce transportation and socioeconomic barriers to medical care [40]. Mobile clinics have been used to provide other types of medical care previously, and have been associated with improved healthcare utilization [41], and potentially, fewer visits to the emergency department [42], after implementation.

Improving public transportation connectivity to other parts of the city, where preferred HIV clinics may operate, is key to increasing mobility of lower income communities that may be less likely to own a vehicle. Increasing frequency of existing public bus and train routes may also cut down on commute times and improve the level of convenience associated with taking public transportation. However, expansion of public transit in Atlanta has continually been a contentious issue among the public [23, 43]. The original plan for a public transit system was published in a 1961 report by the Atlanta Region Metropolitan Planning Commission, and included an expansive, 66 mile rail network, covering five counties in the metro area [21, 22]. Unfortunately, the plan was not approved by voters and eventually resulted in the 48 mile rail and 91 route bus system that it is today [22]. Despite limited availability of funds and mixed levels of

support to expand the current public transportation network, incorporating discussions about public health during transit planning would be helpful in serving communities which may benefit from greater access to medical resources they may need.

Limitations

There are several limitations to this study. First, the cross-sectional study design does not lend itself to making inferences on temporality or causality. Second, because almost 40% of participants were recruited online, HIV status was self-reported and could not be verified. However, we suspect little to no misclassification of HIV status because the study survey contained detailed questions about provider location and HIV care engagement. The outcome, number of attended HIV care visits in the past 12 months, was self-reported, and therefore, is subject to information bias. We hypothesize that the number of attended appointments might be over-reported, but do not suspect that misclassification was differential with respect to travel parameters. Further, results were generated from a convenience sample which may not be representative of all HIV-positive MSM living in Atlanta, limiting generalizability of results. In addition, using population-based estimates as a proxy for individual household vehicle ownership may not have been appropriate due to convenience sampling. Relationships between population-based estimates of household car ownership and availability of public transit, and interpolated commute times associated with attending HIV care based on a convenience sample of Atlanta-based HIV-positive MSM are ecologic and should be further explored. Finally, home and provider locations are based on self-report and therefore subject to information bias.

Conclusion

Using public transportation, compared to private transportation, may have been a barrier to HIV care among a sample of Atlanta-based, HIV-positive MSM living in south Atlanta. Using public transportation to attend HIV care resulted in longer commute times. We hypothesize that reasons for taking public transportation to receive HIV care may differ across region of residence in Atlanta, which may explain the differences in the observed association by region; however, this hypothesis should be further explored in larger studies.

The results from this analysis add to the current knowledge about travel and transportation-related barriers to HIV care, may inform the design of larger population-based studies which further explore potential neighborhood-level characteristics driving differences in travel-related barriers, and could provide guidance on potentially beneficial interventions which address gaps in care among Atlanta-based, HIV-positive MSM.

Acknowledgments

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Conflicts of Interest

None declared.

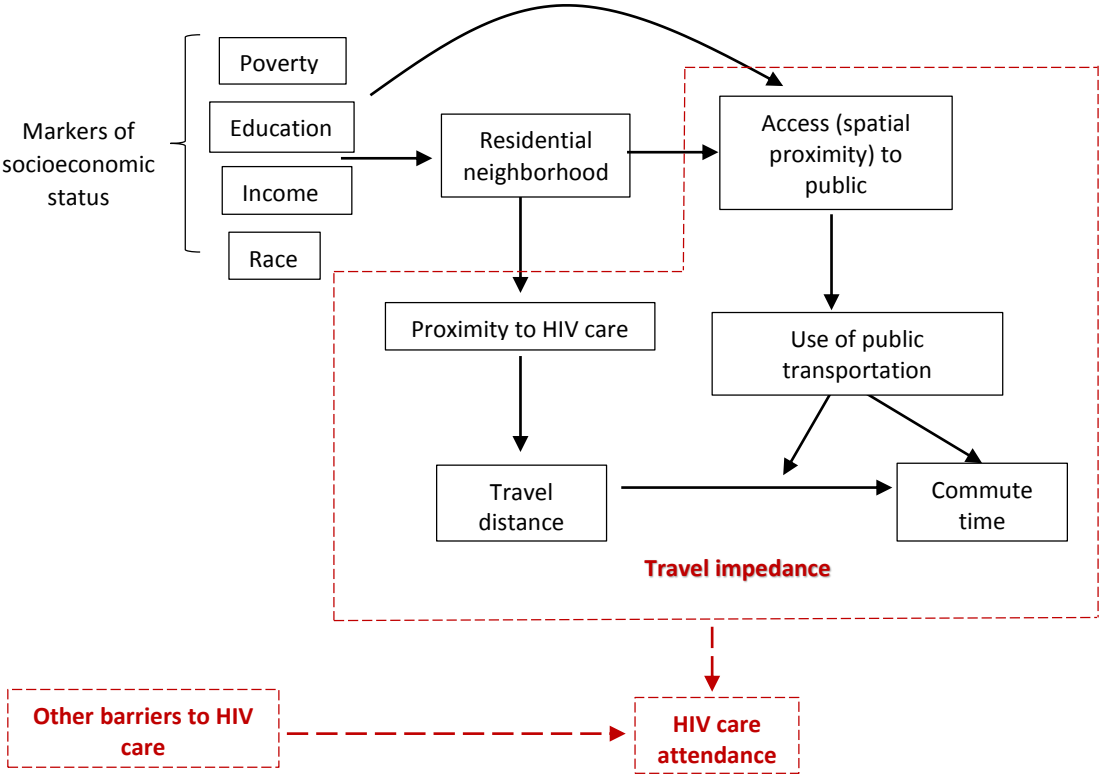
Additional analyses and discussion

We present the work from this project after many iterations of conducted analyses. The primary objective of this study aim was to explore the relationship between travel-related factors and HIV care engagement, a proxy for realized access. Our initial research question focused on estimating the association between commute distance and/or time and rates of HIV care attendance, and examining whether this association varied across Atlanta using a geographically-weighted Poisson regression (GWPR) model. GWPR allowed us to examine these relationships in an exploratory way, but lacked sufficient statistical power to make any definitive conclusions. The results from the GWPR regression models helped in restructuring the research question and choosing appropriate analytic methods to answer this question.

The directed acyclic graph (DAG) below demonstrates why the final research question primarily focused on use of public transportation, instead of distance or commute time. Specifically, the causal diagram shows that public transit use is upstream of commute time, but also is an effect modifier in the relationship between travel distance and commute time. Therefore, use of public

transit served as a proxy for travel-related factors associated with attending HIV care visits. Further, by excluding commute distance and time from the final model, we simplified the analytic process and avoided potential biases that could have occurred in controlling for an intermediate. Travel distance and commute time, however, are important variables to consider; thus, the relationship between distance and commute time was quantified, stratifying by mode of transit.

Figure 4.5. A DAG describing relationships between markers of socioeconomic status, travel-related factors, and HIV care attendance, a proxy for realized access.



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Chapter 5: Spatial accessibility to HIV providers in Atlanta, Georgia

Abstract

No abstract was included because this was submitted as a short communication paper.

Publication

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Introduction

Spatial accessibility to medical providers, which includes proximity to clinics and commuting characteristics [1], can affect healthcare utilization among people living with HIV [2]. We mapped major HIV providers in the six county metropolitan Atlanta area to examine measures of spatial accessibility with respect to HIV case counts, poverty, and household vehicle ownership.

Methods

We obtained Atlanta HIV case counts by zip code tabulation area (ZCTA) from AIDSVu.org, an online tool illustrating HIV prevalence for multiple US cities [3]. Data on household vehicle access, a proxy for car ownership, by census tract and households living in poverty by ZCTA were obtained from the American Community Survey. Areas with <87% household vehicle ownership (cutoff based on national estimates of household vehicle access) [4] and the highest quartile of households living in poverty are presented.

We cataloged major HIV primary care providers in the six county area from the Southeast AIDS Training and Education Center Key Contacts booklet [5], the AIDS.gov HIV testing and care services locator [6], and the HRSA HIV treatment site locator [7], and the Georgia Care and Prevention in the United States (CAPUS) resource directory compiled by the Centers for Disease Control and Prevention [8]. We also obtained a list of private practices treating HIV from a previously conducted Atlanta-based study in which a convenience sample of HIV-positive participants were asked where they received their HIV primary care [9]. We used ArcGIS 10.2 to estimate the number of providers within a five mile driving radius of each Census tract centroid. The Google maps API was used to estimate commute time between Census tract centroids and the closest HIV provider (by distance) by car and by public transportation.

Results

Highest quartiles of HIV case counts were observed in central and south Atlanta (Figure 5.1a). Overlapping areas of high HIV case counts and poverty were primarily observed in south and southwest Atlanta. Density of available HIV providers is greatest in central and north-central Atlanta, with surrounding suburban/rural areas having limited accessibility (Figure 5.1b). Figure

5.1c shows that most Census tracts were within 15 minutes of an HIV provider by car; by contrast, Figure 5.1d demonstrates that commute time to the nearest provider increased substantially if traveling by public transportation. Regions with no public transit service to the nearest HIV provider are indicated in white. Areas of low vehicle ownership may indicate a reliance on public transportation for travel, and are primarily observed in southwest Atlanta, where the highest HIV case counts are.

Discussion

Although there is a high density of HIV providers in downtown Atlanta which serve both northern and southern urban areas, fewer options are available for people living with HIV in south Atlanta, where HIV prevalence is high and more resources might be needed.

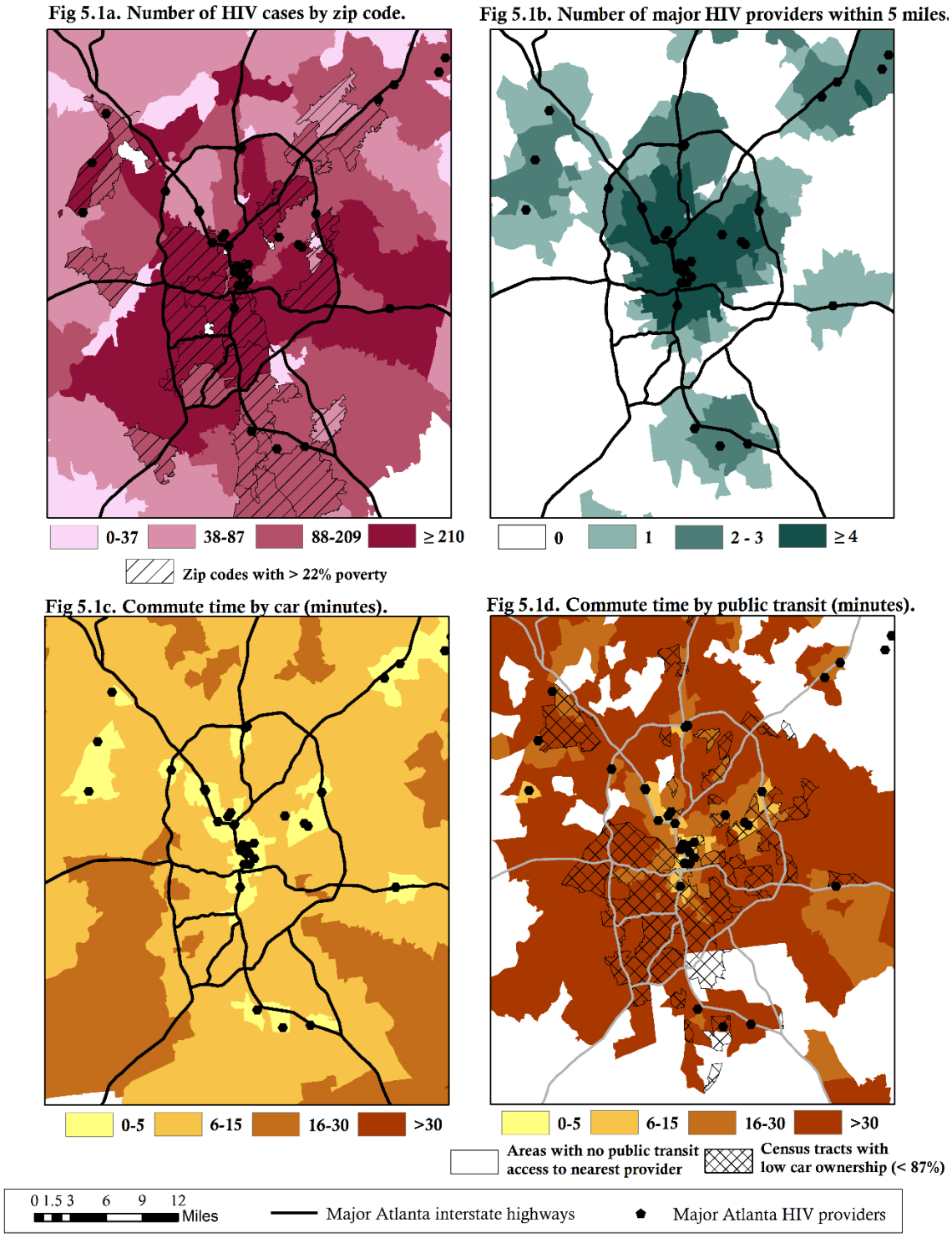
Travel distance and commute time are important markers of accessibility [1]. These findings demonstrate that, due to added commute times and increased modes of transit, traveling by public transportation may make HIV care resources less accessible than if traveling by car. This may be particularly relevant for individuals who do not own a car and rely solely on public transit for travel to HIV care appointments.

Our HIV provider list may underrepresent smaller private practices treating HIV. We did not account for whether or not providers were taking new patients, so access could be overrepresented by our maps. We did not account for traffic patterns in commute time calculations. Finally, all associations with respect to HIV cases, poverty, and household vehicle ownership are ecologic. Population-based data on poverty and car ownership among people living with HIV in Atlanta would help in clarifying these relationships in the future.

Conclusion

These results highlight greater case burden and poorer spatial accessibility to HIV providers in southwest Atlanta, compared to other areas of the city. Longer commute times by public transportation may be a greater burden among those in southwest Atlanta who might rely on public transportation. More studies should further investigate gaps in HIV provider access to inform intervention planning strategies for HIV prevention and treatment in Atlanta.

Figure 5.1. HIV case count, poverty, household vehicle access, and proximity to major HIV providers in Atlanta, Georgia.



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Chapter 6: Development and application of a novel measure of access to HIV providers in Atlanta, Georgia

Abstract

Introduction: No existing measures of access to HIV care consider both spatial proximity to services and provider-related characteristics in a single measure. An individual's choice of a provider is based on access to the supply of available healthcare services. Characteristics influencing choice of provider may vary by factors related to travel mode, such as poverty. We developed a tool to comprehensively quantify spatial access to services (supply) and identify underserved areas with respect to HIV cases (demand), by mode of travel, and applied it to the Atlanta metropolitan area.

Methods: We cataloged major HIV primary care providers from multiple resources, and collected information on available provider-hours, patient eligibility, and services offered from each provider. We obtained population-based HIV case counts by zip code tabulation area (ZCTA) from AIDSVu.org.

Building on a study of HIV care engagement, we fit a discrete choice model to estimate the practice characteristics most salient in defining patient care access. Characteristics retained in the final model include: travel distance, number of available provider hours, availability of ancillary services, and whether Ryan White CARE patients were accepted.

We used a modified spatial gravity model to quantify supply access based on the results from the discrete choice model. Supply of services was conceptualized separately for two modes of travel: by car and by public transportation. Relative access scores were calculated for each ZCTA and underserved areas, defined as having low supply (lowest two quintiles) and high HIV case count (highest two quintiles), were identified for each travel mode.

Results: HIV provider supply was higher in urban versus suburban/rural areas for both travel modes, with lower overall scores if traveling by public transportation. Underserved areas were largely concentrated in urban ZCTAs in south and east Atlanta if traveling by public

transportation, which overlapped with areas of high poverty. Approximately 7.7%, if traveling by car, and 64.3%, if traveling by public transportation, of people living with HIV in Atlanta reside in underserved areas.

Conclusion: Conceptualizing access spatially and separately by travel mode may be useful in bridging mismatches between patient needs and service availability, and improving HIV care engagement and clinical outcomes.

Publication

Dasgupta S, Kramer MR, Rosenberg ES, Sanchez TH, Sullivan PS. Development and application of a novel measure of access to HIV providers in Atlanta, Georgia. *In manuscript preparation.*

Introduction

Access to medical care refers to the fit or match between the structure of the healthcare system and patient needs, and can be characterized by the use of healthcare services [1, 2]. Inherently spatial in nature, access to care represents a balance between supply of available services, which we refer to as supply access, with respect to the number of patients served, or the demand for healthcare services. Spatial access to medical services can determine an individual's choice of a healthcare provider, and encompasses five domains, each defined below [1, 3].

Availability represents the distribution of existing medical services with respect to location of clients who needs them. Accessibility, closely related to availability, is defined by the density of available medical practices or clinics and spatial proximity to services, and is characterized by travel distance, commute time, mode of travel, and associated travel costs. Affordability is the ability for clinics to financially accommodate clients based on their income and health insurance status. Acceptability refers to provider-patient interactions, and accommodation is the ability for clinic locations to provide clinic hours that are convenient to patients served [1]. Inequities in spatial access occur when there is an imbalance between patient needs and the healthcare system, which can be explained by one or more of these dimensions.

Issues of spatial access to healthcare resources for people living with HIV have not be extensively explored, particularly in Atlanta, where case burden is high. Georgia ranks second highest in the United States in the number of people living with HIV; among all cases in the state, 64% live in the Atlanta metropolitan area [4, 5]. HIV prevalence varies across the metropolitan area, with a greater case load in urban areas with the highest population density [6]. A disproportionate number of cases in urban areas are in central, south, and southwest Atlanta, compared to other regions of the city [7].

Identifying mismatches between supply and demand for medical services may be important in addressing gaps in HIV care engagement [8-10], and subsequently, improving HIV clinical outcomes [11-13] in a city with high HIV prevalence, such as Atlanta. However, spatial access to healthcare services is a difficult construct to quantify, largely because there is no standard model

of conceptualization, but also because it is difficult to find data which incorporates multiple dimensions of access. Some previous research on spatial access has focused on accessibility of medical services. Other work has incorporated certain other aspects of access, such as the number of patients served by the healthcare system [3, 14-16] and characteristics related to the provider [17].

We previously examined accessibility to HIV care resources by mode of travel in Atlanta [18]. To expand on this work, we quantified spatial access to care more comprehensively by incorporating multiple facets of access, including availability, accessibility, affordability, and accommodation. We also conceptualized spatial access to services separately for travel by car and by public transportation because we hypothesized, a priori, that (1) longer commute times when traveling by public transportation are associated with reduced accessibility of services, compared to users of private transportation [18], and (2) characteristics related to patients selecting an HIV provider may vary based on social determinants of health correlated with public transportation use, such as poverty [19, 20].

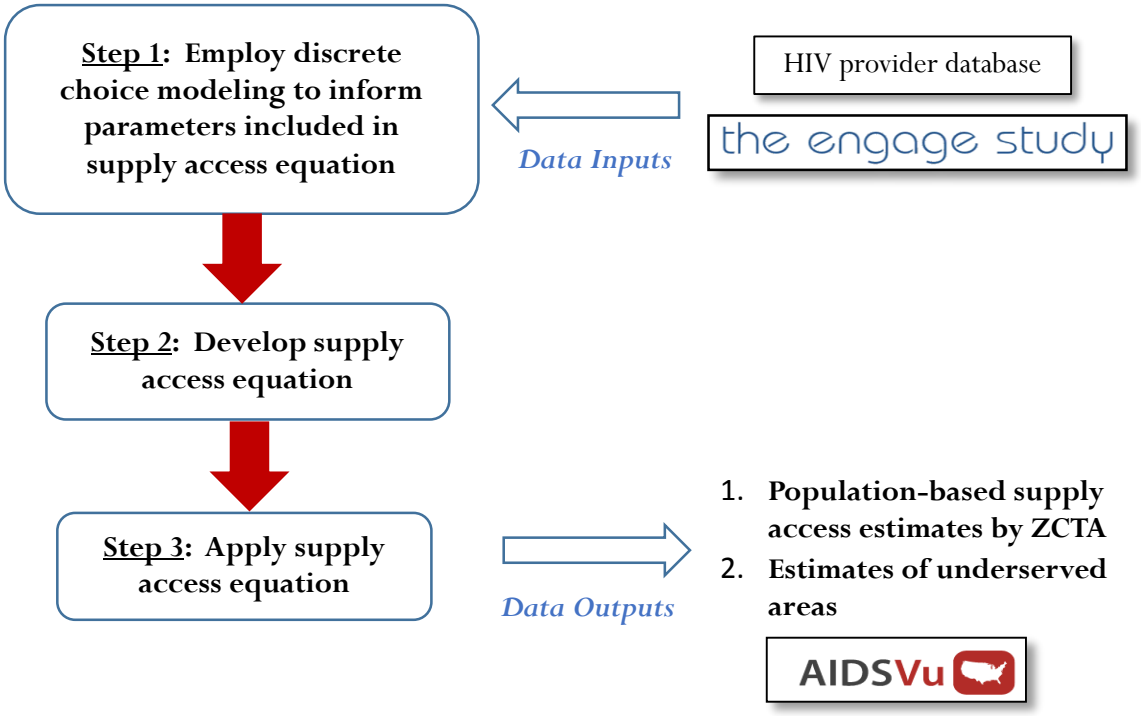
In this study, we used modified spatial gravity modeling to develop a novel tool to (1) comprehensively assess spatial access to services (supply), and (2) apply the tool to identify underserved areas, with respect to HIV case burden (demand), by mode of transportation in the six county Atlanta area.

Methods

We employed a multi-step process, and three different data sources, to accomplish the study objectives. In the first step, discrete choice modeling, often used in econometrics, was conducted to inform parameters included in a supply access equation. Second, the supply access equation, which described access to the supply of Atlanta HIV providers by zip code tabulation area (ZCTA), was constructed based on results from the discrete choice model. Finally, the supply access equation was applied to present two study outputs, population-based estimates of supply access by ZCTA and estimates of underserved areas in the six county Atlanta area. A schematic of this

three step process, along with the data sources used in each step, is highlighted in Figure 6.1. Details on the analytic methodology employed are described below.

Figure 6.1. A schematic of the three-step process employed to quantify supply access to services and identify underserved areas in Atlanta.



Data Sources

Three data sources were utilized in this study. In the first step of the analytic methodology, an HIV provider database and the Engage Study served as data inputs in discrete choice model building. In the third step, data from AIDSVu was used to help identify underserved areas based on results from the previous two steps. Details on each of the three data sources are provided below.

HIV provider database

We created a database of major HIV providers located in the six county Atlanta area containing key characteristics about each individual clinic or practice.

To construct the database, a list of providers was first compiled based on five sources of data: (1) Southeast AIDS Training and Education Center (SEATEC) Key Contacts booklet for the metro Atlanta area [21], (2) AIDS.gov HIV testing and care services locator [22], (3) Health Resources and Services Administration (HRSA) HIV treatment site locator [23], (4) Georgia Care and Prevention in the United States (CAPUS) resource directory compiled by the Centers for Disease Control and Prevention [24], and (5) private practices and clinics attended by Engage Study participants for HIV care that were otherwise not included.

Next, we called every practice or clinic to verify that HIV primary care was provided on-site by at least one physician, physician's assistant, and/or nurse practitioner. After excluding locations that did not provide HIV care, 41 HIV clinics and practices remained in the final database. Additionally, data on each individual HIV provider were collected based on questions from the Medical Monitoring Project (MMP) facility attributes survey, which is administered biennially by the Centers for Disease Control and Prevention to a nationally representative sample of HIV providers in the US [25].

We collected information about the facility type, types of services offered, number of available providers on-site, weekly appointment and walk-in hours, and patient eligibility in regards to available patient options, including whether Ryan White services were offered. First established in 1990, the Ryan White HIV/AIDS program is a federal grant system which works with local health departments and community-based organizations to cover the cost of medical care and support services for HIV-positive individuals who would otherwise be unable to afford such services [26]. Patient eligibility for these services is particularly relevant in Atlanta, as an estimated 47% of people living with HIV in the Atlanta area are Ryan White clients [27].

We classified each facility as a private practice, clinical research facility, community health center or community-based service organization, or state or local health department. To assess patient eligibility based on payment options, we asked each clinic whether it accepted private health insurance, Medicare, or Medicaid as forms of payment, and if it offered a discounted pay structure for those who qualified based on income or Ryan White services. Data were collected on

whether or not the clinic offered the following ancillary services: HIV case management, mental health services, dental care, substance abuse treatment, transportation assistance, and an on-site pharmacy that fills prescriptions. In addition, data on the number of part-time or full-time providers on-site and weekly appointment hours were used to estimate the number of provider-hours available to clients per week. Only physicians, physician's assistants, and nurse practitioners contributed to the sum of weekly provider-hours by clinic.

The Engage Study

The Engage Study investigated structural and psychosocial barriers to HIV care among self-identifying HIV-positive MSM living in the Atlanta area. Details on recruitment have been previously described [28]. After providing consent, participants were directed to a web-based, HIPAA-compliant online questionnaire administered through SurveyGizmo (Boulder, Colorado). The Emory University Institutional Review Board approved the study protocol (approval number: IRB00060430).

The Engage Study questionnaire collected data on residential address at the time of the interview and location of the last HIV care provider, which was used to estimate travel distance and commute time to attend care visits [20, 28]. We geocoded all addresses using ArcGIS 10.2 (Redlands, CA). Participants were also asked about mode of transportation used to regularly attend care. Those reporting normally traveling by train, bus, or foot were considered to be public transportation users; otherwise, we assumed they traveled by car.

The Google Maps Direction application programming interface (API) was used to estimate travel distance and commute time between participant's home address and last attended HIV provider. Travel parameters were calculated for each pair of origin-destination points (i.e. residence and provider locations) based on the most optimal route chosen by Google maps. Latitude-longitude coordinates for residence were anonymized before entered into Google maps to protect confidentiality of participants. Only participants who were living in the six county Atlanta area, had been linked to HIV care, and had received HIV care from a provider in the six county area were included in the analysis.

AIDSVu

We obtained HIV case counts by ZCTA in the six county Atlanta area from AIDSVu.org, an online mapping tool which illustrates rates of HIV for several US cities [7]. Data reflect case counts entered in the electronic HIV/AIDS Reporting System monitored by the Georgia Department of Public Health as of the end of 2013 and are based on ZCTA of diagnosis. Only data from ZCTAs whose population-weighted centroids were contained in the six county area were included in this study.

Descriptive statistics

Descriptive statistics about the Engage Study participants and the HIV providers included in this analysis are presented. Using the Google maps API, we calculated driving distances between population-based centroids of ZCTAs and each HIV provider. Then, based on HIV case counts by ZCTA from AIDSVu, we estimated the cumulative percentage of HIV cases living within defined thresholds of average driving distances (miles) to the nearest HIV provider.

Discrete choice modeling

Access to HIV providers can depend on individual circumstances. Clients of the healthcare system presumably choose their providers based on these personal constraints. Discrete choice modeling provides one way to understand and quantify the significance of certain characteristics in choosing one provider over other available options. Subsequently, the most significant predictors of provider choice may compositely be indicative of, or serve as a proxy for, access to care.

Discrete choice modeling is generally used in econometrics to estimate factors used by individuals in choosing one among a set of mutually exclusive options. One of the primary assumptions is that the user's choice is made to maximize utility, based on individual circumstances and constraints [29]. This type of modeling has been used to weight components that define access to healthcare services previously [17]. In this study, we used data from the Engage Study in a discrete choice model to estimate characteristics most important in selecting a provider, by mode of transportation taken to attend visits.

We assumed that the study area has a finite set of HIV providers, and that each HIV-positive participant chose one provider (based on reported last attended HIV provider) out of the set of all possible providers after comparing the utility of each option. For instance, the distance between the patient's residence and location of the potential provider might be a barrier to accessing care, and thus, distance would play a role in the utility function. Similarly, provider-hours or acceptance of Ryan White funding might make some providers more or less appealing to some patients.

We created 'choice sets' for each Engage Study participant by merging them with the set of 41 HIV providers in the study area; of the 41 providers, only one was actually chosen by each patient (representing the last attended HIV provider) and 40 were not chosen. The structure of the dataset reflected an epidemiologic matched case-control study. Each case represented a "successful" pair (a participant with the chosen provider) and controls represented all other pairs (the same participant with all non-chosen providers), resulting in a 1:40 matched case-control dataset. No restrictions were made on the available pool of providers from which to choose based on distance or commute time. Because each participant served as his own control, there was no need to control for individual characteristics which might confound the association of interest.

The following facility-specific characteristics were considered in describing the supply environment, and thus, contributors to the individual's choice utility function: facility type (private practice versus other), whether or not any ancillary services were offered, payment options (whether or not Ryan White patients were accepted), number of available provider-hours during the week, and whether or not walk-in hours were offered. We also considered two covariates directly related to the participant as potential descriptors of supply access, including distance between study participant residence and each HIV provider and mode of transportation taken to attend HIV care visits. Because travel distance and provider-hours were non-normally distributed, the natural-log of these two variables were included in the discrete choice model and evaluation of supply access.

We employed a generalized estimating equations (GEE) model with a logit link function, accounting for clustering by patient using an exchangeable correlation structure, to investigate factors associated with choosing a provider. The coefficient for covariate x represented the odds in choosing a provider which had characteristic x, compared to providers without characteristic x.

Because accounting for potential differences in choice of provider by travel mode was of primary interest, we included two-way interaction terms between each provider characteristic and mode of transportation taken to attend HIV visits. Backward selection was used to determine which variables should be retained in the final model, using a cutoff of $p < 0.05$. The multivariable GEE model was built using SAS 9.4 (Cary, NC).

Development of supply access equation

We developed the supply access equation as a way to describe the relationship between certain provider-related characteristics and spatial access to HIV care in Atlanta, based on the results from the final discrete choice model. The variables retained in the final discrete choice model represented the set of characteristics most significantly associated selecting an HIV provider in The Engage Study. We assumed that the participants in The Engage Study (and the choices they made) represented all people living with HIV in Atlanta. Thus, the equation describing supply access was comprised of the variables from the final model so that access could be quantified and generalized for the entire Atlanta study area. Regression coefficients from the discrete choice model were used as the corresponding weights of importance for each characteristic. Equations described supply access separately for travel by car and by public transportation.

The supply access equation represented a modified gravity model, and was used to generate a supply access score for every ZCTA-provider pair. There were 41 ZCTA-provider pairs for every ZCTA, with pairs corresponding to each of the providers in the six county Atlanta area. Scores for each pair reflected spatial access to provider j from the population-weighted centroid of ZCTA i, based on the sum of individual provider-related characteristics and road distance between the centroid and provider.

Following other work on spatial access to health care, we assumed an inverse exponential relationship between patient's choice for a provider and both travel distance and provider-hours

[17]. In other words, supply access scores for facilities that were closer received a greater weight than those further away. Thus, distance and provider-hours were included as the natural log of the resulting odds ratio. Other provider-related characteristics were assumed to have a linear relationship with access, and corresponding odds ratios from the discrete choice modeling were included as coefficients in the final supply access equation.

A generic form of a_{ij}, representing the supply access score for ZCTA-provider pair ij, is shown below:

$$a_{ij} = \sum_{all\ c} \alpha_{c(ij)}\, x_c + \sum_{all\ c} x_c^{\beta c(ij)}$$

where the first summation represents the set of characteristics which assume a linear relationship between provider-related characteristics and spatial access and the second summation represents the set of characteristics which assume an exponential relationship between the two. In this equation, c = each characteristic included in the supply access equation, α = odds ratios corresponding to parameter c from the discrete choice model, β = the natural log of the odds ratio corresponding to parameter c from the discrete choice model, and x = value of characteristic c in the supply access equation.

Application of supply access equation

Study output 1: Computing population-based estimates of supply access by ZCTA

Scores for each ZCTA-provider pair were calculated based on the supply access equation developed. Subsequently, each of these scores were summed within each ZCTA, presenting an estimate of the average supply access to HIV providers available to the population of each ZCTA i. Summary scores were computed separately for travel by car and travel by public transportation in order to distinguish the possibly differential supply access and choice process as a function of patient mode of transit. Specifically, where i = an individual ZCTA and j = an individual provider, the sum of supply access scores for a single ZCTA would be:

$$A_{i\,(car)} = \sum_{all\ j} a_{ij}$$

$$A_{i\,(PT)} = \sum_{all\ j} a_{ij}$$

In Atlanta, there is little to no public transit available outside of the core urbanized area. As a result, the Engage Study participants reporting use of public transit to attend HIV care visits were, by definition, closer to the urban core, and consequently relatively closer to the concentration of providers than suburban participants. Despite being closer to a higher density of services, however, those living in urban areas and traveling by public transit may have longer commute times, reducing overall spatial access and actual use of healthcare services.

Although the supply access equation synthesized multiple dimensions of spatial access into a single measure, it did not account for the barrier in HIV care attendance shown to be associated with taking public transit, versus a car, among people living with HIV in Atlanta [20]. Thus, to make supply scores for both modes of travel more comparable to each other, we fixed the total sum of supply access scores for public transportation to be a proportion of that for travel by car.

Previously, we showed that controlling for race, income, and health insurance status, rates of HIV care attendance, a proxy for access to HIV care, were lower among Engage Study participants who took public transportation, compared to those who traveled by car (RR: 0.84, 95% CI: 0.70, 1.01) [20]. Using this relationship, we transformed the sum of scores for travel by public transportation based on the point estimate from this measure of association. In other words,

$$\left(\sum_{all\ i}\sum_{all\ j} A_{ij}\right)_{PT} = \left(\sum_{all\ i}\sum_{all\ j} A_{ij}\right)_{car} * (0.84)$$

where PT = travel by public transportation and car = travel by car.

Using ArcGIS 10.2, supply access scores were mapped for travel by car and by public transportation. The distribution of scores were compared across travel mode using quintiles of supply access for travel by car.

Study output 2: Identifying underserved areas

After evaluating supply access to HIV providers by ZCTA, potentially underserved areas in the six county area were identified by mode of transit. We defined underserved areas to be ZCTAs

representing both the lowest two quintiles of supply access and the highest two quintiles of HIV case count. Subsequently, we estimated the proportion of all HIV cases in Atlanta living in these underserved areas for each individual mode of travel. In a post-hoc analysis, population-based estimates of poverty by ZCTA were obtained from the American Community Survey (five year estimates, 2009-2013) to quantify potential overlap with underserved areas [30].

Results

Descriptive statistics

HIV provider database

The number of available provider-hours per week was lower among private practices, compared to non-private practices, although the difference was not statistically significant (Table 6.1). Private practices were more likely to accept private health insurance, and less likely to accept Ryan White patients and offer discounted or sliding fee schedules for low income individuals. Generally, ancillary services were more likely to be available among non-private practices.

Figure 6.2 describes population-based estimates of the cumulative proportion of all Atlanta-based HIV-positive individuals living within defined thresholds of driving distances to the nearest HIV provider. The figure demonstrates that 50% of all people living with HIV in Atlanta live in a ZCTA whose population-weighted centroid is within approximately 4 miles of the nearest HIV provider.

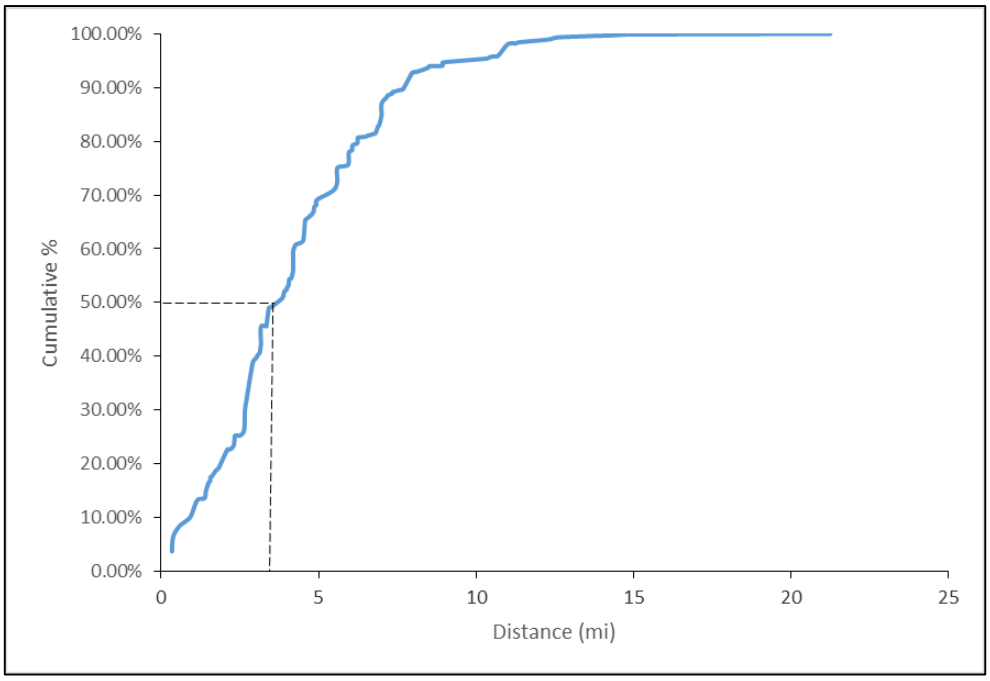
Table 6.1. Descriptive statistics of HIV providers in the 6 county Atlanta area, overall and by practice type.

	Overall		Private practice		Other facility type	
	Mean	SD	Mean	SD	Mean	SD
Available provider-hours*	99.91	97.58	89.82	84.71	117.4	117.79
	n	**%**	**n**	**%**	**n**	**%**
Accepted payment types						
Private health insurance†	36	87.8	26	100	10	66.67
Medicare	34	82.93	22	84.62	12	80
Medicaid	30	73.17	18	69.23	12	80
Discounted/sliding fee†	18	43.9	6	23.08	12	80
Ryan White Care†	10	24.39	1	3.85	9	60
Available ancillary services						
HIV case management†	12	29.27	2	7.69	10	66.67
Mental health services†	9	21.95	1	3.85	8	53.33
Dental care†	6	14.63	0	0	6	40
Substance abuse treatment†	3	7.32	0	0	3	20
Transportation assistance†	11	26.83	2	7.69	9	60
On-site pharmacy†	11	26.83	3	11.54	8	53.33
One or more services offered†	16	39.02	5	19.23	11	73.33

* HIV providers included in this count include physicians, physican's assistants, and nurse practitioners.

† Denotes statistically significant difference across provider type at the $\alpha = 0.05$ level.

Figure 6.2. Cumulative proportion of all people living with HIV in the Atlanta 6 county area living within defined thresholds of driving distances (miles) from population-weighted ZCTAs. The dotted lines highlight the median distance to the nearest HIV provider.



The Engage Study

Among the 213 participants enrolled in The Engage Study, 193 (91%) were living in the six county area, among which 186 (96%) had been linked to care. Out of those enrolled in HIV care, 163 (88%) reported receiving HIV care from an identifiable provider located in the six county area, and were included in the analysis. Of those, 100 (61%) reported being black/African American, 84 (52%) an annual household income of less than $20,000, and 64 (39%) not having health insurance at the time of the survey. Median distance traveled to the last HIV care provider was 8.6 miles (IQR: 4.5, 13.4). More details about The Engage Study participants have been previously described [28].

Discrete choice modeling

The final discrete choice model results demonstrated four covariates that were salient in patients selecting an HIV provider, including travel distance to HIV provider, available weekly provider-hours, whether or not the clinic offered at least one ancillary service, and whether the provider offered Ryan White services. In addition, the two-way interaction between travel mode and availability of Ryan White services was retained in the final model. No other interaction terms between provider characteristics and travel mode were statistically significant.

Development of supply access equation

Table 6.2 shows the parameters estimates from the final, multivariable GEE model that were applied to the supply access equation. Because availability of Ryan White services varied in importance by mode of transit, two separate parameters were included in the supply access equation reflecting these differences.

Table 6.2. Parameter values used in supply access equation for travel by public transportation and car.

	Travel by car		Travel by public transit	
	Ln (Odds ratio)	**Odds ratio**	**Ln (Odds ratio)**	**Odds ratio**
Distance (natural log)	-0.3178	--	-0.3178	--
Available provider-hours (natural log)	0.8797	--	0.8797	--
At least one ancillary service available	--	2.2737	--	2.2737
Offers Ryan White CARE	--	1.1794	--	1.9020

The parameters from the Engage Study discrete choice model were used in the subsequent equation quantifying supply access for every ZCTA-provider pair in the study area as shown below:

$$a_{ij} = \left(\ln distance_{ij}\right)^{-0.3178}\left(ln\ provhrs_{ij}\right)^{0.8797}(2.2737 ancserv_{ij})(1.1794 RW_{ij}[1 - PT_{ij}])(1.9020 RW_{ij} PT_{ij})$$

where:

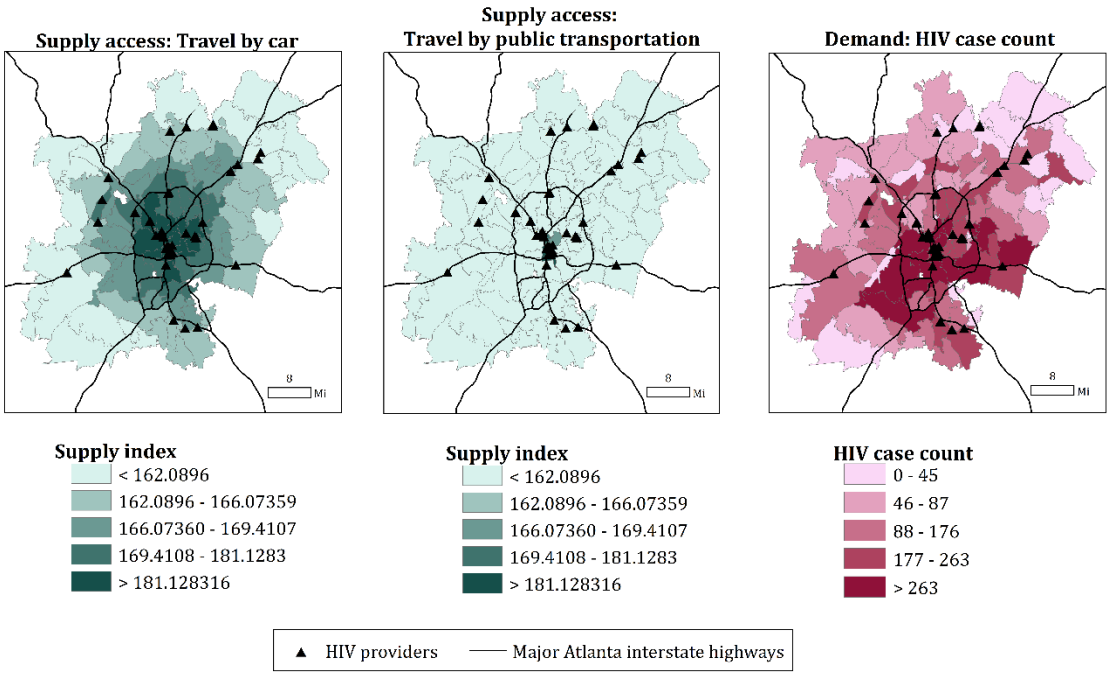
- i = ZCTA
- j = individual providers
- ln distance = natural log of the travel distance between each ZCTA centroid and provider j
- ln provhrs = natural log of the number of available provider-hours at provider j
- ancserv = whether provider j offers any ancillary services to patients (for full list, see modeling strategy)
- RW = whether or not provider j accepts Ryan White patients

Application of supply access equation

Study output 1: Computing population-based estimates of supply access by ZCTA

Computed supply access scores were higher in urban versus suburban and rural areas if traveling by car (Figure 6.3, left). Similar centric patterns were observed for supply access if traveling by public transportation, with lower overall scores (Figure 6.3, center). HIV cases are more concentrated in urban areas, with the highest quintiles of case counts in central, south, and parts of east Atlanta (Figure 6.3, right).

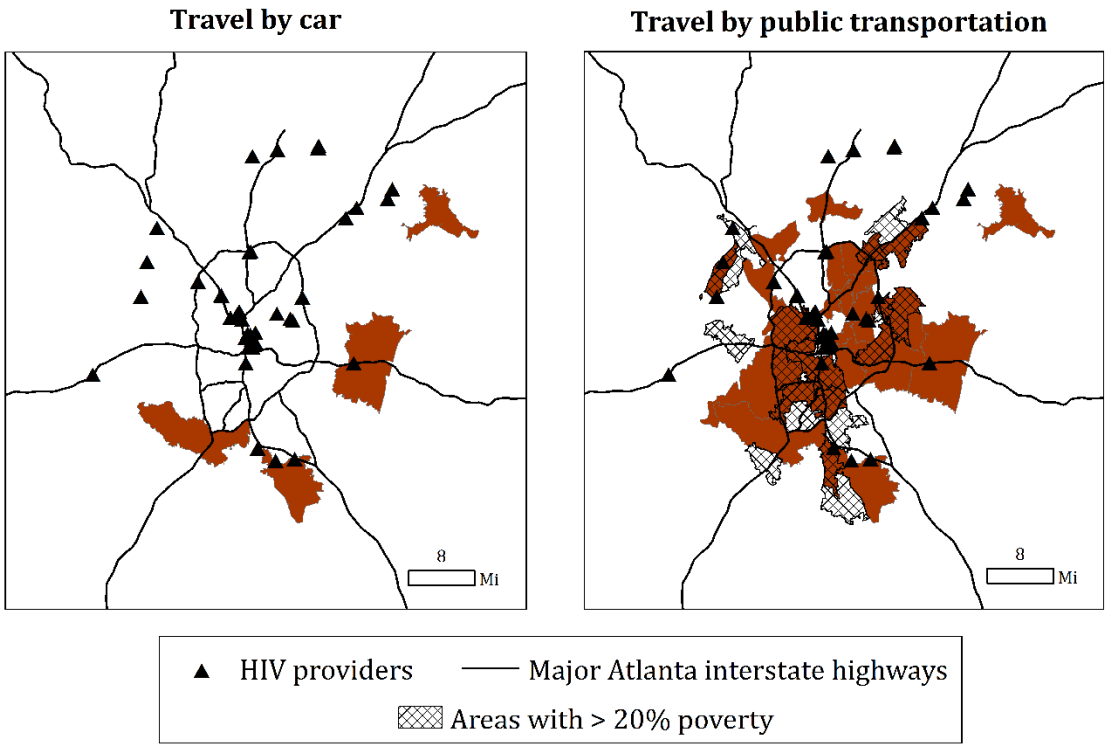
Figure 6.3. Supply access scores for travel by car (left) and by public transit (middle), and HIV case count (right), by ZCTA in the six county Atlanta area.



Study output 2: Identifying underserved areas

If traveling by car, few areas were identified as having low supply and high demand (Figure 6.4). Only an estimated 7.7% of HIV cases lived in these underserved areas. However, we observed more underserved areas in urban ZCTAs in south and east Atlanta if traveling by public transportation; an estimated 64.3% of HIV cases resided in these underserved areas. Approximately 38.9% of these areas coincided with high poverty ZCTAs (in which > 20% of the population are living in poverty).

Figure 6.4. Underserved areas, defined by ZCTAs with the two lowest quintiles of supply access and two highest quintiles of HIV case count, or demand) highlighted in maroon for travel by car (left) and travel by public transportation (right). The panel on the right also highlights areas of high poverty.



Discussion

Principal results

Identifying areas with poor spatial access to HIV medical services with respect to number of patients served may be helpful in addressing gaps in HIV care and improving important clinical outcomes in Atlanta. In this study, we developed a novel tool to (1) quantify access to HIV care services (supply) and (2) identify underserved areas, with respect to HIV case burden (demand), in the six county Atlanta area.

Based on results from the discrete choice model, travel distance, number of provider-hours, and availability of ancillary services were significant factors in choosing an HIV provider, but were similar in importance for both modes of transit. Whether or not Ryan White patients were accepted by a clinic was also a salient factor in choosing a provider. However, individuals who took public transportation were more likely to choose a provider that offered Ryan White services, compared to those who traveled by car to their appointments. We hypothesize this is because reliance on public transportation is associated with factors related to poverty, such as dependence on Ryan White service availability in surrounding clinics.

Access to public transportation has been shown to be strongly correlated with poverty [19]. In Atlanta, access to public transportation is greater in areas of high HIV prevalence, high poverty, and low household vehicle ownership [18, 20]. Further, nearly half of people living with HIV received Ryan White services, and of these, 88% had either no or public health insurance coverage [27]. If a large proportion of HIV-positive individuals in Atlanta rely on both public transportation and publicly-funded medical services, expanding Ryan White funding to other clinics in areas where services are needed may improve healthcare access to those who currently have fewer options for care. In addition, expanding ancillary services in clinics accepting Ryan White patients may be beneficial in improving engagement in HIV care [31].

Taking public transportation has been associated with greater overall commute times and increased number of modes of travel [32, 33], which can be an added inconvenience in accessing health services. Specifically, although most people live within five miles of driving distance from the nearest HIV provider in Atlanta, commute time associated with this distance is much higher if

public transportation is taken, decreasing overall spatial access (Appendix 1). One way to address these travel-related barriers to care might be to improve connectivity and frequency of available transit (1) between different clinic locations within a medical system highly accessed by HIV patients, in which primary and ancillary medical services are not co-located, and (2) in areas of high poverty and HIV prevalence, in which a large proportion of people living with HIV may rely on public transportation as a sole means for travel. Although rarely utilized to specifically deliver HIV care, implementing the use of mobile clinics may also help address travel-related barriers and improve spatial access to HIV medical services. Mobile clinics have been used to administer other types of medical care successfully in the United States [34, 35].

In addition, increasing overall HIV service availability in underserved areas would improve spatial access to HIV medical care in Atlanta. However, the capacity to build new clinics in areas of greater need may be limited by local funding. One more cost-effective way to increase service availability is by utilizing traveling medical teams which provide HIV care to different clinics throughout the week. This may be beneficial in rural areas with a lower density of available clinics and limited funding to hire full-time clinicians. Another cost-effective method of increasing service availability is by offering HIV medical care within structures of already existing clinics, particularly in those located in underserved areas.

The results from this study demonstrate how access to health services can have meaningful geographic variation without relying solely on spatial proximity (distance to clinic) as the reason. Mode of transit and poverty vary by neighborhood and contribute to the constraints on choice of providers. In particular, if access was characterized uniformly across Atlanta in this study, underserved areas for travel by public transportation, which otherwise had a sufficient supply environment if traveling by car, would not have been identified.

In this study, we used a methodologically novel approach to incorporate multiple dimensions of access into a single, comprehensive measure to assess the supply of HIV care services around Atlanta. We accounted for the fact that access may be defined based on varying sets of characteristics for different people. We expanded on work which defined access based solely on

spatial proximity to services, and highlighted potentially underserved areas in the city spatially, and by mode of transportation. The analytic methods employed in this analysis were novel, but demonstrated just one of many ways to conceptualize access based on previous frameworks and availability of data. This work should be seen as a jumping off point for others to improve on the modeling strategies utilized in this study so access to healthcare services can be further developed and refined.

Finally, it is important to consider potential interventions to improve spatial access to HIV care as the body of literature on this subject continues to grow. If the results presented can be corroborated in future studies, conducting cost-benefit analyses on implementing certain interventions, some of which are suggested in this paper, may be a key next step in addressing the mismatch between the healthcare system and HIV patients living in the Atlanta area.

Limitations

There are limitations in this study. There were many aspects of access which were not captured in the supply access scores described in this analysis, including quality of patient navigation systems for each clinic. Implementing patient navigation systems has been championed as a way to help patients steer through complexities of a healthcare system [36, 37], reduce barriers to care engagement, and improve retention in care over time [38]. Care-coordination programs are an essential part of addressing the mismatch between patient needs and availability of services, and should be incorporated in future measures of access.

We also did not consider including neighborhood contextual factors in the supply access measure. Although neighborhood contextual factors have been shown to be associated with health-seeking behaviors and outcomes [39-41], we assumed in this analysis that many of these factors should theoretically be addressed through components of the healthcare system. For example, having flexible payment options and offering travel vouchers may be helpful for low income individuals, and providing resources for substance abuse treatment could be beneficial for injection drug users navigating through the system.

Further, our HIV provider list may underrepresent smaller private practices treating HIV. We did not account for whether or not providers were taking new patients, so access could be

overrepresented. Discrete choice modeling assumed that patients considered all possible options available and chose a provider based on maximum utility. Also, the weights in the supply access equation may have been misspecified if choices made by participants from the Engage Study were not representative of all people living with HIV in Atlanta. Further, spatial access to care could not be evaluated for those not initiated in HIV care, as all Engage Study participants included in the analysis had to be linked care to receive HIV medical services in the area. HIV case counts used to identify underserved areas were based on ZCTA of diagnosis and not on current residence; patterns of mobility after diagnosis were therefore not captured in this analysis.

Last, the differences in supply access scores between the two modes of travel are highly sensitive to the estimate we used to transform scores for public transportation and may be biased towards the null. In Appendix C, we conducted a sensitivity analysis to explore potential consequences of using different values to calculate spatial access scores. However, future studies conceptualizing and quantifying access by travel mode should utilize more updated estimates describing the association between public transit use and care attendance.

Conclusion

Overall, supply access is greater in urban areas, then gradually decreases in suburban/rural areas further away from the city. Underserved areas were identified in urban areas in south, central, and east Atlanta if traveling by public transportation. Characterizing supply environment spatially, based on discrete choice modeling, and separately by mode of transportation taken to attend HIV medical visits may be useful in bridging mismatches between patient needs and service availability. The results from this analysis can serve as a framework to refine how access to healthcare is conceptualized.

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Chapter 7: Conclusion and future directions

In this chapter, we summarize significant findings from each of the four dissertation aims, present their contributions to the field, and discuss future directions in research.

Through the work of this dissertation, we quantified spatial access to HIV care in several different ways. The Engage Study was created to elucidate relationships between structural and psychosocial factors and HIV care access, which was used to address three out of four aims of this dissertation. The study was unique in that it collected data on important locations related to HIV, which allowed us to assess spatial access to medical services. Significant findings from the Engage Study have been presented orally at Emory University, the Centers for Disease Control and Prevention (CDC), The Hope Clinic, and other institutions. The data have also been used in an analysis conducted by Ryan Derni to meet Emory University Master of Public Health (MPH) thesis requirements.

Recently, there has been more focus on issues related to accessing HIV care, particularly spatial accessibility, in Atlanta and other cities in the US and Canada [1-4]. The work from this dissertation highlights the complexities of studying spatial access to HIV care in Atlanta, and has recently generated some interest within the research community. We have received several opportunities to present these results in the coming months, including in a CDC Turning Research Into Prevention (TRIP) seminar, during one of the Emory Center for AIDS Research Translational Research Interdisciplinary Group (TRIG) monthly meetings, and for the Georgia Department of Public Health HIV/AIDS Surveillance team.

Assessing usability of a novel map tool

Primary findings

Identifying locations related to one's physical and social environment is becoming increasingly relevant in understanding relationships with important health outcomes [5-8]. We assessed the usability of a Google map question embedded in a Web-based survey to determine whether it can serve as a valid and reliable alternative to geocoded address data. The map tool demonstrated

strong validity but varying reliability by recruitment mode in identifying key locations related to HIV, such as participant residence and last attended HIV provider.

Contributions to the field

As Internet-based questionnaires become a more popular form of data collection and neighborhood contextual factors become more pertinent in health research, these findings demonstrate that using the Google map tool in online surveys provides both a valid and less time-intensive method of identifying important health-related locations. This is especially relevant for locations for which address data may not be available or may be difficult to obtain, such as where an individual last sought medical care or had sex.

The results of this analysis were published in the *Journal of Medical Internet Research (JMIR) Research Protocols* in October 2014. Variations of the Google map tool have been used in other health surveys within the Emory University Programs, Research, and Innovation in Sexual Minority (PRISM) Health research group. For example, Sex Marks the Spot (NIH grant #: 1F31MH1073430-01), a project which seeks to understand how health- and risk-related daily activities affect HIV incidence, will utilize a variation of the map tool to determine several different locations for a sample of MSM in three US states. In addition, engage[men]t (NIH grant #: 1R01AI112723-01A1), which examines HIV care engagement among Atlanta-based men who have sex with men (MSM), and ele[men]t (NIH grant #: 1R01DA038196-01), which focuses on substance abuse and HIV/STI incidence among young black MSM, may also utilize the map tool to discern important health-related locations.

Examining the effect of commuting patterns on realized access

Primary findings

In this study, we investigated the effect of commuting patterns on rates of HIV care attendance. The study results show that using public transportation to attend appointments was associated with lower rates of HIV care attendance compared to using private transportation, but only in south Atlanta. Participants living in south Atlanta were more likely to have longer commute times, greater access to public transportation, and less household vehicle access. With longer

overall commute times associated with taking public transportation, travel-related barriers may be more prominent for people living with HIV in south Atlanta.

Contributions to the field

Travel-related barriers to HIV care have not been extensively explored, especially in Atlanta, where HIV prevalence is high [9]. Unlike many other studies, data from the Engage Study provided a unique opportunity to explore commuting patterns associated with attending HIV care visits in multiple ways. Although some previous studies have focused on travel distance [1, 10], commute time and mode of transit may be more important to measure in the context of travel-related barriers to HIV care in Atlanta.

Mode of travel may be of particular importance. Motivations for public transportation use may vary by city and even within Atlanta. Reliance on public transit in the absence of other means of travel is associated with markers of socioeconomic status (SES), such as poverty and low car ownership [11, 12]. Though ecologic, the study findings suggest potentially greater reliance on public transportation in south Atlanta, where HIV prevalence is higher [9, 13]. If the results from this analysis can be corroborated with larger studies in the future, improving local public transit and implementing the use of mobile clinics in south Atlanta could help address travel-related barriers to HIV care.

This work has been submitted to the *Journal of the International Association of Providers of AIDS Care* in January 2015.

Quantifying spatial access to major HIV providers in Atlanta, Georgia

Primary findings

In this study, we quantified spatial accessibility to HIV providers in Atlanta. There is a high density of HIV providers in downtown and midtown Atlanta, but overall, fewer options for care for people living with HIV in south Atlanta, where prevalence is high and more resources might be needed. Most areas are within 15 minutes of the nearest HIV provider by car; however, accessibility to the closest provider by public transportation is much lower, and dependent on access to public transportation in the city. Urban areas in south and southwest Atlanta have

fewer overall HIV care resources and poorer accessibility by public transit, which coincide with regions of high HIV prevalence, high poverty, and low household vehicle access.

Contributions to the field

No other study that we are aware of has used a comprehensive database of HIV providers to quantify spatial accessibility to resources in Atlanta. The results from this analysis identify underserved areas in urban south Atlanta, and may inform targeted intervention planning to improve spatial access to care. A manuscript presenting this work has been accepted to *AIDS Research and Human Retroviruses* in March 2015.

We combined validated information from several sources to compile the database of HIV care resources across the six county Atlanta area. This database was immensely useful in quantifying spatial access for this dissertation, but has also since been used in other work as well. For instance, these data are currently being used to analyze spatial patterns along the HIV care continuum in Atlanta as a part of an academic training grant (NIH grant #: 1K23AI116388-01A1). In addition, the provider database is also being used by MPH students, Neetu Hariharan and Brian Huylebroeck, in analyses conducted to meet Emory MPH thesis requirements.

Finally, we are in conversations with the CDC Georgia Care and Prevention in the United States (CAPUS) team and Southeast AIDS Training and Education Center (SEATEC) to update the resource lists they provide to people living with HIV in Atlanta to reflect the most current information.

Developing and applying an tool to identify underserved areas of access

Primary findings

In this study, we developed and applied a tool to quantify access to services (supply) and identify underserved areas with respect to HIV cases (demand), by mode of travel, in Atlanta. Supply of services was higher in urban versus suburban/rural areas for both travel modes, with lower overall scores if traveling by public transportation. Urban areas in south and east Atlanta may be underserved if traveling by public transportation. There is tremendous overlap between these underserved areas and regions of high poverty and HIV prevalence. If the model assumptions are

correct, nearly 64% of people living with HIV in Atlanta are living in underserved areas if traveling by public transportation.

Contributions to the field

Components defining access to healthcare may vary by neighborhood-level characteristics related to health. Conceptualizing access spatially and by travel mode may be useful in addressing mismatches between patient needs and service availability, and improving HIV care engagement and clinical outcomes. This study is the first of its kind to assess the supply of services around Atlanta by combining multiple dimensions of potential access into a single, comprehensive measure.

The work from this analysis expanded on the previous aim, in which we quantified spatial accessibility to services. By incorporating clinic-related characteristics into the measure, we were able to refine our assessment of spatial access and identify underserved areas based on added information about patient eligibility and other components pertaining to provider choice.

The analytic methods employed in this analysis were certainly unique, but demonstrated just one of many ways to conceptualize access based on previous frameworks and availability of data. This work should be seen as a starting point for others to improve the modeling strategies utilized in this study and continue to refine how we define access to HIV care. Future work confirming these results may help guide intervention planning on bridging the gap or mismatch between patient needs and HIV medical providers in Atlanta. The work from this analysis may be submitted as a manuscript to *Health and Place* in May 2015, but other journals will be considered for submission.

Future directions

In some ways, the Engage Study served as a pilot to further explore place-based barriers to HIV care in Atlanta. Preliminary data from this study were used to demonstrate feasibility in collecting HIV care engagement data in a grant application for a newly NIH-funded cohort study within the PRISM Health research group, engage[men]t. Engage[men]t was created to more extensively study factors driving racial disparities in HIV care engagement among black and white

MSM in Atlanta. The two year follow-up period of newly diagnosed HIV-positive individuals will enable researchers to treat important HIV outcomes, such as retention in care and viral suppression, as more dynamic measures than previously characterized in many other studies. Further, the follow-up period will allow for better understanding of the fluctuations in these measures over time that the Engage Study and CDC Medical Monitoring Project (MMP) have been unable to capture, due to their cross-sectional study design. Data elements from the Engage Study, including the Google map tool and some of the HIV care-related questions, will be considered during questionnaire development for engage[men]t.

Our comprehensive database of HIV providers should be reassessed and updated continuously in the future. With the ever-changing funding environment, Atlanta-based clinics will continue to change locations, expand, close, re-open, and merge with other institutions based on patient needs and costs to run the clinics. Although initially compiled for this dissertation, keeping the HIV provider database current will facilitate linkage to care in Atlanta, and aid in future assessments of spatial access to HIV medical resources, so that targeted intervention planning reflects the most accurate information.

As researchers continue to shed light on the importance of spatial accessibility to resources in HIV care engagement, travel-related barriers to care should be explored in other cities bearing high HIV prevalence. For example, local MMP sites that collect participant address data can examine spatial access to care, given the sample of participating providers represents a majority of available providers in the catchment area. The Philadelphia MMP team has already begun exploring some aspects of spatial accessibility [1, 2].

Finally, as research continues to grow in this field and we gain a better understanding of the underlying issues predisposing spatial differences in access to HIV care, we must consider how to apply generalized knowledge to implement cost-effective interventions. If future studies examining access to care support the results of this dissertation, potential ways of addressing the mismatch between patient needs and service availability include:

- Sharing results with the Atlanta Regional Commission and Metropolitan Atlanta Regional Transit Authority, the local public transit system, expressing the need to expand public transportation options (both connectivity and frequency of available transit):
    - Between different clinics or locations within a medical practice or hospital system (e.g. Ponce Clinic and Grady Hospital) for patients seeking primary and ancillary medical services not currently co-located
    - In areas of high poverty and HIV prevalence, in which a large proportion of people living with HIV may rely on public transportation as a sole means for travel
- Utilizing mobile clinics to administer basic HIV care in underserved areas, particularly in areas of low car ownership
- In resource-limited settings, having a traveling medical team visit local clinics based on patient load during the week (Note: This is already being implemented in rural areas of Georgia)
- Considering expanding Ryan White coverage to clinics not currently serving Ryan White clients, but are proximal to a large population of patients eligible for these services
- Redistributing HIV care services from overserved to underserved areas
- Adding HIV services to already existing medical practices or hospitals which currently do not serve HIV patients (i.e. building on an already existing infrastructure)
- Building clinics in underserved areas

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Appendix A: The Engage Study questionnaire

the engage study

The Engage Study

Welcome!

Page exit logic: New Page Logic Action **IF:** Edit link jump is exactly equal to "true" **THEN:** Jump to page 39 - Number of care facilities

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Eligibility Screener

What was your sex at birth?*

( ) Male

( ) Female

Have you ever had sex with a male?*

( ) Yes

( ) No

Have you ever been told you are HIV-positive?*

( ) Yes

( ) No

Do you currently live in Atlanta or the surrounding area?*

( ) Yes

( ) No

Please enter your age in years.*

_____

---

eligibility pass

Eligible participants

Consent to be a Research Subject

Page exit logic: New Page Logic Action**IF:** Question "**Consent**
Please check the box below if you agree to be in the study. Please print a copy of this form for your records.

If you agree to the above information and would like to be in this study, please click on "I agree" below." #6 is not exactly equal to ("I agree. I have read the information above and I want to be in this study.") **THEN:** Disqualify and display: "By not clicking on "I agree," you have decided not to participate in this study. If you have any questions about the study or have reached this message in error, feel free to contact us at engage@emory.edu or 404-727-2038. Thank you so much for your interest!"

Consent
Please check the box below if you agree to be in the study. Please print a copy of this form for your records.

If you agree to the above information and would like to be in this study, please click on "I agree" below.

( ) I agree. I have read the information above and I want to be in this study.

( ) I do not agree to participate in the study.

Welcome to the Survey!

Residential Information

Have you moved since the last time you took a survey with [invite("custom 2")]? *

( ) Yes

( ) No

( ) I don't remember what information I gave in the survey

Logic: Show/hide trigger exists.

Do you rent, own, or stay at the place you slept last night?

( ) Rent

( ) Own

( ) Stay for nightly or monthly rate

( ) Stay for free

( ) Don't know

How long have you lived or stayed at the place you rest at night?

( ) Less than one year

( ) 1-3 years

( ) 4-6 years

( ) 7-10 years

( ) More than 10 years

Logic: Dynamically shown if "Do you rent, own, or stay at the place you slept last night?" = Stay for nightly or monthly rate or "Do you rent, own, or stay at the place you slept last night?" = Stay for free or "Do you rent, own, or stay at the place you slept last night?" = Don't know

Are you currently homeless? By homeless, we mean living on the street, in a shelter, a Single Room Occupancy hotel (SRO), temporarily staying with friends or relatives, or living in a car.

( ) Yes

( ) No

New address

Please provide your address of where you currently live or stay at night. Do not worry -- the information you give us will be kept confidential. We will not give anyone else your address and we will not send you anything in the mail.

Street Address: _____

Apt/Suite/Office: _____

City: _____

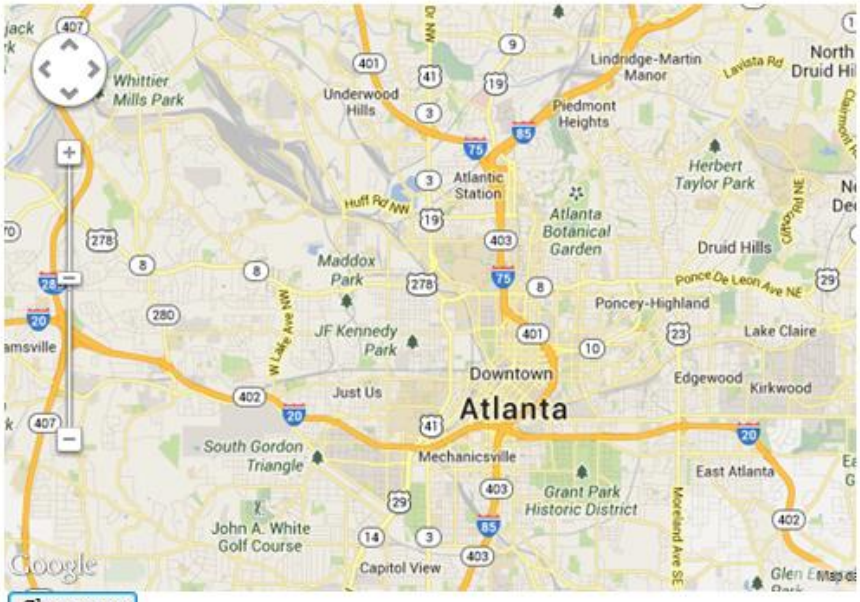
State: _____

ZCTA: _____

Page entry logic: This page will show when: (Question "**Are you currently homeless? By homeless, we mean living on the street, in a shelter, a Single Room Occupancy hotel (SRO), temporarily staying with friends or relatives, or living in a car.**" #10 is exactly equal to ("No") OR Question "**Are you currently homeless? By homeless, we mean living on the street, in a shelter, a Single Room Occupancy hotel (SRO), temporarily staying with friends or relatives, or living in a car.**" #10)

Permanent Residential Location

Feel free to zoom in and out of the map as you need to. If you need to start over and re-enter the location of where you currently live, DO NOT PRESS BACK on your browser. Just press "CLEAR MAP" at the bottom left-hand corner of the map, then click on the appropriate place on the map.

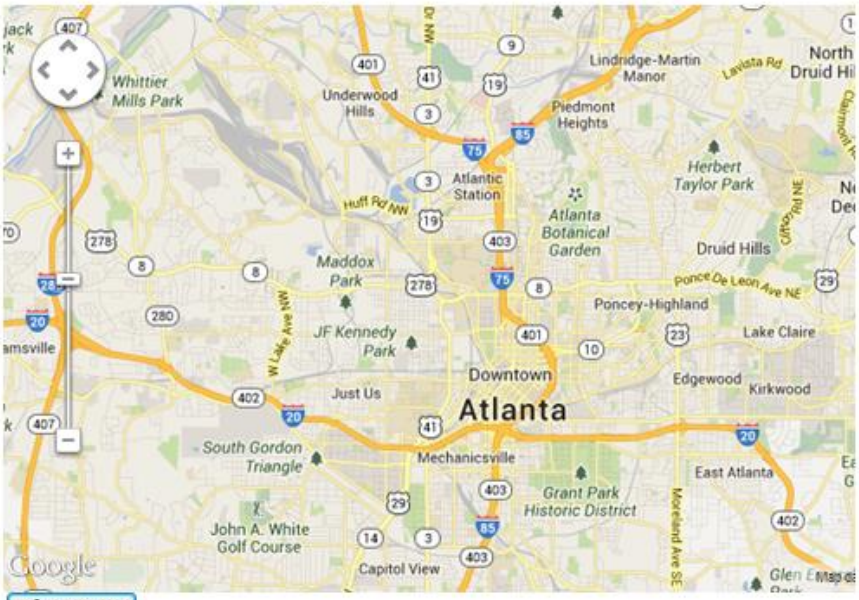


Clear map

Page entry logic: This page will show when: Question "**Are you currently homeless? By homeless, we mean living on the street, in a shelter, a Single Room Occupancy hotel (SRO), temporarily staying with friends or relatives, or living in a car.**" #10 is exactly equal to ("Yes")

Homeless Location

Feel free to zoom in and out of the map as you need to. If you need to start over and re-enter the location of where you currently live, DO NOT PRESS BACK on your browser. Just press "CLEAR MAP" at the bottom left-hand corner of the map, then click on the appropriate place on the map.



Clear map

Employment

Are you currently employed?

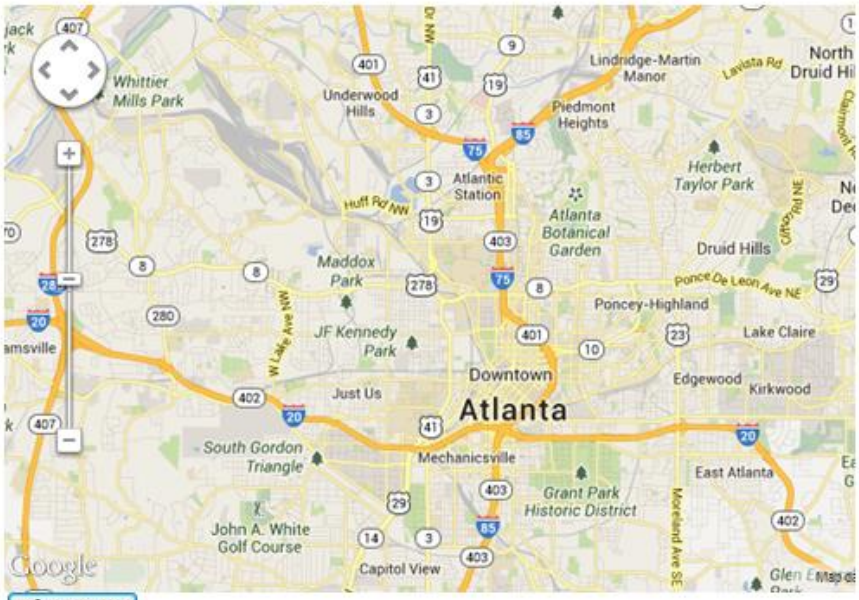
( ) Yes

( ) No

Page entry logic: This page will show when: Question "**Are you currently employed?**" #12 is exactly equal to ("Yes")

Employment Map

Feel free to zoom in and out of the map as you need to. If you need to start over and re-enter the location of where you currently live, DO NOT PRESS BACK on your browser. Just press "CLEAR MAP" at the bottom left-hand corner of the map, then click on the appropriate place on the map.



Clear map

Income

What was your household income last year from all sources before taxes?

(monthly / yearly)

( ) 0 to $417 (monthly) / 0 to $4,999 (yearly)

( ) $418 to $833 (monthly) / $5,000 to $9,999 (yearly)

( ) $834 to $1250 (monthly) / $10,000 to $14,999 (yearly)

( ) $1251 to $1667 (monthly) / $15,000 to $19,999 (yearly)

( ) $1668 to $2500 (monthly) / $20,000 to $29,999 (yearly)

( ) $2501 to $3333 (monthly) / $30,000 to $39,999 (yearly)

( ) $3334 to $4167 (monthly) / $40,000 to $49,999 (yearly)

( ) $4168 to $6250 (monthly) / $50,000 to $74,999 (yearly)

( ) $6251 or more (monthly) / $75,000 or more (yearly)

( ) Don't know

Including yourself, how many people depended on this income? (must be at least 1)

_____

Health Insurance

Logic: Show/hide trigger exists.

Do you currently have health insurance or coverage? (This includes Medicare or Medicaid)

( ) Yes

( ) No

Logic: Dynamically shown if "Do you currently have health insurance or coverage? (This includes Medicare or Medicaid)" = Yes

What kind of health insurance or coverage do you currently have? Check all that apply.

[ ] Private health insurance or HMO

[ ] Medicaid

[ ] Medicare

[ ] Ryan White

[ ] TRICARE (CHAMPUS)

[ ] Veterans Administration Coverage

[ ] Some other insurance, please specify::

_____

[ ] Don't know

Smoking

Logic: Show/hide trigger exists.

Have you smoked at least 100 cigarettes in your entire life?

( ) Yes

( ) No

( ) Don't know

Logic: Show/hide trigger exists. Dynamically shown if "Have you smoked at least 100 cigarettes in your entire life?" = Yes

Do you now smoke cigarettes every day, some days, or not at all?

( ) Every day

( ) Some days

( ) Not at all

( ) Don't know

Logic: Dynamically shown if "Do you now smoke cigarettes every day, some days, or not at all?" = Every day or "Do you now smoke cigarettes every day, some days, or not at all?" = Some days

You mentioned in a previous question that you are HIV-positive. Did you smoke before learning you were HIV-positive?

( ) Yes, I smoked before I learned I was HIV-positive

( ) No, I started smoking after I learned I was HIV-positive

( ) Don't know

Logic: Dynamically shown if "Do you now smoke cigarettes every day, some days, or not at all?" = Every day or "Do you now smoke cigarettes every day, some days, or not at all?" = Some days

Do you want to stop smoking cigarettes?

( ) Yes

( ) No

( ) Don't know

Relationship Status

Logic: Show/hide trigger exists.

Have you had sex with anyone in the past 12 months?

( ) Yes

( ) No

Logic: Dynamically shown if "Have you had sex with anyone in the past 12 months?" = Yes

In the past 12 months, have you had sex with a (check all that apply):

[ ] Man

[ ] Woman

[ ] Transgender: male to female

[ ] Transgender: female to male

Logic: Show/hide trigger exists. Dynamically shown if "Have you had sex with anyone in the past 12 months?" = Yes

Are you currently in at least one sexual relationship? (This could mean with a main or casual partner)

( ) Yes

( ) No

Logic: Show/hide trigger exists. Dynamically shown if "Are you currently in at least one sexual relationship? (This could mean with a main or casual partner)" = Yes

Are you currently having sex with someone you feel or felt committed to above all others (someone you might call your boyfriend/girlfriend, significant other, life partner, or husband/wife)?

( ) Yes

( ) No

Logic: Dynamically shown if "Are you currently having sex with someone you feel or felt committed to above all others (someone you might call your boyfriend/girlfriend, significant other, life partner, or husband/wife)?" = Yes

Thinking about the person you are currently having sex with, is this person a man or a woman?

( ) Man

( ) Woman

( ) Transgender

( ) Other, please specify:: _____

HIV diagnosis

Logic: Show/hide trigger exists.

You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?

( ) Don't remember

( ) 2013

( ) 2012

( ) 2011

( ) 2010

( ) 2009

( ) 2008

( ) 2007

( ) 2006

( ) 2005

( ) 2004

( ) 2003

( ) 2002

( ) 2001

( ) 2000

( ) 1999

( ) 1998

( ) 1997

( ) 1996

( ) 1995

( ) before 1995

Logic: Dynamically shown if "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 2013 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 2012 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are

HIV-positive?" = 2011 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 2010 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 2009 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 2008 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 2007 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 2006 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 2005 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 2004 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 2003 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 2002 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 2001 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 2000 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 1999 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 1998 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 1997 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 1996 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = 1995 or "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" = before 1995

In what month of this year did you first find out that you are HIV-positive?

( ) Don't remember

( ) January

( ) February

( ) March

( ) April

( ) May

( ) June

( ) July

( ) August

( ) September

( ) October

( ) November

( ) December

HIV diagnosis custom scripting

Page entry logic: This page will show when: (((Question "**You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?**" #25 is exactly equal to ("Don't remember") OR Question "**In what month of this year did you first find out that you are HIV-positive?**" #26 is exactly equal to ("Don't remember")) OR Question "**You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?**" #25) OR Question "**In what month of this year did you first find out that you are HIV-positive?**" #26)

HIV Diagnosis -- Approximation

Logic: Hidden unless: (Question "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" #25 is exactly equal to ("Don't remember") OR Question "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" #25)

That's okay that you don't remember the exact year. Can you remember about how many years ago you first found out you are HIV-positive?

( ) Less than a year ago

( ) 1-2 years ago

( ) 2-5 years ago

( ) 5-10 years ago

( ) More than 10 years ago

Logic: Hidden unless: (Question "In what month of this year did you first find out that you are HIV-positive?" #26 is exactly equal to ("Don't remember") OR (Question "You mentioned earlier in the survey that you are HIV-positive. In what year did you first find out that you are HIV-positive?" #25 is one of the following answers ("2012","2011","2010","2009","2008","2007","2006","2005","2004","2003","2002","2001","2000","1999","1998","1997","1996","1995","before 1995") AND Question "In what month of this year did you first find out that you are HIV-positive?" #26))

It's okay that you don't remember the exact month you first found out you are HIV-positive.

Think back to the time in [question("value"), id="575"] when you first found out you are HIV-positive. Do you remember finding out you are HIV-positive around a certain time of year? Maybe

you can remember if it was warm outside or if it was after a trip you took.

Based on what you can remember, try to select a time of year in [question("value"), id="575"] when you first found out about your diagnosis.

( ) January - March

( ) April - June

( ) July - September

( ) October - December

( ) Don't know when during the year

HIV Ever Care

Logic: Show/hide trigger exists.

Have you ever gotten care for HIV (this includes getting blood tests, seeing a doctor about HIV-related symptoms, etc.)?*

( ) Yes

( ) No

Page exit logic: New Page Logic Action**IF:** Question "**Have you ever gotten care for HIV (this includes getting blood tests, seeing a doctor about HIV-related symptoms, etc.)?**" #29 is exactly equal to ("No") **THEN:** Jump to page 24 - NIC Reasons

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HIV Linkage

Logic: Show/hide trigger exists. Dynamically shown if "Have you ever gotten care for HIV (this includes getting blood tests, seeing a doctor about HIV-related symptoms, etc.)?" = Yes

What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?

( ) Don't remember

( ) 2013

( ) 2012

( ) 2011

( ) 2010

( ) 2009

( ) 2008

( ) 2007

( ) 2006

( ) 2005

( ) 2004

( ) 2003

( ) 2002

( ) 2001

( ) 2000

( ) 1999

( ) 1998

( ) 1997

( ) 1996

( ) 1995

( ) Before 1995

Logic: Dynamically shown if "Have you ever gotten care for HIV (this includes getting blood tests, seeing a doctor about HIV-related symptoms, etc.)?" = Yes or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 2013 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 2012 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 2011 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 2010 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 2009 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 2008 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 2007 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 2006 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 2005 or "What year did you first see a doctor, nurse, or other health care worker for HIV

medical care after you learned you are HIV-positive?" = 2004 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 2003 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 2002 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 2001 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 2000 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 1999 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 1998 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 1997 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 1996 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = 1995 or "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" = Before 1995

What month of this year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?

( ) Don't remember

( ) January

( ) February

( ) March

( ) April

( ) May

( ) June

( ) July

( ) August

( ) September

( ) October

( ) November

( ) December

First care date custom script

Page entry logic: This page will show when: (((Question "**What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?**" #30 is exactly equal to ("Don't remember") OR Question "**What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?**" #30) OR Question "**What month of this year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?**" #31 is exactly equal to ("Don't remember")) OR Question "**What month of this year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?**" #31)

HIV Linkage -- Approximation

Logic: Hidden unless: (Question "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" #30 is exactly equal to ("Don't remember") OR Question "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" #30)

That's okay if you don't remember the exact year you first got care. Can you remember about how many years ago you first went to get HIV medical care after testing positive for HIV?

( ) Less than 1 year ago

( ) 1 to 2 years ago

( ) 2 to 5 years ago

( ) 5 to 10 years ago

( ) More than 10 years ago

Logic: Hidden unless: (Question "What month of this year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" #31 is exactly equal to ("Don't remember") OR (Question "What year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" #30 is one of the following answers ("2012","2011","2010","2009","2008","2007","2006","2005","2004","2003","2002","2001","2000","1999","1998","1997","1996","1995","Before 1995") AND Question "What month of this year did you first see a doctor, nurse, or other health care worker for HIV medical care after you learned you are HIV-positive?" #31))

It's okay if you don't remember the exact month you first got care.

Think back to the time in [question("value"), id="669"] when you first got HIV medical care. Do you remember going to your first visit around a certain time of year? Maybe you can remember if it was warm outside or if it was after a trip you took.

Based on what you can remember, try to select a time of year in [question("value"), id="669"] when you first got HIV medical care.

( ) January - March

( ) April - June

( ) July - September

( ) October - December

( ) Don't know when during the year

Page entry logic: This page will show when: Question "**Have you ever gotten care for HIV (this includes getting blood tests, seeing a doctor about HIV-related symptoms, etc.)?**" #29 is exactly equal to ("No")

NIC Reasons

Logic: Dynamically shown if "Have you ever gotten care for HIV (this includes getting blood tests, seeing a doctor about HIV-related symptoms, etc.)?" = No

What are reasons that you have NOT gotten care for HIV? Check all that apply.

[ ] I just got diagnosed and haven't had time to get care

[ ] My health insurance does not cover HIV care services so I can't afford a usual source of care

[ ] I don't have health insurance and can't afford a usual source of care

[ ] I don't know where to find regular HIV care

[ ] I can't get a regular appointment anywhere

[ ] There are no HIV doctors in my area

[ ] I am afraid doctors will treat me differently because I have had sex with men

[ ] I am afraid doctors will treat me differently because I have HIV

[ ] I don't think it was necessary to get care for HIV

[ ] I thought it was necessary, but never tried to get HIV care

[ ] It would be difficult to take time off of work to get HIV care

[ ] I don't want to think about my HIV status

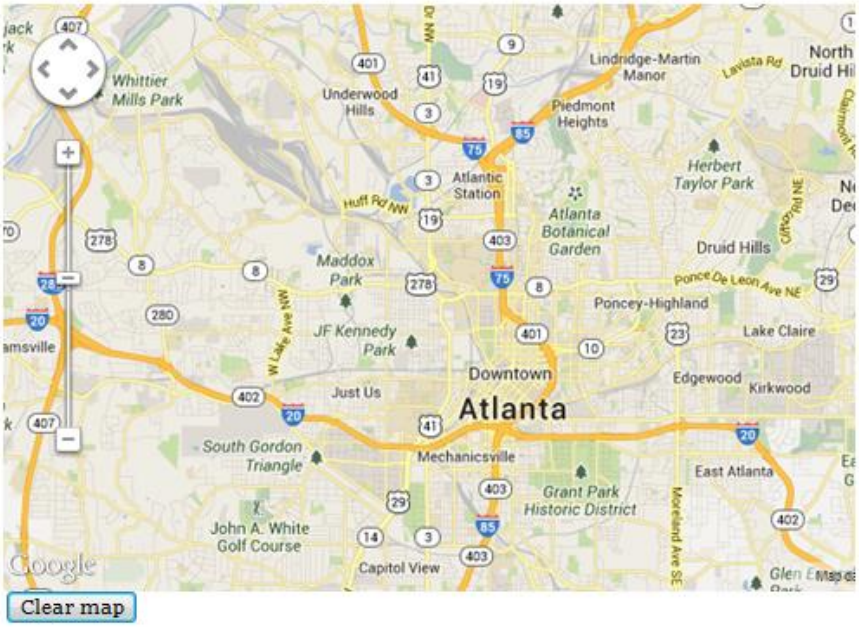
[ ] I don't want anyone to know about my HIV status

[ ] Other reason, please specify::
_____

Page entry logic: This page will show when: Question "**Have you ever gotten care for HIV (this includes getting blood tests, seeing a doctor about HIV-related symptoms, etc.)?**" #29 is exactly equal to ("No")

Ideal HIV Care Location

Feel free to zoom in and out of the map as you need to. If you need to start over and re-enter the location of where you currently live, DO NOT PRESS BACK on your browser. Just press "CLEAR MAP" at the bottom left-hand corner of the map, then click on the appropriate place on the map.



Page exit logic: New Page Logic Action**IF:** Question "**Have you ever gotten care for HIV (this includes getting blood tests, seeing a doctor about HIV-related symptoms, etc.)?**" #29 is exactly equal to ("No") **THEN:** Jump to page 106 - Community Perceptions of HIV

HIV Care Services Needed -- Past 12 Months

Which of the services below do you feel that you have <u>needed</u> in the past 12 months (including the services you have received)? Check all that apply.

[ ] Regular blood tests to get CD4 counts and viral loads

[ ] HIV medication prescription and pick-up

[ ] HIV care management services

[ ] Individual counseling about how to prevent the spread of HIV

[ ] Couples' counseling about how to prevent the spread of HIV

[ ] Medicine through the AIDS Drug Assistance Program (ADAP)

[ ] Public benefits including the Supplemental Security Income (SSI) or Social Security Disability Insurance (SSDI)

[ ] Professional help remembering to take your HIV medicines on time

[ ] Dental care

[ ] Help with transportation to get to appointments

[ ] Home health services (like in-home nursing care, hospice care)

[ ] Mental health services

[ ] HIV peer group support

[ ] Drug or alcohol counseling or treatment

[ ] Link to social services (like for domestic violence, shelter or housing, meals, childcare, and interpreter services)

[ ] Other, please specify:: _____

Page entry logic: This page will show when: Question "**Which of the services below do you feel that you have <u>needed</u> in the past 12 months (including the services you have received)? Check all that apply.**" #35

HIV Care Services Accessed -- Past 12 Months

Out of the HIV services you have needed, which ones have you <u>received</u> in the past 12 months? Check all that apply.

[ ] None of these

HIV services custom script

Ancillary HIV Care Services Received

Now we are going to ask you about OTHER services that might be related to HIV. <u>In the past 12 months</u>, have you received any of the following? Check all that apply.

[ ] HIV peer support group meetings or events

[ ] Domestic violence services

[ ] Shelter or housing services

[ ] Meal or food services

[ ] Childcare services

[ ] Mental health counseling

[ ] Drug or alcohol counseling

[ ] Other, please specify:: _____

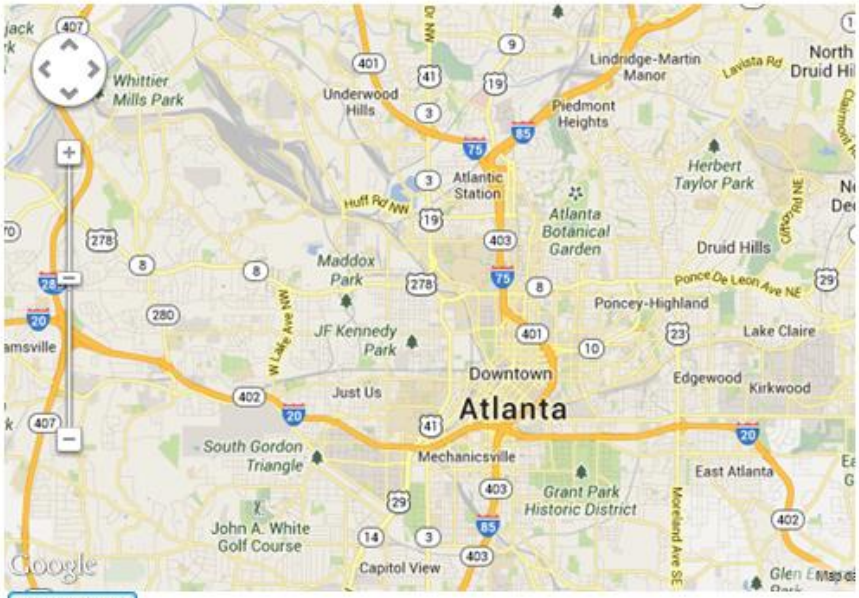
Ancillary HIV Care Services Received (Most Recent)

Out of these services that you received in the <u>past 12 months</u>, which did you most recently get?

Page entry logic: This page will show when: Question "**Now we are going to ask you about OTHER services that might be related to HIV. <u>In the past 12 months</u>, have you received any of the following? Check all that apply.** " #37

HIV Ancillary Service Map

Feel free to zoom in and out of the map as you need to. If you need to start over and re-enter the location of where you currently live, DO NOT PRESS BACK on your browser. Just press "CLEAR MAP" at the bottom left-hand corner of the map, then click on the appropriate place on the map.



Clear map

CD4 test - ever

Have you ever had a CD4 test done?

( ) Yes

( ) No

( ) Don't know

Page entry logic: This page will show when: Question "**Have you ever had a CD4 test done?**" #39 is exactly equal to ("Yes")

HIV Clinical Information - CD4 counts

How many CD4 tests have you gotten in the last 12 months?

( ) Don't know

( ) 0

( ) 1

( ) 2

( ) 3

( ) 4

( ) 5

( ) More than 5

What month and year did you get your last CD4 test?

Month

( ) Don't remember

( ) January

( ) February

( ) March

( ) April

( ) May

( ) June

( ) July

( ) August

( ) September

( ) October

( ) November

( ) December

Year

( ) Don't remember

( ) 2013

( ) 2012

( ) 2011

( ) 2010

( ) 2009

( ) 2008

( ) 2007

( ) 2006

( ) 2005

( ) 2004

( ) 2003

( ) 2002

( ) 2001

( ) 2000

( ) 1999

( ) 1998

( ) 1997

( ) 1996

( ) 1995

( ) Before 1995

What was the result of your most recent CD4 count?

( ) 0-49

( ) 50-99

( ) 100-199

( ) 200-349

( ) 350-499

( ) 500 or more

( ) Don't know

CD4 counts check custom script

VL test ever

Have you ever had a viral load test done?

( ) Yes

( ) No

( ) Don't know

Page entry logic: This page will show when: Question "**Have you ever had a viral load test done?**" #43 is exactly equal to ("Yes")

HIV Clinical Information - Viral Loads

How many viral load tests have you had in the last 12 months?

( ) Don't know

( ) 0

( ) 1

( ) 2

( ) 3

( ) 4

( ) 5

( ) More than 5

What month and year did you get your last viral load test?

Month

( ) Don't remember

( ) January

( ) February

( ) March

( ) April

( ) May

( ) June

( ) July

( ) August

( ) September

( ) October

( ) November

( ) December

Year

( ) Don't remember

( ) 2013

( ) 2012

( ) 2011

( ) 2010

( ) 2009

( ) 2008

( ) 2007

( ) 2006

( ) 2005

( ) 2004

( ) 2003

( ) 2002

( ) 2001

( ) 2000

( ) 1999

( ) 1998

( ) 1997

( ) 1996

( ) 1995

( ) Before 1995

What was the result of your last viral load test?

( ) Below the level of detection, undetectable

( ) Detectable but less than 5,000 viral copies/mL

( ) 5,000 to 100,000 viral copies/mL

( ) Greater than 100,000 viral copies/mL

( ) Don't know

Viral Loads Check Custom Script

Number of care facilities

IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?*

( ) Haven't gotten HIV care in the past year

( ) 1 place

( ) 2 places

( ) 3 places

( ) 4 places

( ) 5 places

( ) More than 5 places

HIV Care Location Custom Script

HIV Care Locations - Region ID

Think about the last [question("value"), id="813"] you have gotten HIV care. In which of the following general areas did you get medical care? Check all that apply.

If you think you might have gotten care in a certain region in Georgia but aren't certain, go ahead and choose it anyway.*

[ ] Atlanta/North Central Georgia (Atlanta, Athens)

[ ] North Georgia (Dalton, Rome, Gainesville)

[ ] South Georgia (Albany, Valdosta, Savannah)

[ ] Central Georgia (Columbus, Macon, Augusta, Dublin)

[ ] I got care outside Georgia

Outside Georgia Custom Scripting Error

HIV Care Location Identification

Logic: Hidden unless: Question "Think about the last [question("value"), id="813"] you have gotten HIV care. In which of the following general areas did you get medical care? Check all that apply.

If you think you might have gotten care in a certain region in Georgia but aren't certain, go ahead and choose it anyway." #48 is one of the following answers ("Atlanta/North Central Georgia (Atlanta, Athens)")

ATLANTA/NORTH CENTRAL GEORGIA (ATLANTA, ATHENS)

[ ] AbsoluteCARE Medical Center and Pharmacy, Atlanta

[ ] AID Atlanta, Atlanta

[ ] AID Gwinnett, Duluth

[ ] AIDS Research Consortium of Atlanta (ARCA), Atlanta

[ ] Clayton County Health Department, Jonesboro

[ ] Cobb-Douglas County Health Services Clinic, Marietta

[ ] Regional Health Center of College Park, Atlanta

[ ] Cobb County Health Department, Acworth

[ ] Douglas County Health Department, Douglasville

[ ] Dekalb County Central Health Center, Atlanta

[ ] Emory University Hospital at Midtown, Atlanta

[ ] Fulton County Aldredge Health Center, Atlanta

[ ] Grady Infectious Disease Program, Atlanta

[ ] Haven of Hope, Newnan

[ ] Fulton County Department of Health HIV Primary Care Clinic, Atlanta

[ ] Hope Clinic, Emory University, Decatur

[ ] Marietta Community Health Center (Cobb County Health), Marietta

[ ] St. Joseph's Mercy Clinic, Decatur St, Atlanta

[ ] St. Joseph's Mercy Clinic, Buford Highway, Atlanta

[ ] St. Joseph's Mercy Clinic, Edgewood Avenue, Atlanta

[ ] Morehouse School of Medicine, Infectious Disease Program, Atlanta

[ ] Ryan White Early Care Clinic, Decatur

[ ] Specialty Care Clinic, Athens

[ ] The Shepherd's Inn, Atlanta

[ ] Atlanta Veteran Affairs (VA) Medical Center, Atlanta

[ ] Atlanta Medical Center, Atlanta

[ ] Dekalb Medical Center, Atlanta

[ ] Northside Hospital, Atlanta

[ ] Piedmont Hospital, Atlanta

[ ] Kindred Hospital, Atlanta

Logic: Hidden unless: Question "Think about the last [question("value"), id="813"] you have gotten HIV care. In which of the following general areas did you get medical care? Check all that apply.

If you think you might have gotten care in a certain region in Georgia but aren't certain, go ahead and choose it anyway." #48 is one of the following answers ("North Georgia (Dalton, Rome, Gainesville)")

NORTH GEORGIA (DALTON, ROME, GAINESVILLE)

[ ] Cherokee County Health Department, Canton

[ ] Cherokee County Health Department, Woodstock

[ ] Clarke County Specialty Care Clinic, Athens

[ ] Fannin County Health Department, Blue Ridge

[ ] Hall County Health Department, Gainesville

[ ] Specialty Care Clinic - Northwest Georgia Public Health, Rome

[ ] The Living Bridge Center, Whitfield County Health Department, Dalton

Logic: Hidden unless: Question "Think about the last [question("value"), id="813"] you have gotten HIV care. In which of the following general areas did you get medical care? Check all that apply.

If you think you might have gotten care in a certain region in Georgia but aren't certain, go ahead and choose it anyway." #48 is one of the following answers ("South Georgia (Albany, Valdosta, Savannah)")

SOUTH GEORGIA (ALBANY, VALDOSTA, SAVANNAH)

[ ] Adult Health Promotion Clinic, Valdosta

[ ] Albany Area Primary Health: Rural Clinic, Albany

[ ] Dougherty County Health Department, Albany

[ ] Bulloch County Wellness Clinic, Statesboro

[ ] Chatham County CARE Center, Savannah

[ ] Wellness Center of Coffee County, Douglas

[ ] Glynn County CARE Center, Brunswick

[ ] Liberty County CARE Center, Hinesville

[ ] Southeast Health Unit, Waycross

[ ] Adult Health Promotion Clinic (Tift County), Valdosta

[ ] Ware County Wellness Center, Waycross

[ ] Wayne County Wellness Center, Jesup

Logic: Hidden unless: Question "Think about the last [question("value"), id="813"] you have gotten HIV care. In which of the following general areas did you get medical care? Check all that apply.

If you think you might have gotten care in a certain region in Georgia but aren't certain, go ahead and choose it anyway." #48 is one of the following answers ("Central Georgia (Columbus, Macon, Augusta, Dublin)")

CENTRAL GEORGIA (COLUMBUS, MACON, AUGUSTA, DUBLIN)

[ ] Muscogee County Health Department, LaGrange

[ ] Sumter County Health Department, Americus

[ ] Columbus Department of Public Health, Columbus

[ ] Crisp County Health Department, Cordele

[ ] Richmond County Health Department, HIV Outpatient Services, Augusta

[ ] South Central Health District, Dublin (Laurens County Health Department Ryan White Program)

[ ] The HOPE Center, Macon

[ ] Toombs County Wellness Center, Lyons

Logic: Show/hide trigger exists.

OTHER (PLEASE CHECK ANY OF THE PLACES YOU MAY HAVE GONE TO THAT WERE NOT LISTED ABOVE):

[ ] One or more emergency departments in Georgia

[ ] One or more private doctors, clinics, or hospitals (not emergency department) in Georgia

[ ] One or more prison clinics in Georgia

Verifying number of care facilities custom script

Page entry logic: This page will show when: radio

Introduction to HIV Care Locations (Other)

Logic: Hidden unless: Question "Think about the last [question("value"), id="813"] you have gotten HIV care. In which of the following general areas did you get medical care? Check all that apply.

If you think you might have gotten care in a certain region in Georgia but aren't certain, go ahead and choose it anyway." #48 is one of the following answers ("I got care outside Georgia") Dynamically shown if "OTHER (PLEASE CHECK ANY OF THE PLACES YOU MAY HAVE GONE TO THAT WERE NOT LISTED ABOVE):" = One or more emergency departments in Georgia or "OTHER (PLEASE CHECK ANY OF THE PLACES YOU MAY HAVE GONE TO THAT WERE NOT LISTED ABOVE):" = One or more private doctors, clinics, or hospitals (not emergency department) in Georgia or "OTHER (PLEASE CHECK ANY OF THE PLACES YOU MAY HAVE GONE TO THAT WERE NOT LISTED ABOVE):" = One or more prison clinics in Georgia

You mentioned that you went to another clinic or hospital outside of Georgia for HIV care.

Out of the [question("value"), id="801"] places you went to in the last 12 months, how many were clinics or hospitals outside Georgia?*

( ) 1

( ) 2

Logic: Hidden unless: Question "OTHER (PLEASE CHECK ANY OF THE PLACES YOU MAY HAVE GONE TO THAT WERE NOT LISTED ABOVE):" #53 is one of the following answers ("One or more emergency departments in Georgia")

You mentioned that you went to an emergency department in Georgia for HIV care.

Out of the [question("value"), id="801"] places you went to in the last 12 months, how many were emergency departments in Georgia?*

( ) 1

( ) 2

Logic: Hidden unless: Question "OTHER (PLEASE CHECK ANY OF THE PLACES YOU MAY HAVE GONE TO THAT WERE NOT LISTED ABOVE):" #53 is one of the following answers ("One or more private doctors, clinics, or hospitals (not emergency department) in Georgia")

You mentioned that you went to a private doctor's office, clinic, or hospital (NOT an emergency department) in Georgia for HIV care.

Out of the [question("value"), id="801"] places you went to in the last 12 months, how many were private providers, clinics, or hospitals in Georgia?*

( ) 1

( ) 2

Logic: Hidden unless: Question "OTHER (PLEASE CHECK ANY OF THE PLACES YOU MAY HAVE GONE TO THAT WERE NOT LISTED ABOVE):" #53 is one of the following answers ("One or more prison clinics in Georgia")

You mentioned that you went to a prison clinic in Georgia for HIV care.

Out of the [question("value"), id="801"] places you went to in the last 12 months, how many were prison clinics in Georgia?*

( ) 1

( ) 2

Data Check - Sum facilities with radio buttons

Page entry logic: This page will show when: outga address

HIV Care Locations (Other - outside GA)

Logic: Hidden unless: ((outga1 OR outga 2) OR outga 3)

Please tell us the names of the other clinics or providers you saw OUTSIDE GEORGIA for HIV care. It would also be helpful if you told us a little about the location of the clinics or providers you went to.

We understand if you don't remember or prefer not to provide specific information on the places you went to. Instead, you can also give us a nickname of the place you went to. This will help you answer more specific questions about your care later on in the survey.

Keep in mind that your privacy is very important to us. We will never share this information or use it to find out more about your medical history.

Provider Name 1: _____

Clinic or Hospital Name 1*:
_____

City: _____

State: _____

Logic: Hidden unless: (outga 2 OR outga 3)

Provider Name 2: _____

Clinic or Hospital Name 2*:
_____

City: _____

State: _____

Logic: Hidden unless: outga 3

Provider Name 3: _____

Clinic or Hospital Name 3*:
_____

City: _____

State: _____

Page entry logic: This page will show when: er address

HIV Care Locations (Other - ED)

Logic: Hidden unless: ((er 1 OR er 2) OR er 3)

Please tell us the names of the hospitals IN GEORGIA you went to when you went to the emergency department for HIV care. It would also be helpful if you told us a little about where each of the hospitals is located. Perhaps you remember the street intersection or the area of town.

We understand if you don't remember or prefer not to provide specific information on the emergency departments you went to. Instead, you can also give us a nickname of the place you went to. This will help you answer more specific questions about your HIV care later on in the

survey.

Keep in mind that your privacy is very important to us. We will never share this information or use it to find out more about your medical history.

Hospital (Emergency Department) Name 1*:
_____

City: _____

Location (intersection or area of town):
_____

Logic: Hidden unless: (er 2 OR er 3)

Hospital (Emergency Department) Name 2*:
_____

City: _____

Location (intersection or area of town):
_____

Logic: Hidden unless: er 3

Hospital (Emergency Department) Name 3*:
_____

City: _____

Location (intersection or area of town):
_____

Page entry logic: This page will show when: drga address

HIV Care Locations (Other - Private doctor, clinic, or hospital)

Logic: Hidden unless: ((dr ga 1 OR dr ga 2) OR dr ga 3)

Please tell us below the names of the private doctors, clinics, or hospitals IN GEORGIA you went to. It would also be helpful if you told us where each of these places is roughly located. Perhaps you remember the street intersection or the area of town.

We understand if you don't remember or prefer not to provide specific information on the providers you went to. Instead, you can also give us a nickname of the place you went to. This will help you answer more specific questions about your HIV care later on in the survey.

Keep in mind that your privacy is very important to us. We will never share this information or use it to find out more about your medical history.

Logic: Hidden unless:

Private Doctor Name 1: _____

Hospital or Clinic Name 1*:
_____

City: _____

Location (intersection or area of town):
_____

Logic: Hidden unless: (dr ga 2 OR dr ga 3)

Logic: Hidden unless: QUESTION NOT FOUND! is one of the following answers [NO OPTIONS SET]

Private Doctor Name 2: _____

Hospital or Clinic Name 2*:
_____

City: _____

Location (intersection or area of town):
_____

Logic: Hidden unless: dr ga 3

Logic: Hidden unless: QUESTION NOT FOUND! is one of the following answers [NO OPTIONS SET]

Private Doctor Name 3: _____

Hospital or Clinic Name 3*:
_____

City: _____

Location (intersection or area of town):
_____

Page entry logic: This page will show when: prison address

HIV Care Locations (Other - Prison clinics)

Logic: Hidden unless: ((prison 1 OR prison 2) OR prison 3)

Please tell us the name of the prisons in Georgia you went to when you got HIV care in a prison clinic.

We understand if you don't remember or prefer not to provide specific information on the prison clinics you went to. Instead, you can also give us a nickname of the place you went to. This will help you answer more specific questions about your HIV care later on in the survey.

Keep in mind that your privacy is very important to us. We will never share this information or use it to find out more about your medical history.

Prison Name 1*: _____

City: _____

Logic: Hidden unless: (prison 2 OR prison 3)

Prison Name 2*: _____

City: _____

Logic: Hidden unless: prison 3

Prison Name 3*: _____

City: _____

Care Facility Names - Custom Scripting

Custom dates and care facilities table

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is not exactly equal to ("Haven't gotten HIV care in the past year")

HIV Care Timing

Logic: Hidden unless: Question "IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?" #47 is one of the following answers ("1 place")

Below is a timeline of the last 12 months. Please indicate which months you got care from [question("value"), id="915"]. *

Please check at least one month in the last 12 months that you attended [question("value"), id="915"] for HIV care.

	[question("value")]	**[question("value")]**	**[question("value")]**	**[question("value")]**	**[question("value")]**	**[question("value")]**	**[question("value")]**	**[question("value")]**	**[question("value")]**	**[question("value")]**	**[question("value")]**	**[question("value")]**

	e"), id="962"]	e"), id="963"]	e"), id="964"]	e"), id="965"]	e"), id="966"]	e"), id="967"]	e"), id="968"]	e"), id="969"]	e"), id="970"]	e"), id="971"]	e"), id="972"]	e"), id="973"]
[question("value"), id="915"]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

Logic: Hidden unless: Question "IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?" #47 is one of the following answers ("2 places")

Below is a timeline of the last 12 months. Please indicate which months you got care from [question("value"), id="915"] and [question("value"), id="916"]. *

Please check at least one month in the last 12 months for each of the places that you went to for HIV care ([question("value"), id="915"] and [question("value"), id="916"]).

	[question("value"), id="	[question("value"), id="	[question("value"), id="	[question("value"), id="	[question("value"), id="	[question("value"), id="	[question("value"), id="	[question("value"), id="	[question("value"), id="	[question("value"), id="	[question("value"), id="	[question("value"), id="

	962"]	963"]	964"]	965"]	966"]	967"]	968"]	969"]	970"]	971"]	972"]	973"]
[question("value"), id="915"]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
[question("value"), id="916"]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

Logic: Hidden unless: Question "IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?" #47 is one of the following answers ("3 places","4 places","5 places","More than 5 places")

Below is a timeline of the last 12 months. Please indicate which months you got care from [question("value"), id="915"], [question("value"), id="916"], and [question("value"), id="917"]. *

Please check at least one month in the last 12 months for each of the places that you went to for HIV care ([question("value"), id="915"], [question("value"), id="916"]), and [question("value"), id="917"]).

	[question("v	[question("v	[question("v	[question("v	[question("v	[question("v	[question("v	[question("v	[question("v	[question("v	[question("v	[question("v

	alue"), id="962"]	**alue"), id="963"]**	**alue"), id="964"]**	**alue"), id="965"]**	**alue"), id="966"]**	**alue"), id="967"]**	**alue"), id="968"]**	**alue"), id="969"]**	**alue"), id="970"]**	**alue"), id="971"]**	**alue"), id="972"]**	**alue"), id="973"]**
[question("value"), id="915"]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
[question("value"), id="916"]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]
[question("value"), id="917"]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like**

CD4 tests, viral load tests, or prescriptions for HIV medications)?" #47 is not exactly equal to ("Haven't gotten HIV care in the past year")

Care 1: HIV Services Accessed - Past 12 Months

Logic: Hidden unless: Question "IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?" #47 is one of the following answers ("1 place","2 places","3 places","4 places","5 places","More than 5 places")

In the past 12 months, what types of HIV services have you gotten from [question("value"), id="915"]?*

	[question("value"), id="915"]
Regular blood tests to get CD4 counts and viral loads	[ ]
HIV medication prescription and pick-up	[ ]
HIV care management services	[ ]
Individual counseling about how to prevent spread of HIV	[ ]
Couples' counseling about how to prevent the spread of HIV	[ ]
Medicine through the AIDS Drug	[ ]

Assistance Program (ADAP)	
Professional help remembering to take your HIV medicines on time	[ ]
Dental care	[ ]
Public benefits including Supplemental Security Income (SSI) or Social Security Disability Insurance (SSDI)	[ ]
Transportation assistance to help you get to your appointments	[ ]
Home health services (like in-home nursing care, hospice care)	[ ]
Mental health services	[ ]
HIV peer group support	[ ]
Drug or alcohol	[ ]

counseling or treatment	
Link to social services (like for domestic violence, shelter or housing, meals, childcare, or interpreter services)	[ ]
Other	[ ]

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is not exactly equal to ("Haven't gotten HIV care in the past year")

Care 2: HIV Services Accessed - Past 12 Months

Logic: Hidden unless: Question "IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?" #47 is one of the following answers ("2 places","3 places","4 places","5 places","More than 5 places")

In the past 12 months, what types of HIV services have you gotten from [question("value"), id="916"]?*

	[question("value"), id="916"]
Regular blood tests to get CD4 counts and viral loads	[ ]
HIV medication	[ ]

prescription and pick-up	
HIV care management services	[ ]
Individual counseling about how to prevent spread of HIV	[ ]
Couples' counseling about how to prevent the spread of HIV	[ ]
Medicine through the AIDS Drug Assistance Program (ADAP)	[ ]
Professional help remembering to take your HIV medicines on time	[ ]
Dental care	[ ]
Public benefits including Supplemental Security Income (SSI) or Social Security Disability	[ ]

Insurance (SSDI)	
Transportation assistance to help you get to your appointments	[ ]
Home health services (like in-home nursing care, hospice care)	[ ]
Mental health services	[ ]
HIV peer group support	[ ]
Drug or alcohol counseling or treatment	[ ]
Link to social services (like for domestic violence, shelter or housing, meals, childcare, or interpreter services)	[ ]
Other	[ ]

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like**

CD4 tests, viral load tests, or prescriptions for HIV medications)?" #47 is not exactly equal to ("Haven't gotten HIV care in the past year")

Care 3: HIV Services Accessed - Past 12 Months

Logic: Hidden unless: Question "IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?" #47 is one of the following answers ("3 places","4 places","5 places","More than 5 places")

In the past 12 months, what types of HIV services have you gotten from [question("value"), id="917"]?*

	[question("value"), id="917"]
Regular blood tests to get CD4 counts and viral loads	[ ]
HIV medication prescription and pick-up	[ ]
HIV care management services	[ ]
Individual counseling about how to prevent spread of HIV	[ ]
Couples' counseling about how to prevent the spread of HIV	[ ]
Medicine through the AIDS Drug	[ ]

Assistance Program (ADAP)	
Professional help remembering to take your HIV medicines on time	[ ]
Dental care	[ ]
Public benefits including Supplemental Security Income (SSI) or Social Security Disability Insurance (SSDI)	[ ]
Transportation assistance to help you get to your appointments	[ ]
Home health services (like in-home nursing care, hospice care)	[ ]
Mental health services	[ ]
HIV peer group support	[ ]
Drug or alcohol	[ ]

counseling or treatment	
Link to social services (like for domestic violence, shelter or housing, meals, childcare, or interpreter services)	[ ]
Other	[ ]

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is exactly equal to ("Haven't gotten HIV care in the past year")

HIV Services Accessed - Ever

What types of HIV services have you ever gotten from [question("value"), id="915"]?*

	Received
Regular blood tests to get CD4 counts and viral loads	[ ]
HIV medication prescription and pick-up	[ ]
HIV care management services	[ ]

Individual counseling about how to prevent spread of HIV	[ ]
Couples' counseling about how to prevent the spread of HIV	[ ]
Medicine through the AIDS Drug Assistance Program (ADAP)	[ ]
Professional help remembering to take your HIV medicines on time	[ ]
Dental care	[ ]
Public benefits including Supplemental Security Income (SSI) or Social Security Disability Insurance (SSDI)	[ ]
Transportation assistance to help you get to your appointments	[ ]

Home health services (like in-home nursing care, hospice care)	[ ]
Mental health services	[ ]
HIV peer group support	[ ]
Drug or alcohol counseling or treatment	[ ]
Link to social services (like for domestic violence, shelter or housing, meals, childcare, or interpreter services)	[ ]
Other	[ ]

Other HIV Services

Logic: Hidden unless: (Question "Other" OR Question "Other")

What other HIV services have you gotten from [question("value"), id="915"]?

_____

Logic: Hidden unless: Question "Other"

What other HIV services have you gotten from [question("value"), id="916"]?

_____

Logic: Hidden unless: Question "Other"

What other HIV services have you gotten from [question("value"), id="917"]?

_____

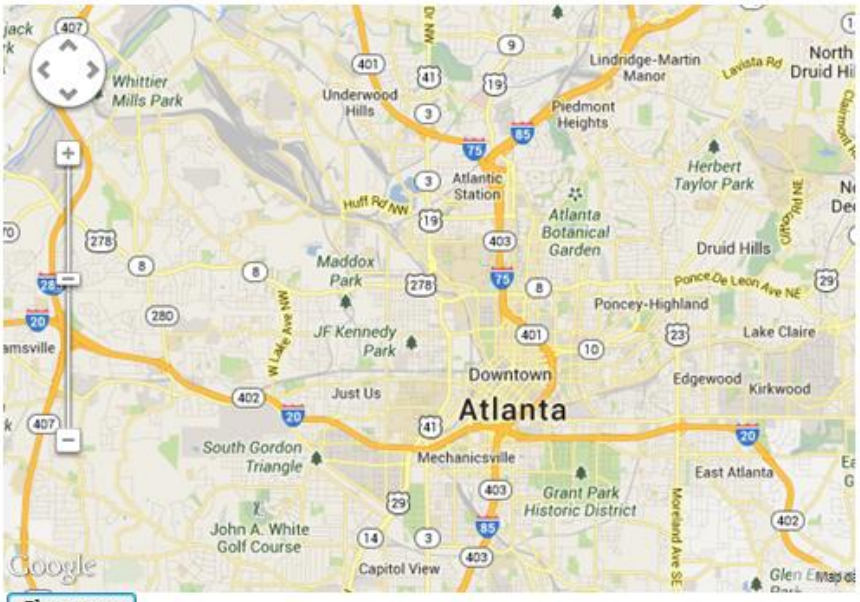
Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("Haven't gotten HIV care in the past year","1 place","2 places","3 places","4 places","5 places","More than 5 places")

Introduction - HIV Care A

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("Haven't gotten HIV care in the past year","1 place","2 places","3 places","4 places","5 places","More than 5 places")

HIV Care A: Map Location

Feel free to zoom in and out of the map as you need to. If you need to start over and re-enter the location of where you currently live, DO NOT PRESS BACK on your browser. Just press "CLEAR MAP" at the bottom left-hand corner of the map, then click on the appropriate place on the map.



Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("Haven't gotten HIV care in the past year","1 place","2 places","3 places","4 places","5 places","More than 5 places")

HIV Care A: Reasons for Getting Care

What were reasons you got your HIV care at [question("value"), id="915"] instead of another facility? Check all that apply.

[ ] It is close to where I live or work

[ ] It is cheaper and faster to travel to this facility than to others

[ ] I don't know of other places I could go to

[ ] A friend or family member told me about this place

[ ] The facility partially or fully covers the cost of my care

[ ] I feel safe and supported at this facility

[ ] This facility respects my background and my privacy

[ ] I am satisfied with my care at this facility

[ ] There are more social support services at this facility

[ ] It is easy to make appointments for my care here

[ ] I get my other medical care here too

[ ] I got my HIV diagnosis here

[ ] I wanted to go somewhere that was further away so my partner wouldn't find out I have HIV

[ ] I wanted to go somewhere that was further away so no one I know would find out I have HIV

[ ] Other reason, please specify::
_____

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("Haven't gotten HIV care in the past year","1 place","2 places","3 places","4 places","5 places","More than 5 places")

HIV Care A: Reasons for Getting Care Rank

Logic: Hidden unless: Question "What were reasons you got your HIV care at [question("value"), id="915"] instead of another facility? Check all that apply. " #84

Please rank the reasons you got care at [question("value"), id="915"] below (where 1 = the most important reason).

Were there other facilities you could go to for HIV care that are closer to your home or work than [question("value"), id="915"]?

( ) Yes

( ) No

( ) Don't Know

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("Haven't gotten HIV care in the past year","1 place","2 places","3 places","4 places","5 places","More than 5 places")

HIV Care A: Transportation and Distance

How do or did you normally get to [question("value"), id="915"] to receive care for your HIV? Check all that apply.

[ ] I drive

[ ] A friend or family member drives me

[ ] I ride the MARTA train

[ ] I take the bus

[ ] I take a taxi

[ ] I ride a bicycle

[ ] I walk

[ ] Other, please specify:: _____

On average, how long does it take you to travel to [question("value"), id="915"] (one-way)?

( ) Less than 5 minutes

( ) 5 to 15 minutes

( ) 16 to 30 minutes

( ) 31 to 59 minutes

( ) More than 1 hour

On average, how much does it cost to get to [question("value"), id="915"] (one-way)?

( ) Less than a dollar

( ) $1-$5

( ) $6-$10

( ) $11-$20

( ) $21-$40

( ) More than $40

On average, how far do or did you travel to get to [question("value"), id="915"] (one-way)?

( ) Less than 5 miles

( ) 6 to 10 miles

( ) 11 to 20 miles

( ) 21 to 30 miles

( ) 31 to 40 miles

( ) More than 40 miles

Where do or did you usually travel from when going to [question("value"), id="915"]?

( ) My home

( ) My workplace

( ) Other, please specify:: _____

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("Haven't gotten HIV care in the past year","1 place","2 places","3 places","4 places","5 places","More than 5 places")

HIV Care A: Quality of Care

Overall, how would you rate the HIV care services you receive at [question("value"), id="915"]?

( ) 1 = Very Poor

( ) 2

( ) 3

( ) 4

( ) 5 = Excellent

During any of the times that you got HIV care at [question("value"), id="915"], did a doctor or nurse ever ask you about your sex practices?

( ) Yes

( ) No

( ) Don't know

During any of the times that you got HIV care at [question("value"), id="915"], did a doctor or nurse ever ask if you have had sex with men?

( ) Yes

( ) No

( ) Don't know

During any of the times that you got HIV care at [question("value"), id="915"], did you ever disclose to a doctor or nurse that you have had sex with men?

( ) Yes

( ) No

( ) Don't know

Page entry logic: This page will show when: (Question "**During any of the times that you got HIV care at [question("value"), id="915"], did you ever disclose to a doctor or nurse that you have had sex with men?**" #95 is exactly equal to ("Yes") AND Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("Haven't gotten HIV care in the past year","1 place","2 places","3 places","4 places","5 places","More than 5 places"))

HIV Care A: HCW-related stigma

After you disclosed to a doctor or nurse that you have had sex with men at [question("value"), id="915"], did any of the following happen?

	Yes	**No**
The doctor or nurse offered you counseling on safer practices while having sex with men	( )	( )
The doctor or nurse avoided you	( )	( )
The doctor or nurse made fun of you or treated you differently	( )	( )
The doctor or nurse refused to serve you	( )	( )
The doctor or nurse offered counseling on how to prevent spread of HIV	( )	( )
The doctor or nurse asked you if you have been experiencing STI symptoms (for example, burning or tingling when you urinate, difficulty passing urine, swollen testicles, open	( )	( )

sores on genitals, etc.)		
The doctor or nurse avoided performing certain screening tests (such as for chlamydia or gonorrhea screening) because they felt uncomfortable	( )	( )

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("Haven't gotten HIV care in the past year","1 place","2 places","3 places","4 places","5 places","More than 5 places")

HIV Care A: Appointments

Logic: Show/hide trigger exists.

In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?*

( ) 0

( ) 1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7

( ) 8

( ) 9

( ) 10

( ) 11

( ) 12

( ) 13

( ) 14

( ) 15

( ) More than 15

Logic: Dynamically shown if "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = 1 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = 2 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = 3 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = 4 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = 5 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = 6 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = 7 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = 8 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = 9 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = 10 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = 11 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = 12 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = 13 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = 14 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = 15 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="915"] to get HIV care?" = More than 15

Out of the appointments you scheduled in the past 12 months at [question("value"), id="915"] for HIV care, how many did you miss?*

( ) 0

( ) 1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7

( ) 8

( ) 9

( ) 10

( ) 11

( ) 12

( ) 13

( ) 14

( ) 15

( ) More than 15

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("Haven't gotten HIV care in the past year","1 place","2 places","3 places","4 places","5 places","More than 5 places")

HIV Care A: Appointments Custom Script

Page entry logic: This page will show when: (Question "**Out of the appointments you scheduled in the past 12 months at [question("value"), id="915"] for HIV care, how many did you miss?**" #98 is one of the following answers ("1","2","3","4","5","6","7","8","9","10","11","12","13","14","15","More than 15") AND Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("Haven't gotten HIV care in the past year","1 place","2 places","3 places","4 places","5 places","More than 5 places"))

HIV Care A: Missed Appointments

What are reasons you may have missed your appointments for your HIV at [question("value"), id="915"] in the past?

[ ] I didn't have transportation to my appointment

[ ] I couldn't afford the cost of travel

[ ] The place I get care is far from where I live

[ ] I was afraid my family or friends would find out about my HIV

[ ] I was afraid someone at work would find out about my HIV

[ ] My insurance didn't cover the cost of my care

[ ] I don't have insurance and couldn't pay for my care

[ ] I had to work and couldn't get time off to go

[ ] I had to take care of family household responsibilities and couldn't go

[ ] The clinic isn't open when it's convenient to me (limited hours of operation)

[ ] I felt like I really didn't need to go -- I felt fine

[ ] I felt sick and couldn't go

[ ] I forgot to go to my appointment

[ ] Other reason, please specify::
_____

[ ] I have not missed any appointments at this location

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("Haven't gotten HIV care in the past year","1 place","2 places","3 places","4 places","5 places","More than 5 places")

HIV Care A: Missed Appointments Rank

Logic: Hidden unless: Question "What are reasons you may have missed your appointments for your HIV at [question("value"), id="915"] in the past?" #99

Please rank the reasons you may have missed appointments at [question("value"), id="915"] in the past (1 = most important reason).

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("Haven't gotten HIV care in the past year","1 place","2 places","3 places","4 places","5 places","More than 5 places")

HIV Care A: Frequency of Care

How often do or did you get HIV care at [question("value"), id="915"]?

( ) I've only gone once or twice, but don't go regularly

( ) 1-2 times a year

( ) About once every 3-4 months

( ) About once every month

( ) More often than once a month

How often do or did you have enough money to pay for HIV-related healthcare visits at [question("value"), id="915"]?

( ) Always

( ) Often

( ) Sometimes

( ) Rarely

( ) Never

Are you currently a regular patient at [question("value"), id="915"]?

( ) Yes

( ) No

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("2 places","3 places","4 places","5 places","More than 5 places")

Introduction - HIV Care B

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("2 places","3 places","4 places","5 places","More than 5 places")

HIV Care B: Map Location

Feel free to zoom in and out of the map as you need to. If you need to start over and re-enter the location of where you currently live, DO NOT PRESS BACK on your browser. Just press "CLEAR MAP" at the bottom left-hand corner of the map, then click on the appropriate place on the map.

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("2 places","3 places","4 places","5 places","More than 5 places")

HIV Care B: Reasons for Getting Care

What were reasons you got your HIV care at [question("value"), id="916"] instead of another facility? Check all that apply.

[ ] It is close to where I live or work

[ ] It is cheaper and faster to travel to this facility than to others

[ ] I don't know of other places I could go to

[ ] A friend or family member told me about this place

[ ] The facility partially or fully covers the cost of my care

[ ] I feel safe and supported at this facility

[ ] This facility respects my background and my privacy

[ ] I am satisfied with my care at this facility

[ ] There are more social support services at this facility

[ ] It is easy to make appointments for my care here

[ ] I get my other medical care here too

[ ] I got my HIV diagnosis here

[ ] I wanted to go somewhere that was further away so my partner wouldn't find out I have HIV

[ ] I wanted to go somewhere that was further away so no one I know would find out I have HIV

[ ] Other reason, please specify::
_____

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("2 places","3 places","4 places","5 places","More than 5 places")

HIV Care B: Reasons for Getting Care Rank

Logic: Hidden unless: Question "What are reasons you may have missed your appointments for your HIV at [question("value"), id="915"] in the past?" #99

Please rank the reasons you got care at [question("value"), id="916"] below (where 1 = the most important reason).

Were there other facilities you could go to for HIV care that are closer to your home or work than [question("value"), id="916"]?

( ) Yes

( ) No

( ) Don't Know

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("2 places","3 places","4 places","5 places","More than 5 places")

HIV Care B: Transportation and Distance

How do or did you normally get to [question("value"), id="916"] to receive care for your HIV? Check all that apply.

[ ] I drive

[ ] A friend or family member drives me

[ ] I ride the MARTA train

[ ] I take the bus

[ ] I take a taxi

[ ] I ride a bicycle

[ ] I walk

[ ] Other, please specify:: _____

On average, how long does it take you to travel to [question("value"), id="916"] (one-way)?

( ) Less than 5 minutes

( ) 5 to 15 minutes

( ) 16 to 30 minutes

( ) 31 to 59 minutes

( ) More than 1 hour

On average, how much does it cost to get to [question("value"), id="916"] (one-way)?

( ) Less than a dollar

( ) $1-$5

( ) $6-$10

( ) $11-$20

( ) $21-$40

( ) More than $40

On average, how far do or did you travel to get to [question("value"), id="916"] (one-way)?

( ) Less than 5 miles

( ) 6 to 10 miles

( ) 11 to 20 miles

( ) 21 to 30 miles

( ) 31 to 40 miles

( ) More than 40 miles

Where do or did you usually travel from when going to [question("value"), id="916"]?

( ) My home

( ) My workplace

( ) Other, please specify:: _____

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("2 places","3 places","4 places","5 places","More than 5 places")

HIV Care B: Quality of Care

Overall, how would you rate the HIV care services you receive at [question("value"), id="916"]?

( ) 1 = Very Poor

( ) 2

( ) 3

( ) 4

( ) 5 = Excellent

During any of the times that you got HIV care at [question("value"), id="916"], did a doctor or nurse ever ask you about your sex practices?

( ) Yes

( ) No

( ) Don't know

During any of the times that you got HIV care at [question("value"), id="916"], did a doctor or nurse ever ask if you have had sex with men?

( ) Yes

( ) No

( ) Don't know

During any of the times that you got HIV care at [question("value"), id="916"], did you ever disclose to a doctor or nurse that you have had sex with men?

( ) Yes

( ) No

( ) Don't know

Page entry logic: This page will show when: (Question "**During any of the times that you got HIV care at [question("value"), id="916"], did you ever disclose to a doctor or nurse that you have had sex with men?**" #112 is exactly equal to ("Yes") AND Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("2 places","3 places","4 places","5 places","More than 5 places"))

HIV Care B: HCW-related stigma

After you disclosed to a doctor or nurse that you have had sex with men at [question("value"), id="916"], did any of the following happen?

	Yes	**No**
The doctor or nurse offered you counseling on safer practices while having sex with men	( )	( )
The doctor or nurse avoided you	( )	( )
The doctor or nurse made fun of you or treated you differently	( )	( )

The doctor or nurse refused to serve you	( )	( )
The doctor or nurse offered counseling on how to prevent spread of HIV	( )	( )
The doctor or nurse asked you if you have been experiencing STI symptoms (for example, burning or tingling when you urinate, difficulty passing urine, swollen testicles, open sores on genitals, etc.)	( )	( )
The doctor or nurse avoided performing certain screening tests (such as for chlamydia or gonorrhea screening) because they felt uncomfortable	( )	( )

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("2 places","3 places","4 places","5 places","More than 5 places")

HIV Care B: Appointments

Logic: Show/hide trigger exists.

In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?*

( ) 0

( ) 1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7

( ) 8

( ) 9

( ) 10

( ) 11

( ) 12

( ) 13

( ) 14

( ) 15

( ) More than 15

Logic: Dynamically shown if "In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?" = 1 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?" = 2 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?" = 3 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?" = 4 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?" = 5 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?" = 6 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?" = 7 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?" = 8 or "In the past 12 months, how many appointments

did you schedule at [question("value"), id="916"] to get HIV care?" = 9 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?" = 10 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?" = 11 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?" = 12 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?" = 13 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?" = 14 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?" = 15 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="916"] to get HIV care?" = More than 15

Out of the appointments you scheduled in the past 12 months at [question("value"), id="916"] for HIV care, how many did you miss?*

( ) 0

( ) 1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7

( ) 8

( ) 9

( ) 10

( ) 11

( ) 12

( ) 13

( ) 14

( ) 15

( ) More than 15

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("2 places","3 places","4 places","5 places","More than 5 places")

HIV Care B: Appointments Custom Script

Page entry logic: This page will show when: (Question "**Out of the appointments you scheduled in the past 12 months at [question("value"), id="916"] for HIV care, how many did you miss?**" #115 is one of the following answers ("1","2","3","4","5","6","7","8","9","10","11","12","13","14","15","More than 15") AND Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("2 places","3 places","4 places","5 places","More than 5 places"))

HIV Care B: Missed Appointments

What are reasons you may have missed your appointments for your HIV at [question("value"), id="916"] in the past?

[ ] I didn't have transportation to my appointment

[ ] I couldn't afford the cost of travel

[ ] The place I get care is far from where I live

[ ] I was afraid my family or friends would find out about my HIV

[ ] I was afraid someone at work would find out about my HIV

[ ] My insurance didn't cover the cost of my care

[ ] I don't have insurance and couldn't pay for my care

[ ] I had to work and couldn't get time off to go

[ ] I had to take care of family household responsibilities and couldn't go

[ ] The clinic isn't open when it's convenient to me (limited hours of operation)

[ ] I felt like I really didn't need to go -- I felt fine

[ ] I felt sick and couldn't go

[ ] I forgot to go to my appointment

[ ] Other reason, please specify::
_____

[ ] I have not missed any appointments at this location

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like**

CD4 tests, viral load tests, or prescriptions for HIV medications)?" #47 is one of the following answers ("2 places","3 places","4 places","5 places","More than 5 places")

HIV Care B: Missed Appointments Rank

Logic: Hidden unless: Question "What are reasons you may have missed your appointments for your HIV at [question("value"), id="916"] in the past?" #116

Please rank the reasons you may have missed appointments at [question("value"), id="916"] in the past (1 = most important reason).

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("2 places","3 places","4 places","5 places","More than 5 places")

HIV Care B: Frequency of Care

How often do or did you get HIV care at [question("value"), id="916"]?

( ) I've only gone once or twice, but don't go regularly

( ) 1-2 times a year

( ) About once every 3-4 months

( ) About once every month

( ) More often than once a month

How often do or did you have enough money to pay for HIV-related healthcare visits at [question("value"), id="916"]?

( ) Always

( ) Often

( ) Sometimes

( ) Rarely

( ) Never

Are you currently a regular patient at [question("value"), id="916"]?

( ) Yes

( ) No

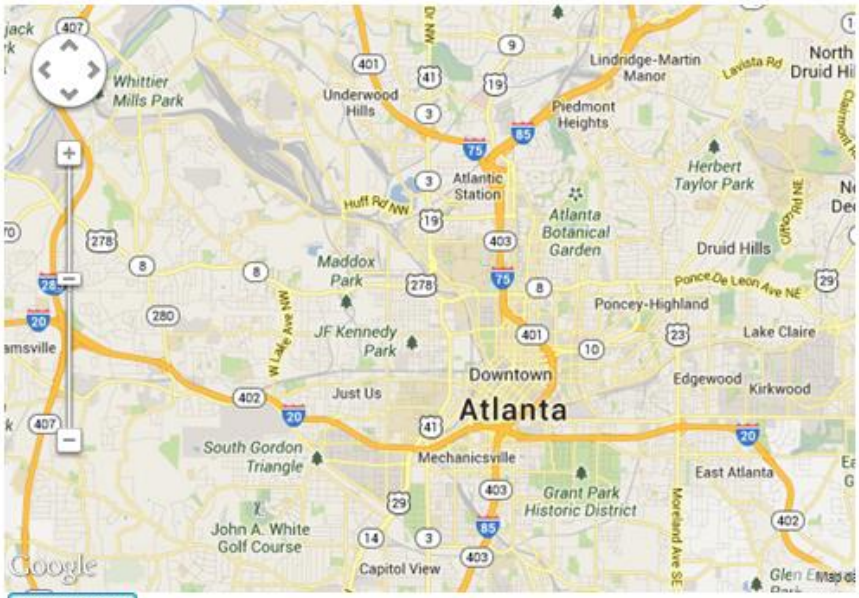
Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("3 places","4 places","5 places","More than 5 places")

Introduction - HIV Care C

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("3 places","4 places","5 places","More than 5 places")

HIV Care C: Map Location

Feel free to zoom in and out of the map as you need to. If you need to start over and re-enter the location of where you currently live, DO NOT PRESS BACK on your browser. Just press "CLEAR MAP" at the bottom left-hand corner of the map, then click on the appropriate place on the map.



Clear map

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("3 places","4 places","5 places","More than 5 places")

HIV Care C: Reasons for Getting Care

What were reasons you got your HIV care at [question("value"), id="917"] instead of another facility? Check all that apply.

[ ] It is close to where I live or work

[ ] It is cheaper and faster to travel to this facility than to others

[ ] I don't know of other places I could go to

[ ] A friend or family member told me about this place

[ ] The facility partially or fully covers the cost of my care

[ ] I feel safe and supported at this facility

[ ] This facility respects my background and my privacy

[ ] I am satisfied with my care at this facility

[ ] There are more social support services at this facility

[ ] It is easy to make appointments for my care here

[ ] I get my other medical care here too

[ ] I got my HIV diagnosis here

[ ] I wanted to go somewhere that was further away so my partner wouldn't find out I have HIV

[ ] I wanted to go somewhere that was further away so no one I know would find out I have HIV

[ ] Other reason, please specify::
_____

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("3 places","4 places","5 places","More than 5 places")

HIV Care C: Reasons for Getting Care Rank

Logic: Hidden unless: Question "What were reasons you got your HIV care at [question("value"), id="917"] instead of another facility? Check all that apply. " #120

Please rank the reasons you got care at [question("value"), id="917"] below (where 1 = the most important reason).

Were there other facilities you could go to for HIV care that are closer to your home or work than [question("value"), id="917"]?

( ) Yes

( ) No

( ) Don't Know

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("3 places","4 places","5 places","More than 5 places")

HIV Care C: Transportation and Distance

How do or did you normally get to [question("value"), id="917"] to receive care for your HIV? Check all that apply.

[ ] I drive

[ ] A friend or family member drives me

[ ] I ride the MARTA train

[ ] I take the bus

[ ] I take a taxi

[ ] I ride a bicycle

[ ] I walk

[ ] Other, please specify:: _____

On average, how long does it take you to travel to [question("value"), id="917"] (one-way)?

( ) Less than 5 minutes

( ) 5 to 15 minutes

( ) 16 to 30 minutes

( ) 31 to 59 minutes

( ) More than 1 hour

On average, how much does it cost to get to [question("value"), id="917"] (one-way)?

( ) Less than a dollar

( ) $1-$5

( ) $6-$10

( ) $11-$20

( ) $21-$40

( ) More than $40

On average, how far do or did you travel to get to [question("value"), id="917"] (one-way)?

( ) Less than 5 miles

( ) 6 to 10 miles

( ) 11 to 20 miles

( ) 21 to 30 miles

( ) 31 to 40 miles

( ) More than 40 miles

Where do or did you usually travel from when going to [question("value"), id="917"]?

( ) My home

( ) My workplace

( ) Other, please specify:: _____

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("3 places","4 places","5 places","More than 5 places")

HIV Care C: Quality of Care

Overall, how would you rate the HIV care services you receive at [question("value"), id="917"]?

( ) 1 = Very Poor

( ) 2

( ) 3

( ) 4

( ) 5 = Excellent

During any of the times that you got HIV care at [question("value"), id="917"], did a doctor or nurse ever ask you about your sex practices?

( ) Yes

( ) No

( ) Don't know

During any of the times that you got HIV care at [question("value"), id="917"], did a doctor or nurse ever ask if you have had sex with men?

( ) Yes

( ) No

( ) Don't know

During any of the times that you got HIV care at [question("value"), id="917"], did you ever disclose to a doctor or nurse that you have had sex with men?

( ) Yes

( ) No

( ) Don't know

Page entry logic: This page will show when: (Question "**During any of the times that you got HIV care at [question("value"), id="917"], did you ever disclose to a doctor or nurse that you have had sex with men?**" #131 is exactly equal to ("Yes") AND Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("3 places","4 places","5 places","More than 5 places"))

HIV Care C: HCW-related stigma

After you disclosed to a doctor or nurse that you have had sex with men at [question("value"), id="917"], did any of the following happen?

	Yes	**No**
The doctor or nurse offered you counseling on safer practices	( )	( )

while having sex with men		
The doctor or nurse avoided you	( )	( )
The doctor or nurse made fun of you or treated you differently	( )	( )
The doctor or nurse refused to serve you	( )	( )
The doctor or nurse offered counseling on how to prevent spread of HIV	( )	( )
The doctor or nurse asked you if you have been experiencing STI symptoms (for example, burning or tingling when you urinate, difficulty passing urine, swollen testicles, open sores on genitals, etc.)	( )	( )
The doctor or nurse avoided performing certain	( )	( )

screening tests (such as for chlamydia or gonorrhea screening) because they felt uncomfortable		

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("3 places","4 places","5 places","More than 5 places")

HIV Care C: Appointments

Logic: Show/hide trigger exists.

In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?*

( ) 0

( ) 1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7

( ) 8

( ) 9

( ) 10

( ) 11

( ) 12

( ) 13

( ) 14

( ) 15

( ) More than 15

Logic: Dynamically shown if "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = 1 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = 2 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = 3 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = 4 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = 5 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = 6 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = 7 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = 8 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = 9 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = 10 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = 11 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = 12 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = 13 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = 14 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = 15 or "In the past 12 months, how many appointments did you schedule at [question("value"), id="917"] to get HIV care?" = More than 15

Out of the appointments you scheduled in the past 12 months at [question("value"), id="917"] for HIV care, how many did you miss?*

( ) 0

( ) 1

( ) 2

( ) 3

( ) 4

( ) 5

( ) 6

( ) 7

( ) 8

( ) 9

( ) 10

( ) 11

( ) 12

( ) 13

( ) 14

( ) 15

( ) More than 15

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("3 places","4 places","5 places","More than 5 places")

HIV Care C: Appointments Custom Script

Page entry logic: This page will show when: (Question "**Out of the appointments you scheduled in the past 12 months at [question("value"), id="917"] for HIV care, how many did you miss?**" #134 is one of the following answers ("1","2","3","4","5","6","7","8","9","10","11","12","13","14","15","More than 15") AND Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("3 places","4 places","5 places","More than 5 places"))

HIV Care C: Missed Appointments

What are reasons you may have missed your appointments for your HIV at [question("value"), id="917"] in the past?

[ ] I didn't have transportation to my appointment

[ ] I couldn't afford the cost of travel

[ ] The place I get care is far from where I live

[ ] I was afraid my family or friends would find out about my HIV

[ ] I was afraid someone at work would find out about my HIV

[ ] My insurance didn't cover the cost of my care

[ ] I don't have insurance and couldn't pay for my care

[ ] I had to work and couldn't get time off to go

[ ] I had to take care of family household responsibilities and couldn't go

[ ] The clinic isn't open when it's convenient to me (limited hours of operation)

[ ] I felt like I really didn't need to go -- I felt fine

[ ] I felt sick and couldn't go

[ ] I forgot to go to my appointment

[ ] Other reason, please specify::
_____

[ ] I have not missed any appointments at this location

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("3 places","4 places","5 places","More than 5 places")

HIV Care C: Missed Appointments Rank

Logic: Hidden unless: Question "What are reasons you may have missed your appointments for your HIV at [question("value"), id="917"] in the past?" #135

Please rank the reasons you may have missed appointments at [question("value"), id="917"] in the past (1 = most important reason).

Page entry logic: This page will show when: Question "**IN THE PAST 12 MONTHS, how many DIFFERENT doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?**" #47 is one of the following answers ("3 places","4 places","5 places","More than 5 places")

HIV Care C: Frequency of Care

How often do or did you get HIV care at [question("value"), id="917"]?

( ) I've only gone once or twice, but don't go regularly

( ) 1-2 times a year

( ) About once every 3-4 months

( ) About once every month

( ) More often than once a month

How often do or did you have enough money to pay for HIV-related healthcare visits at [question("value"), id="917"]?

( ) Always

( ) Often

( ) Sometimes

( ) Rarely

( ) Never

Are you currently a regular patient at [question("value"), id="917"]?

( ) Yes

( ) No

HIV Medications 1

Logic: Show/hide trigger exists.

Have you ever taken any antiretroviral medicines to treat your HIV? These medicines are also known as ART, HAART, or the AIDS cocktail.

( ) Yes

( ) No

Logic: Dynamically shown if "Have you ever taken any antiretroviral medicines to treat your HIV? These medicines are also known as ART, HAART, or the AIDS cocktail." = No

What the main reason you have never taken any antiretroviral medicines (ART)?

( ) My doctor told me I don't need ART yet

( ) I recently started to get care for my HIV and haven't had time to take ART

( ) My CD4 counts or viral loads are good and I don't need ART

( ) I feel good and don't need ART

( ) I am worried about side effects

( ) I don't think it's important to take ART

( ) I don't think the ART will help me get better

( ) I don't want to think about being HIV positive

( ) I don't have insurance and can't pay for ART

( ) My insurance won't cover the cost of ART

( ) I'm worried about remembering to take my medicines

( ) I am taking alternative/complementary medicines for my HIV

( ) I am homeless or living on the street

( ) I have been drinking or using drugs

( ) I am feeling depressed or overwhelmed

( ) Other, please specify: _____

Page entry logic: This page will show when: Question "**Have you ever taken any antiretroviral medicines to treat your HIV? These medicines are also known as ART, HAART, or the AIDS cocktail.**" #140 is exactly equal to ("Yes")

HIV Medications 2

Page exit logic: New Page Logic Action**IF:** Question "**Are you currently taking ART for your HIV?**" #142 is exactly equal to ("No") **THEN:** Jump to page 106 - Community Perceptions of HIV

Logic: Show/hide trigger exists. Dynamically shown if "Have you ever taken any antiretroviral medicines to treat your HIV? These medicines are also known as ART, HAART, or the AIDS cocktail." = Yes

Are you currently taking ART for your HIV?

( ) Yes

( ) No

Logic: Dynamically shown if "Are you currently taking ART for your HIV?" = Yes

How many times a day do you have to take ART medications?*

( ) 1

( ) 2

( ) 3

( ) 4

( ) 5

( ) More than 5

Logic: Dynamically shown if "Have you ever taken any antiretroviral medicines to treat your HIV? These medicines are also known as ART, HAART, or the AIDS cocktail." = Yes or "Are you currently taking ART for your HIV?" = Yes

How many times did you miss taking your ART medications yesterday?*

( ) 0

( ) 1

( ) 2

( ) 3

( ) 4

( ) 5

( ) More than 5

Logic: Dynamically shown if "Are you currently taking ART for your HIV?" = Yes

How many times did you miss taking your ART medications the day before yesterday (2 days ago)?*

( ) 0

( ) 1

( ) 2

( ) 3

( ) 4

( ) 5

( ) More than 5

Logic: Dynamically shown if "Have you ever taken any antiretroviral medicines to treat your HIV? These medicines are also known as ART, HAART, or the AIDS cocktail." = Yes or "Are you currently taking ART for your HIV?" = Yes

How many times did you miss taking your ART medications 3 days ago?*

( ) 0

( ) 1

( ) 2

( ) 3

( ) 4

( ) 5

( ) More than 5

Logic: Dynamically shown if "Are you currently taking ART for your HIV?" = No

What is the main reason you are not currently taking ART?

( ) My doctor told me to stop taking ART

( ) My CD4 counts or viral loads are good and I don't need ART

( ) I feel good and don't need ART

( ) The side effects were too much

( ) I don't think it's important to take ART

( ) I don't think the ART will help me get better

( ) I don't want to think about being HIV positive

( ) I don't have insurance and can't pay for ART anymore

( ) My insurance won't cover the cost of ART

( ) I am taking alternative/complementary medicines for my HIV

( ) I am homeless or living on the street

( ) I have been drinking or using drugs

( ) I am feeling depressed or overwhelmed

( ) Other, please specify:: _____

HIV Medications Error Page

Page entry logic: This page will show when: Question "**Are you currently taking ART for your HIV?**" #142 is exactly equal to ("Yes")

HIV Medications 3

When was the last time you missed taking you ART medications?

( ) Within the past week

( ) 1–2 weeks ago

( ) 2–4 weeks ago

( ) 1–3 months ago

( ) More than 3 months ago

( ) I have never missed a dose

Page entry logic: This page will show when: Question "**Have you ever taken any antiretroviral medicines to treat your HIV? These medicines are also known as ART, HAART, or the AIDS cocktail.**" #140 is exactly equal to ("Yes")

HIV Medication Reasons and Pick-Up

Logic: Hidden unless: ((((Question "How many times did you miss taking your ART medications yesterday?" #144 is one of the following answers ("1","2","3","4","5") OR Question "How many times did you miss taking your ART medications the day before yesterday (2 days ago)?" #145 is one of the following answers ("1","2","3","4","5","More than 5")) OR Question "How many times did you miss taking your ART medications 3 days ago?" #146 is one of the following answers ("1","2","3","4","5","More than 5")) OR Question "When was the last time you missed taking you ART medications?" #148 is one of the following answers ("Within the past week","1–2 weeks ago","2–4 weeks ago","1–3 months ago","More than 3 months ago")) AND Question "Are you currently taking ART for your HIV?" #142 is exactly equal to ("Yes")) Dynamically shown if "Have you ever taken any antiretroviral medicines to treat your HIV? These medicines are also known as ART, HAART, or the AIDS cocktail." = Yes

What is the main reason you may have missed doses of your ART medications?

( ) I forgot to take them

( ) My CD4 counts and viral loads are good and I don't need ART

( ) I felt good and didn't need to take them

( ) I had side effects when I took the medications

( ) I don't think it's important to take ART regularly

( ) I don't think the ART will help me get better

( ) I don't want to think about being HIV positive

( ) I couldn't afford to get more ART medication to continue dosage

( ) I had too many pills to take

( ) I had a problem with the prescription or refill

( ) I was drinking or using drugs

( ) I felt too sick or tired to take the medication

( ) I felt depressed or overwhelmed

( ) I had a change in my daily routine (like travel)

( ) I was homeless

( ) Other reason, please specify:
_____

Page entry logic: This page will show when: Question "**Are you currently taking ART for your HIV?**" #142 is exactly equal to ("Yes")

HIV Medication Pick-up

Logic: Hidden unless: Question "IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?" #47 is one of the following answers ("Haven't gotten HIV care in the past year","1 place")

Where did you last pick up your HIV medications?

( ) [question("value"), id="915"]

( ) I mail order my HIV medications

( ) Some other location

Logic: Hidden unless: Question "IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?" #47 is exactly equal to ("2 places")

Where did you last pick up your HIV medications?

( ) [question("value"), id="915"]

( ) [question("value"), id="916"]

( ) I mail order my HIV medications

( ) Some other location

Logic: Hidden unless: Question "IN THE PAST 12 MONTHS, how many <u>DIFFERENT</u> doctor's offices or clinics have you gone to get care for HIV (like CD4 tests, viral load tests, or prescriptions for HIV medications)?" #47 is one of the following answers ("3 places","4 places","5 places","More than 5 places")

Where did you last pick up your HIV medications?

( ) [question("value"), id="915"]

( ) [question("value"), id="916"]

( ) [question("value"), id="917"]

( ) I mail order my HIV medications

( ) Some other location

Page entry logic: This page will show when: (Question "**Are you currently taking ART for your HIV?**" #142 is exactly equal to ("Yes") AND ((Question "**Where did you last pick up your HIV medications?**" #150 is not exactly equal to ("I mail order my HIV medications") OR Question "**Where did you last pick up your HIV medications?**" #151 is not exactly equal to ("I mail order my HIV medications")) OR Question "**Where did you last pick up your HIV medications?**" #152 is not exactly equal to ("I mail order my HIV medications")))

HIV Medication Pick-Up Map

Page entry logic: This page will show when: Question "**Are you currently taking ART for your HIV?**" #142 is exactly equal to ("Yes")

HIV Medication Pick-Up Details and Payment

Logic: Hidden unless: (Question "Are you currently taking ART for your HIV?" #142 is exactly equal to ("Yes") AND Question "Please indicate the location of where you last picked up your HIV medications.

If you need to start over and re-enter the location, DO NOT PRESS BACK. Just press "CLEAR MAP" at the bottom left-hand corner of the map.")

It would be helpful if you gave us a little more information on where you last went to pick up your medications. Maybe you remember the name of the pharmacy you went to and which area of town the pharmacy was located.

Pharmacy or Clinic Name::

_____

City:: _____

State:: _____

Intersection or area of town::

_____

The last time you picked up your ART medications, how did you pay for them? Check all that apply.

[ ] Private healthcare or HMO

[ ] Medicare

[ ] Medicaid

[ ] AIDS Drug Assistance Program (ADAP)

[ ] AIDS service care organization provided medications

[ ] Public clinic provided medications

[ ] Clinical trial or drug study gave out medications

[ ] Paid for medicines out of pocket

[ ] Other, please specify:: _____

Community Perceptions of HIV

Please answer each of the following items by checking the box that best fits your response.

	Strongly Disagree	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
Most people in my city/town believe that an HIV+ man is just as trustworthy as the average HIV- man	( )	( )	( )	( )	( )
Most employers in my city/town will hire an HIV+ man if he is	( )	( )	( )	( )	( )

qualified for the job					
Most people in my city/town feel that getting HIV is a sign of personal failure	( )	( )	( )	( )	( )
Most people in my city/town would not hire an HIV+ man to take care of their children	( )	( )	( )	( )	( )
Most people in my city/town think less of a person who is HIV+	( )	( )	( )	( )	( )
Most people in my city/town would treat an HIV+ man just as they would treat anyone	( )	( )	( )	( )	( )
Most people in	( )	( )	( )	( )	( )

my city/town will willingly accept an HIV+ man as a close friend					

HIV Status Disclosure

Please indicate below whether you have disclosed your HIV status to the following people.

	Yes	**No**	**Not applicable**
Either of your parents	( )	( )	( )
Any of your sibling(s)	( )	( )	( )
Your partner	( )	( )	( )
Any of your children	( )	( )	( )
At least one close friend	( )	( )	( )
Any of your acquaintances	( )	( )	( )
Anyone you work with	( )	( )	( )
If you got HIV through	( )	( )	( )

sexual contact, the person who might have transmitted HIV to you			

Logic: Show/hide trigger exists.

Is there anyone else that you have disclosed your HIV status to who is not listed above?

( ) Yes

( ) No

Logic: Dynamically shown if "Is there anyone else that you have disclosed your HIV status to who is not listed above?" = Yes

Who else have you disclosed your HIV status to?

_____

Page entry logic: This page will show when: (((((((Question "Either of your parents" is exactly equal to ("Yes") OR Question "Any of your sibling(s)" is exactly equal to ("Yes")) OR Question "Your partner" is exactly equal to ("Yes")) OR Question "Any of your children" is exactly equal to ("Yes")) OR Question "At least one close friend" is exactly equal to ("Yes")) OR Question "Any of your acquaintances" is exactly equal to ("Yes")) OR Question "Anyone you work with" is exactly equal to ("Yes")) OR Question "If you got HIV through sexual contact, the person who might have transmitted HIV to you" is exactly equal to ("Yes")) OR Question "**Is there anyone else that you have disclosed your HIV status to who is not listed above?**" #157 is exactly equal to ("Yes"))

HIV Status Disclosure - Social Support

Thinking about the people you have disclosed your HIV status to, do you feel like ...

	Yes	**No**
You have someone you can talk to when you're feeling sad	( )	( )

about your HIV status?		
You can get a ride from a family member or friend to go to HIV care appointments?	( )	( )
You can count on someone to take care of you when you feel sick?	( )	( )
You know people who can help you with household chores when you cannot do them?	( )	( )
You know people who defend you when others talk negatively about your HIV?	( )	( )

Perceived Health Status

Please indicate below how you feel <u>today</u> on a scale of 1-5, compared to how you felt before you had HIV. 1 = feeling consistently much worse, 3 = feeling the same, 5 = feeling much better

	1 = feeling	**2**	**3 = feeling**	**4**	**5 = feeling**

	much worse		**the same**		**much better**
How you feel physically, overall	( )	( )	( )	( )	( )
Degree of physical pain you feel daily	( )	( )	( )	( )	( )
Degree to which you feel limited physically	( )	( )	( )	( )	( )
How you feel emotionally, overall	( )	( )	( )	( )	( )
How happy you feel, overall	( )	( )	( )	( )	( )
How much energy you feel, overall	( )	( )	( )	( )	( )
Degree to which you can take care of household chores	( )	( )	( )	( )	( )
Degree to which you can work at a job	( )	( )	( )	( )	( )

Perceived Health Stigma

Please indicate the extent to which you agree with the following statements.

	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
It is difficult to tell people about my HIV infection	( )	( )	( )	( )	( )
Being HIV positive makes me feel dirty	( )	( )	( )	( )	( )
I feel guilty that I am HIV positive	( )	( )	( )	( )	( )
I am ashamed that I am HIV positive	( )	( )	( )	( )	( )
I sometimes feel worthless because I am HIV positive	( )	( )	( )	( )	( )
I hide my HIV status	( )	( )	( )	( )	( )

from others					

Comments and NIC contact

You are almost finished with our survey!

We understand that having a forward-only survey can be frustrating because it does not allow you to make corrections to previous responses.

If you would like to change something that you've told us, please describe the question(s) and what the response(s) should be, using the space below.

_____

_____

_____

_____

Logic: Show/hide trigger exists. Hidden unless: Question "Have you ever gotten care for HIV (this includes getting blood tests, seeing a doctor about HIV-related symptoms, etc.)?" #29 is exactly equal to ("No")

You mentioned to us that you have never gotten medical care for HIV. Would you like us to call you and give you more information on how and where you can get HIV care services?

( ) Yes

( ) No

Logic: Dynamically shown if "You mentioned to us that you have never gotten medical care for HIV. Would you like us to call you and give you more information on how and where you can get HIV care services?" = Yes

What is a good number where we can reach you? (Please provide your number in the format: xxx-xxx-xxxx)

_____

Thank You!

Appendix B: Information obtained from each major HIV provider in Atlanta

Atlanta HIV provider survey

_____

Facility Attributes

1) What is the name of the facility?*

_____

2) Who is the point of contact for this facility to answer questions about HIV care services offered? Please include phone contact information if this person has a direct line.

_____

3) What other term(s) would accurately describe this facility? Please select "YES" for ALL choices that apply or "NOT SURE/UNKNOWN" or "REFUSE TO ANSWER"

[ ] A Private practice (solo or group practice)

[ ] A Hospital-affiliated facility

[ ] A Clinical Research Facility

[ ] A Community Health Center

[ ] Other Community-based Service Organization

[ ] A State or Local Health Department Facility

[ ] A Correctional Facility

[ ] Another Type of Facility (Please specify):

_____

4) Which of the following payment options do you offer to cover the cost of HIV care?

[ ] Free HIV care (No fee)

[ ] Discounted/Sliding fee schedules

[ ] Private insurance plans

[ ] Medicare

[ ] Medicaid

[ ] Ryan White care

[ ] VA or military health system

[ ] Other: _____

_____

Facility Services (1)

5) Does this facility provide the following medical services in an outpatient setting? Please select "YES" for ALL choices that apply or "NOT SURE/UNKNOWN" or "REFUSE TO ANSWER".

[ ] Dental care

[ ] Mental health counseling by psychiatrists, psychologists, or others who are licensed to conduct mental health counseling

[ ] Substance abuse treatment

[ ] Prenatal care, general care for pregnancies not considered at high-risk for complications

[ ] Prenatal care, specialized care for high-risk pregnancies

[ ] Other (Please Specify): _____

6) What other resources / services are provided by this facility? Please select "YES" for ALL choices that apply or A159"NOT SURE/UNKNOWN" or "REFUSE TO ANSWER".

[ ] Pre-exposure prophylaxis

[ ] Post-exposure prophylaxis

[ ] An on-site pharmacy

[ ] Consultations or programs specifically designed to support or improve patient adherence to HIV treatment

[ ] HIV risk reduction counseling sessions by a counselor trained specifically to conduct this type of counseling

[ ] Nutrition consultation with a dietician or nutritionist

[ ] HIV/AIDS Case-management services

[ ] Social services

[ ] Language translation services

[ ] On-site childcare services

[ ] Transportation services or financial assistance with transportation

[ ] Alternative therapies (like homeopathy, acupuncture, herbs, massage therapy) by licensed providers

[ ] Other (Please Specify): _____

_____

Facility Services (2)

7) Did this facility receive any Ryan White CARE Act (RWCA) funding during the last calendar year?

( ) Yes

( ) No

8) If yes, which types of RWCA funding did this facility receive in the last year? Please select "YES" for ALL choices that apply or "NOT SURE/UNKNOWN" or "REFUSE TO ANSWER".

[ ] Part A (Title I)

[ ] Part B (Title II)

[ ] Part C (Title III)

[ ] Part D (Title IV)

[ ] Special Projects of National Significance (SPNS)

[ ] AIDS Education and Training Centers (AETC)

[ ] Dental Programs

[ ] Minority AIDS Initiative (MAI)

[ ] None

_____

Availability of providers and patient panel (1)

9) How many individual clinicians (full-time, part-time, or volunteer) provide care to patients with HIV infection at this facility? “Clinicians” include doctors, nurse practitioners, or physician’s assistants. Please do not include in this count the number of students, residents, or other trainees or the number of nurses who are not nurse practitioners.

_____

10) What is the number of full-time equivalents, in terms of HIV care providers (whether volunteer or paid), at this facility? Full-time patient care provider: 40 hours or more of patient care per week.

_____

11) What is the number of part-time equivalents, in terms of HIV care providers (whether volunteer or paid), at this facility?

_____

12) Approximately how many patients do all providers combined see a year for HIV care?

_____

_____

Availability of providers and patient panel (2)

13) Please specify days of the week the facility is open, and hours of operation for each day.

14) Does the facility offer walk-in hours for patients?

( ) Yes

( ) No

15) Please specify the facility's walk-in hours during the week.

_____

Additional feedback

16) Thank you for filling out this survey! Please let us know if there is additional information you would like to provide, or you have any comments or feedback.

_____

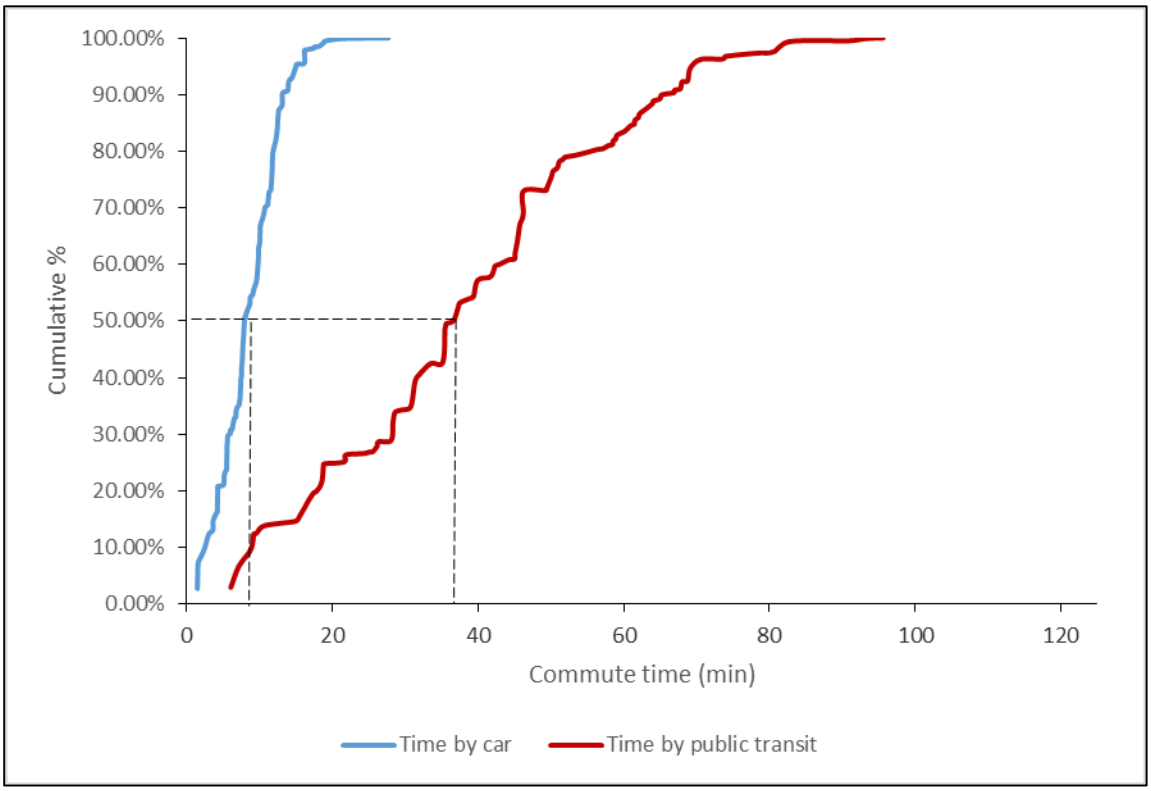
_____

Thank You!

Appendix C: Additional analysis conducted for Chapter 6

Although the nearest provider is within five miles of most areas in the six county Atlanta area, spatial accessibility to services is reduced by the extended commute time associated with taking public transit to attend HIV care visits. Figure A1 shows this below.

Figure A1. Cumulative proportion of HIV-positive population in Atlanta six county area living within defined thresholds of commute time (minutes) from population-weighted ZCTAs, stratified by mode of transportation.



Because supply access for travel by public transportation is sensitive to the estimate utilized in transforming the scores, we used the 95% lower and upper confidence limits to define an interval, or range, of supply access values which defined underserved areas. Subsequently, we estimated upper and lower bounds for the number of HIV cases living in underserved areas. Results are shown in Figures A2 and A3.

Figure A2. Estimated range of supply index values for travel by public transportation under various assumptions. The supply access scores for traveling by public transportaiton were transformed based on the estimated relationship between use of public transportation use and realized access (RR: 0.84, 95% CI: 0.70, 1.01). The panel in the middle shows the distribution of supply access when the scores are transformed based on the point estimate (RR = 0.84). The panels on the left and right use the lower and upper bounds, respectively, of the confidence interval of the association between public transportation use and realized access.

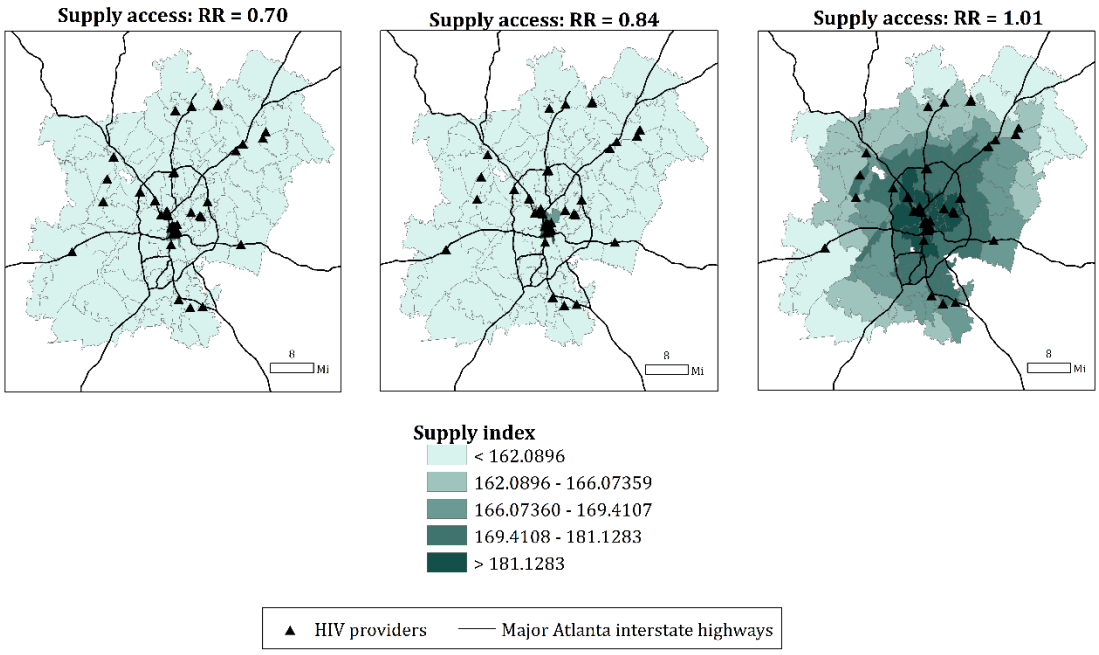


Figure A3. Estimated range of underserved areas, highlighted in maroon, for travel by public transportation under various assumptions, based on results from Appendix Figure 2. The panel in the middle shows the distribution of supply access when the scores are transformed based on the point estimate of the association between public transportation use and realized access (RR = 0.84). The panels on the left and right use the lower and upper bounds, respectively, of the confidence interval of the association between public transportation use and realized access. If transforming supply scores by the point estimate, an estimated 64.3% of HIV cases are living in underserved areas, if traveling by public transportation. Based on estimations from the lower and upper bounds of the estimated association, this proportion ranges from 1.2% to 68.8%.