Behavioral Responses to Risk: Evidence from Classified Ads.*

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Estimating behavioral responses to changes in the cost of engaging in risky behavior is challenging because risky behaviors are private and not readily observed in datasets. I explore behavioral responses to risk in the context of the early years of the HIV/AIDS epidemic by digitizing over 170,000 men's classified ads posted in the oldest and largest national LGBT publication in the United States from 1975 to 1992. Since HIV infections produce only minor symptoms in their early stages and AIDS is diagnosed at later stages, AIDS cases are exogenous to current behavioral patterns. I exploit variation in the timing of the first AIDS case across U.S. cities and show that the first AIDS case is associated with a significant decrease in the total number of ads. The decline is driven largely by reductions in long-term relationship–oriented postings, with much smaller effects on explicitly sexual ads. Under the assumption that individuals who use the classifieds to seek long-term relationships represent lower baseline risk, and that individuals use the classifieds in consistent ways over time, this suggests that those with lower baseline risk were more likely to exit the market when the perceived cost of risky sexual behavior increased. I also find that the first AIDS case is associated with an increase in ads requesting safe-sex practices, indicating early risk-mitigation responses. Finally, I show that areas with larger increases in the use of safe-sex language experienced greater declines in syphilis rates among men, supporting the conclusion that the effects I identify reflect actual behavioral changes. Overall, my results provide novel evidence of behavioral responses to risk during the earliest years of the HIV/AIDS epidemic.

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1 Introduction

Designing effective interventions for risky behaviors requires understanding how individuals change their behavior when the perceived costs shift. Harm-reduction frameworks operate under the premise that individuals frequently continue engaging in risky behaviors even when the costs are high, and therefore focus on minimizing harm. Deterrence-based approaches, by contrast, rely on the assumption that increasing perceived costs will reduce or eliminate the underlying risky behavior. Estimating the effect of a change in the perceived cost of risky behavior on such behaviors is challenging. Risky behaviors are private and not readily observed in datasets. To study risky behaviors, researchers rely either on self-reported survey data or data about certain outcomes which can proxy for those behaviors. Surveys are often limited in the depth of information they can provide because they only capture responses to the questions that are included in the survey. Additionally, self-reports often contain significant misreporting, and this misreporting is not randomly distributed (Corno and De Paula, 2019).[1] Although using outcomes data as a proxy for risky behaviors accounts for individual misreporting, it provides limited information about the types of behaviors that are resulting in changes in the outcome variable. Outcomes data is also an imperfect proxy for risk.[2] Moreover, both survey and outcomes data often fail to capture the behaviors of minority populations due to small sample sizes and difficulty identifying these groups. Secondly, changes in the perceived costs of risky behaviors are rarely exogenous which makes it difficult to establish causal claims. For example, higher levels of risky sexual behavior may lead to greater STI risk, making it challenging to isolate the effect of increased STI risk on risky sexual behaviors (Oster, 2012, 2005).[3]

This paper addresses the challenges of studying risky behaviors in the context of the early years of the HIV/AIDS epidemic by constructing a new dataset of over 170,000 men's classified ads, compiled from the oldest and largest national LGBT publication in the United States, *the Advocate*. The vast majority of these ads represent men seeking other men for sexual or

[1] For example, Soulakova et al. (2012) finds significant differences in smoking misreporting rates by age and De Walque (2007) finds that married individuals are significantly more likely to misreport previous sexual behaviors compared to unmarried individuals.

[2] For example, there is significant misclassification between drug use disorder deaths, accidental deaths and suicide deaths which means that changes in drug use deaths do not necessarily inform us about changes in drug use (Schmeckenbecher et al., 2024). Additionally, there are spacial and temporal differences in the availability of sexually transmitted infection (STI) testing meaning that changes in STI rates could either represent changes in testing availability or changes in risky sex.

[3] Prior research circumvents this issue by specifically exploiting shocks to information rathen than risk (Kerwin, 2020; Delavande and Kohler, 2012.)

romantic relationships. Classified ads hold particular relevance for sexual minorities, who often had limited opportunities to meet potential partners in traditional public spaces. I use Optical Character Recognition (OCR) and machine learning to digitize and extract relevant information from these ads about behavioral responses to HIV/AIDS in the early years of the epidemic. I first document overall trends in the number and types of ads posted in *the Advocate*. Most notably, I find a significant increase in the proportion of ads which include safety language.[4]

An HIV infection typically causes minor or no symptoms during the early stages. Before a test was developed, diagnoses were made only in the late stages of infection, classified as AIDS.[5] AIDS incidence is, therefore, unrelated to current patterns of sexual behavior and instead reflects past sexual behavior.[6] This meant that a city's first AIDS case was unrelated to current patterns of sexual behavior. This study exploits variation in the timing of a city's first reported AIDS case to estimate the causal effect of an increase in STI risk on behavior.

Early cases of AIDS were concentrated among gay men in large urban centers. As a result, gay men living outside these areas often perceived little to no risk of contracting HIV/AIDS (St Lawrence et al., 1989). Although no dataset allows me to directly study how perceptions of HIV/AIDS risk evolved with the first reported local AIDS case during this period, I show that the first reported case marked a probable salient increase in the perceived cost of risky sexual behaviors by analyzing local newspaper reports. I construct a database of HIV/AIDS news reports published in leading local newspapers using the ProQuest Historical Newspaper database and Text and Data Mining (TDM) Studio. Utilizing an event study difference-in-differences design, I demonstrate that the first reported case of AIDS is associated with a significant increase in local newspaper reporting on HIV/AIDS. This increased coverage likely reflects either heightened concerns about the risk of HIV/AIDS or induces fears of contraction. In either case, it signifies an increase in the perceived cost of engaging in risky sexual behavior.

Thereafter, I use an event study difference-in-differences design to estimate the effect of the

[4]I also document trends in the total number of ads, the proportion of ads that are oriented towards long-term relationships, are explicitly sexual, or involve specific risky sexual acts such as receptive anal sex, insertive anal sex, and the sale of sex, as detailed in subsubsection 3.1.3.

[5]Before the development of an HIV test in 1985, the virus could only be detected after significant depletion of the immune system as the virus progressed to AIDS, the final and most severe phase of an HIV infection. Without treatment, an untreated HIV positive individual lives with HIV for approximately 5-10 years before their infection progresses to AIDS (National Institutes of Health, 2024).

[6]I focus specifically on the earliest years of the epidemic (until the first half of 1985) for the causal analysis. AIDS cases resulted from exposures that occurred 5 to 10 years before the diagnosis. Focusing on these early years ensures that all AIDS cases stem from exposures that occurred before the first reports of the virus in 1981.

first AIDS case on classified ads. This involves comparing ads in MSAs with reported AIDS cases to those in MSAs that have not yet reported any cases. I find that the first AIDS case is associated with a significant decrease in the total number of classified ads. I also document noticeable shift in the content of the ads. First, I find strong evidence that individuals responded to the first reported AIDS case by expressing a greater preference for safe sex. This suggests that affected populations enacted meaningful risk-mitigation behaviors. Second, I show that while the number of both relationship-oriented and explicitly sexual ads declined, the reduction was larger for ads seeking long-term relationships. Under the assumption that individuals who use the classifieds to seek long-term relationships represent a lower baseline risk than those posting explicitly sexual ads, and that individuals use the classifieds in consistent ways over time, the evidence indicates that the higher cost of risky sexual behavior prompted behavioral adjustments among those with lower baseline risk. This result is consistent with Kremer (1996), which predicts that increases in the cost of risky sexual behavior lead lower-risk individuals to exit the market, leaving behind a higher-risk pool of sexually active individuals and making each subsequent sexual encounter more risky.

Changes in the content of the ads could either represent individuals who have previously posted in the magazine recognizing differences in risk and deciding to post a different ad in response, or changes in the composition of individuals posting ads. A related concern is that classified ads may have become relatively more attractive as a means of meeting partners as HIV/AIDS risks increased. Unlike encounters in bars or bathhouses, ads allowed individuals to explicitly state safety preferences before meeting, potentially offering greater control over risk exposure.[7] If individuals substituted toward classified ads and away from other venues, the observed changes in ad content could reflect shifts in who uses the classifieds rather than behavioral changes among existing users. To explore which of these mechanisms is driving the changes documented in this paper, I use the phone numbers and P.O. Box numbers provided in the ads to create consistent panels of repeat posters. Although many individuals can be identified as repeat posters, my sample sizes become significantly smaller when I try to follow these individuals over longer periods of time. Although these sample sizes are too small to conduct causal analysis similar to my main specification, I am able to construct smaller subsets

[7] Cunningham and Kendall (2011) make a similar argument in the context of online prostitution, noting that Internet-based solicitation allowed sex workers to screen clients and communicate service preferences in advance, unlike street-based solicitation where such pre-meeting communication was not possible.

of consistent populations whom I follow over time. Even with consistent sample populations, I find significant evidence of the take-up of safety language. This suggests that the increase in safety ads reflects behavioral changes among continuing users and not solely compositional shifts, whether from differential exit from the market or substitution from other venues toward classified ads. I also find limited evidence of individuals moving in and out of posting explicitly sexual or relationship-oriented ads. This suggests that individuals tend to use the classifieds in fairly consistent ways, which supports the assumption underlying the main results.

Additionally, the content of the classified ads are not necessarily indicative of changes in behaviors. Ads often contain vague or ambiguous language that may not necessarily inform us about changes in behavior. For example, many ads express a preference for "safe-sex" but do not mention specific risk mitigation strategies. Therefore, I also compare changes in the content of classified ads to changes in rates of sexually transmitted infections (STIs). Syphilis is heavily concentrated among men who have sex with men (MSM). Although STI rates are only available at the state-level during this period and I am unable to use my main specification to estimate effects on STI rates, I can compare state-level changes in classified ads to state-level changes in STI rates to check whether patterns of classified ads represent changes in behavior. I find that states with larger adoption of safety language in the content of ads also experienced the greatest decline in syphilis rates among men. This indicates that classified ads can offer meaningful insights into patterns of behavior, not just preferences.

I contribute to the growing literature in economics that explores behavioral responses to changes in the cost of risky behavior. There is an extensive body of literature examining the effects of changes in the direct and indirect costs of cigarettes and e-cigarettes on smoking behaviors (Pesko et al., 2020; Nesson, 2017; Callison and Kaestner, 2014; Cotti et al., 2016; Hansen et al., 2017), alcohol on alcohol consumption (Hinnosaar and Liu, 2022; Carpenter and Dobkin, 2009; Miravete et al., 2020; Chalfin et al., 2023; Schilbach, 2019), drugs on drug use (Ruhm, 2019; Packham, 2022; Hansen et al., 2020; Doleac and Mukherjee, 2022).

More specific to this paper, there is a body of literature which explores behavioral responses to changes in the perceived cost of risky sex. Some of this literature exploits changes in STI risk (Oster, 2005; Auld, 2006; Shahid, 2024; Spencer, 2024) while others exploit changes in information which shape perceptions of risk (Kerwin, 2020; Delavande and Kohler, 2012). A

small but growing portion of this literature documents evidence of fatalistic preferences (Kerwin, 2020). Another strand of literature exploits changes in the costs of risky sex induced by technological innovation and access to HIV/AIDS treatments (Shahid, 2023; Mann, 2023; Chan et al., 2016; Baranov and Kohler, 2018; Lakdawalla et al., 2006; Friedman, 2018).[8] Additional studies related to the HIV/AIDS epidemic investigate the virus's impact on public opinion and voting behaviors (Mansour and Reeves, 2022; Fernández et al., 2024; Fernández and Parsa, 2022) and the effects of federal funding aimed at combating HIV/AIDS (Dillender, 2023). My contribution is unique because I am able to focus on specific behavioral responses rather than outcomes data.[9] Understanding specific behavioral responses deepens our understanding of how individuals respond to risks and could help inform the design of targeted interventions. The behavioral adjustments documented in this study are not captured in other datasets due to the lack of data collection on MSM's sexual behaviors before the HIV/AIDS epidemic became widespread. Without these shifts in behavior, the scale of the HIV/AIDS epidemic would have been significantly larger.

Finally, this study is the first to use natural language processing (NLP) and machine learning tools to analyze classified ads of men who have sex with men (MSM). It is part of a growing literature that leverages these tools to measure behaviors and attitudes that we were previously unable to observe (Dell, 2024; Davis et al., 2020; Atalay et al., 2020; Gromadzki and Siemaszko, 2023). These methods can be particularly useful for studying minority populations, such as MSM, who are underrepresented in traditional datasets, especially in historical settings. These tools allow me to analyze the universe of classified ads posted in *the Advocate*, comprising a sample of over 170,000 ads. Although other researchers have used personal ads in LGBTQ+ magazines and newspapers to gain insight into the sexual behaviors of MSM, their analyses are based on manually digitized ads, resulting in smaller sample sizes that do not lend themselves to causal inference. Table A.1 lists these studies and the number of ads used in each study. Notably, each of these studies utilizes less than 2% of my sample size.[10]

[8] A related literature examines how the online provision of classified advertising shapes risky behavior (Cunningham et al., 2024; Liu and Bharadwaj, 2020; Chan et al., 2019; Logan, 2017; Logan and Shah, 2013) and newspaper market performance (Djourelova et al., 2025).

[9] My findings are most similar to Ahituv et al. (1996) who uses survey data to show that higher rates of AIDS are associated with higher levels of condoms.

[10] Nonetheless, these studies provide valuable insight about the content of men's personal ads. Lee (1976), Lumby (1978), Bartholome et al. (2000) and Baker (2003) explore themes and preferences represented in the ads while Thorne and Coupland (1998), Laner and Kamel (1978), Gonzales and Meyers (1993), and Hatala and Prehodka (1996) compare personal ads by gender and sexual orientation. Most of these studies document that gay men's ads place a strong emphasis on physical appearance and sexual relationships. Several papers also

2 Background

2.1 HIV/AIDS Emergence

Although an article titled Rare Cancer Seen in 41 Homosexuals" published on July 3rd, 1981 in the *New York Times* is widely cited as the first newspaper report on HIV/AIDS, the *New York Native*, a local gay newspaper, had reported about an exotic new disease" that was striking gay men in New York as early as May 1981 (Streitmatter, 1995a).[11] Despite the absence of scientific evidence showing the cause of the illness, even these early reports linked the disease to "frequent sexual encounters with different (homosexual) partners" (Altman, 1981). Early understanding of AIDS transmission was marked by considerable uncertainty and misinformation. Some theories attributed the disease to recreational drug use, particularly alkyl nitrites known as "poppers," which were commonly used to enhance sexual pleasure (Los Angeles Times, 1986). Others suggested a cumulative exposure model, in which repeated sexual contacts were necessary to trigger the illness (Sonnabend et al., 1983).[12] While these theories would later prove incorrect, the common thread across competing explanations was that sexual behavior played a central role in disease transmission. It was not until 1983 that scientists identified the illness as being caused by a virus, later named Human Immunodeficiency Virus (HIV), which could be transmitted through sexual contact. Regardless of the specific mechanism understood at the time, the dominant narrative consistently identified sexual activity between men as a key risk factor, thereby increasing the perceived cost of risky sexual behavior.[13]

Early cases of the virus were concentrated among gay men in large urban centers. Consequently, gay men living outside these areas often perceived little to no risk of contracting HIV/AIDS (St Lawrence et al., 1989). There was a large amount of reporting about the first local case of AIDS in local newspapers.[14] As reports of AIDS emerged in other cities, these

document themes in these ads in the context of the HIV/AIDS epidemic. Davidson (1991) documents increasing health concerns during the early years of HIV/AIDS while Smith (2000) documents the prevalence of safety language.

[11] There is now significant evidence of earlier cases of HIV/AIDS with recent retrospective studies identifying evidence of infections as early as 1969 (AIDS Foundation of Chicago, 2024).

[12] In May 1983, activists Michael Callen and Richard Berkowitz published "How to Have Sex in an Epidemic: One Approach," which based its recommendations on the cumulative exposure model (Callen and Berkowitz, 1983). Although the underlying theory was flawed, the manual nevertheless advocated reducing the number of sexual partners and practicing safer sex.

[13] In fact, early names for the illness reflected this association with sexual behavior among gay men. The disease was initially called Gay-Related Immune Deficiency (GRID) in 1982 before being renamed Acquired Immune Deficiency Syndrome (AIDS) later that year (Treichler, 1987).

[14] See Figure A.9 for examples.

perceptions likely began to shift.

An HIV infection only results in minor or no symptoms in the early phases of the infection. In the early years, nearly all diagnoses represented late forms of infection. In these years, AIDS was identified through the diagnosis of Kaposi's Sarcoma (KS), Pneumocystis carinii Pneumoni (PCP) or other opportunistic diseases. These only emerge after significant depletion of the immune system. Before the development of an HIV test in 1985, the virus could only be detected after the virus progressed to AIDS, the final and most severe phase of an HIV infection. The fact that most AIDS diagnoses represented late phases of infection is also evident in the life expectancies of those diagnosed. Of all individuals diagnosed with the virus by January 1983, 75% were known dead by April 1985 (Centers for Disease Control and Prevention, 1985). We know now that even untreated HIV positive individuals live approximately 10 years before their disease progresses to AIDS (National Institutes of Health, 2024).

2.2 Government Inaction

In the early years of the virus, President Ronald Regan did not address HIV/AIDS. He briefly mentioned the virus after the death of Hollywood actor, Rock Hudson, in 1985 and provided a more detailed address in 1987. Prior to 1986, the Federal Government made few attempts to disseminate HIV/AIDS related information. In October 1986, Surgeon General C. Everett Koop released a report on AIDS where he explained how HIV/AIDS was spread and advocated for HIV/AIDS education in schools. The Surgeon General's report was met with both praise and criticism and prompted a national debate about HIV/AIDS education in schools. Ultimately, an abbreviated pamphlet of the report was distributed to all U.S. households titled "Understanding AIDS" between May 26 and June 15, 1988. The Centers for Disease Control (CDC) launched an AIDS education campaign in 1987 called 'America Responds to AIDS'. This campaign included nationwide public service announcements, educational materials, and community outreach programs aimed at promoting HIV prevention and safe sex practices.

Due to the relative inaction from the Federal Government prior to 1986, there were significant community responses aimed at AIDS information. Pre-existing LGBTQ+ organizations worked to disseminate information about AIDS. For example, as early as June 1982, the San Francisco based organization *The Sisters of Perpetual Indulgence* were distributing fliers titled "Play

Fair!" which emphasized safe sex practices (Gay in the 80s, 2013). Several new community organizations were formed to address increasing concerns of AIDS. They also contributed to early dissemination of AIDS information. In July 1982, the recently formed New York-based organization, Gay Men's Health Crisis distributed its first newsletter, which included the latest in AIDS research and recommendations to prevent the spread of the virus (SuchIsLifeVideos, 2014). Other significant efforts at AIDS information dissemination during this period include the L.A. Cares (Los Angeles Cooperative AIDS Risk Reduction Service). L.A. Cares was was launched in 1984 by the AIDS Project Los Angeles (APLA) to disseminate AIDS information among gay men in Los Angeles (Los Angeles Times, 1985).[15]

2.3 Gay Newspapers and Classified Ads

Several gay newspapers and magazines rose to prominence following the 1969 *Stonewall Riots* (Streitmatter, 1995b). Many of these publications catered to the gay populations of specific cities.[16] *The Advocate* soon emerged as the leading national gay publication. Although consistent circulation data is unavailable, I can obtain some information by searching through old issues of the magazine for the "Statement of Ownership, Management & Circulation". This provides me with the average number of copies of *the Advocate* distributed in the past 12 months per issue. Figure A.3 presents the distribution statistics in the located statements. By 1985, *the Advocate* accounted for approximately 10% of the combined circulation of all lesbian and gay publications (Streitmatter, 1995a).

Many of these publications also had classified sections which provided men a convenient way to connect with other men seeking romantic or sexual relationships.[17] These were particularly popular and served as an effective means for the newspapers to generate revenue. The publication would charge a small fee to allow readers to post an ad. *The Advocate* was unique among its competitors because it had significant distribution throughout the country. Many of the other newspapers only served specific cities.[18] While there is no data on the prevalence of

[15] Efforts involved television, newspaper, and magazine advertisements featuring Hollywood actor, Zelda Rubinstein, telling younger gay men to 'play careful' to prevent contracting the virus (Story, 2019).

[16] For example, the *New York Native* was circulated in New York city while the *Sentenial* and *Bay Area Reporter* served the city of San Francisco (Streitmatter, 1995a).

[17] See Table A.1 for details about studies using the personals section of several other leading newspapers.

[18] Individuals in some large cities, such as New York and San Francisco, had the option to post classified ads in several different publications. Since this paper's findings are based solely on classified ads in *the Advocate*, one limitation is that I am unable to identify individuals who may have switched between their preferred publication.

classified ad usage among men who have sex with men, classifieds were especially relevant for sexual minorities, who often had limited opportunities to meet potential partners in conventional public spaces (Lever et al., 2008).[19] The ads appear to have attracted a diverse range of users. The anonymity offered by classified ads may have been particularly valuable for men who were closeted or seeking what the ads frequently termed "discreet" encounters. However, memoirs and oral histories from the period suggest that openly gay men also regularly used the classifieds.[20] Classified ads offered advantages beyond anonymity. Unlike encounters in bars or other public venues, ads allowed men to communicate preferences in advance, specifying what they were seeking, whether casual encounters, long-term relationships, or particular activities or physical characteristics. This screening function appears to have made classified ads attractive across a broad spectrum of gay men.

During the early years of the HIV/AIDS epidemic, these publications played a pivotal role in disseminating HIV/AIDS information during a period when mainstream media was often reluctant or slow to cover the crisis. Nevertheless, many have been critical of the lack of AIDS reporting even in gay publications including *the Advocate* (SuchIsLifeVideos, 2014). Streitmatter (1995a) explains that newspapers generated some of their revenue through advertisements from bathhouses.[21] These interests may have deterred certain publications from reporting the seriousness of the virus.

However, in subsection E.1, I find qualitatively similar estimates even after excluding all cities that reported their first AIDS case in 1981. Since the initial AIDS cases were identified in cities with large gay communities, these are also the cities where individuals had multiple publication options for posting personal ads.

[19] Although we lack data on the prevalence of classified ad usage among MSM during our period of analysis, sexual minorities have been more likely to use online dating apps in later years for similar reasons. A recent study, using data from a 2013 survey, finds that 10% of heterosexuals and 30% of sexual minorities reported ever using a dating app (Johnson et al., 2017).

[20] For example, Richard Berkowitz, an openly gay activist and co-author of "How to Have Sex in an Epidemic," recounts on the podcast *Fiasco* how he and his friend Hibiscus both used classified sections to meet partners (Fiasco, 2024).

[21] During the mid-1980s, several cities had debates about whether bathhouses should be closed in order prevent the spread of HIV/AIDS. For example, San Francisco became the first city to ban bathhouses in 1984 and New York city passed similar but less stringent regulations in 1985 (Binson and Woods, 2013).

3 Data

3.1 Classified Ads Data

The main dataset used in this paper comes from the classified section of issues of *the Advocate* published between 1975 to 1992. *The Advocate* is the largest and longest running LGBT Publication in the United States. It was first published as a local newsletter distributed by an activist group in Los Angeles in 1967.[22] It was converted into a national magazine in 1974. Over the next few years, *the Advocate* became the leading LGBT magazine in the country (Kirsch, 1995).[23]

The Advocate has been publishing a classified section since 1967.[24] Individuals pay a small fee to mail in the text for their ad in the classified section.[25] Although individuals use these ads for a wide variety of purposes, the vast majority these ads represent men seeking other men for sexual or romantic relationships. Following 1992, rather than being part of the magazine itself, *the Advocate Classifieds* became a separate stand-alone magazine.[26] I do not have access to issues of the stand-alone magazine.

3.1.1 Data Collection and Cleaning

The primary dataset is produced by digitizing issues of *the Advocate* which have been purchased by the Vanderbilt University library through Proquest. Classified ads are presented one after the other in columns over multiple pages of *the Advocate*. The ads are organized into subsections, with personal ads and models-and-masseurs being the most popular. The personal subsection comprises of ads from individuals seeking companionship, relationships, or sexual encounters, whereas the models and masseurs subsection contains advertisements for commercial services, many of which explicitly offer the sale of sex. While there are minor changes to

[22] The Personal Rights in Defence and Education (PRIDE) was an activist organization formed in 1966 in response to frequent police raids on Los Angeles' gay bars.

[23] By 1985, the average number of copies distributed per issue was approximately 80,000, with nearly equal shares coming from a combination of dealers, carriers, street vendors, and counter sales, and from mail subscriptions.

[24] The first issue of *the Advocate* that is available to me via Proquest was published on September 1st, 1967 and contains a classified section.

[25] Individuals pay a fixed fee for a certain number of characters but this fee increases as the number of characters increases.

[26] Information obtained from personal communication with Proquest.

the set of subsections over time, these two categories persist across all issues. There is also substantial apparent misclassification, including sex-work solicitations appearing in personal ads and relationship-oriented notices appearing within the models-and-masseurs subsection. The individual ads are sorted by state as depicted in Figure A.1. I exploit the vertical columns dividing the ads and Optical Character Recognition (OCR) to create a dataset where each column contains the text making up each ad.[27] Since the classified columns also contain general business advertisements, as well as postings related to employment, housing, or tenants, I apply a machine-learning classifier to remove all entries that are not placed by an individual seeking a social, romantic, or sexual connection with another individual. The data collection and cleaning process is described in detail in Appendix B. This process results in a dataset of 176,906 ads.

3.1.2 Data Specifics

Subsequently, I analyze the text of each advertisement to extract meaningful information about the advertiser and their preferences. Since individuals selectively disclose information in their classified ads, and the median word count is only 25 words, the information available about each advertiser is limited. Nevertheless, it is common for advertisers to reveal demographic details such as age and race. I am able to discern the state where an advertiser resides based on the format in which the ads are listed in *the Advocate*. Ads also often include phone numbers and addresses. I use this information to identify which MSA many of the ads represent.

In addition to providing valuable demographic information, I also categorize the ads in economically meaningful ways. Specifically, a significant number of ads express a preference for long-term relationships or are explicitly sexual. I use natural language processing tools to determine whether an ad represents a preference for a long-term relationship and whether it is explicitly sexual. From the universe of ads, I randomly select 300 and manually identify whether the ads represent a preference for a long-term relationship and whether they are explicitly sexual. I use this as training data. I use a supervised machine learning model to classify the ads. The model is trained on the manually labeled subset of 300 ads, which have been identified as either expressing a preference for long-term relationships or being explicitly sexual.[28] The

[27] See Appendix B for details.

[28] I use Term Frequency-Inverse Document Frequency (TF-IDF) to vectorize the ads. This involves measuring the importance of words in the ads of a specific category. It discounts words that are common throughout the document. I use TF-IDF instead of word embedding models like FastText and Word2Vec because personal ads

trained model is then applied to the entire dataset to automatically categorize the remaining ads. Additionally, a notable share of ads include language related to safety. I search the personal ads for the terms "safe," "condom," and "protect." Ads containing any of these terms are grouped together and, henceforth, referred to as "safety ads." Similarly, some ads reference health-related attributes using terms such as "fit," "health," "muscular," "active," or "gym." I group these ads together and, henceforth, refer to them as "health-related ads." Individuals may respond to AIDS by adopting safer sex strategies or by seeking partners whom they perceive to be healthy.[29]

Additionally, many of the ads also mention a preference for specific sexual acts. Given that different sexual acts represent different levels of risk, it is possible that individuals respond to HIV/AIDS risk by changing their preferred sex act.[30] These are somewhat harder to categorize. Searching for ads with specific words or phrases may yield misleading trends given that individuals sometimes specify their own preferred sexual position or the position of their partner.[31] Therefore, I identify verbs in the ads which allow me to separate text which is self-descriptive or describes characteristics of a preferred partner.[32] After separating the ad into a self-descriptive statement and a statement describing the preferred partner, I identify ads which represent a preference for receptive and insertive anal sex.[33] A significant portion of the ads also represent individuals selling sex.

Additionally, advertisements in *The Advocate* are organized into several subsections, with personals and models-and-masseurs being the most prominent. I first manually identify whether each page contains ads from the personals section, the models-and-masseurs section, other subsections, or a combination of these. For pages featuring multiple subsections, I then use

often include slang, coded language, and abbreviations that may not be captured by standard dictionaries or pre-trained embeddings. Additionally, contextual embeddings can overfit on linguistic relationships that fail to generalize well when dealing with coded and culturally specific language.

[29] I do not use a supervised machine learning strategy to categorize safety ads or health-related ads given the diversity in the text of these ads. Many different types of ads mention safety terms or health related language.

[30] For example, receptive anal intercourse represents a significantly larger risk than insertive anal intercourse. These differences in risk were identified relatively early in the virus. For example, in May 1983, a manual titled "How to Have Sex in an Epidemic: One Approach" was widely distributed among gay men (Callen and Berkowitz, 1983). The manual categorizes different sexual acts by their risk of transmission.

[31] For example, an individual seeking receptive anal sex may post that they are a "bottom" or that they are seeking a "top".

[32] For example, the text following verbs such as 'seeks' and 'looking' is considered as characteristics of a preferred partner. Alternatively, the text preceding verbs such as 'wanted' or 'desired' represents characteristics of a preferred partner. See Appendix B for details.

[33] For example, if the self-descriptive statement portion of the ad contains the term 'top' or the statement describing the preferred partner includes the term 'bottom', the ad is treated as representing a preference for insertive anal sex. More details provided in Appendix B.

a supervised machine learning approach to classify each individual ad as a personal ad, a models-and-masseurs ad, or an ad belonging to another subsection.[34] This process allows me to determine the specific subsection in which each ad appears.

The ads also include important geographic information. The ads are listed in columns by state in the classified section of the magazine. The vast majority of ads appear under the title of a specific state while some ads appear under a 'nationwide' and 'international' title. I use this information to identify the state where an advertiser may reside. The ads themselves also include additional geographic information. Most ads include either a phone-number or a P.O. Box number with a zip code. Therefore, I search each ad for consecutive digits which follow the form of a phone-number or a zip code. The first three digits of a phone-number represent a particular area code and can be linked to a metropolitan statistical area. Zip codes can also be used to link to MSAs.

I provide a summary of these statistics in Table 1. The majority of ads are from young white men.[35] Approximately 73% of ads are explicitly sexual and 31% of the ads express a preference for long-term relationships. 7% of ads mention some safety term. 13% of ads indicate a preference for insertive anal intercourse while 11% of ads indicate an interest for receptive anal intercourse. 13% of ads include terms which suggest they may indicate the sale of sex. I also present statistics about the top five states and MSAs represented in the classified section. I am able to identify the state and MSA of the advertiser for 70% of the ads. Interestingly, a large portion of ads represent cities with large gay populations such as Los Angeles, New York and San Francisco.[36,37]

3.1.3 Trends over time

I also explore how the number of ads evolve over time. Figure 2 depicts the total number of personal ads in each issue of *the Advocate* over time. In general, there is large variation in the

[34] More details provided in Appendix B.

[35] Figure A.2 presents the Age distribution of respondents. There is significant bunching of respondents at ages 18, 20, 30 indicating that some individuals may be misreporting their age.

[36] The overrepresentation of these large cities may be explained by the larger populations of sexual minority men living in them. The size of the sexual minority male population has a compounding effect on the total number of ads, as the probability of a personal ad from a sexual minority man resulting in a match is significantly higher in cities with larger sexual minority populations.

[37] To ensure that my estimates are not driven by MSAs with a small number of personal ads, I drop MSAs within the lowest 10th, 25th, and 50th percentiles based on the number of personal ads and demonstrate that the estimates remain consistent in Table A.4.

total number of ads posted per issue where most issues have anywhere between 350 and 750 ads. There is also a high degree of serial correlation in the number of ads posted, indicating that the number of ads in one issue is strongly correlated with the number of ads in the preceding issue. Overall, I observe a rise in the average number of ads posted in the years leading up to the first reports of AIDS in mid-1981. There is an additional increase in the total number of ads posted in the early years of the virus. The number of ads peak in late 1983 and are followed by a large decline after which most issues hover around 400 ads per issue. The rise in the number of classified ads prior to the first reports of AIDS and the decrease in the total number of ads in the mid 1980s follows a similar trend to the total number of issues distributed per year.[38]

To explore these trends further, I break down the sample into ads which express a preference for long-term relationships and ads which do not in the first panel of Figure A.5. The figure suggests that the spike in personal ads in 1983 is driven entirely by ads which represent a preference for long-term relationships.[39] In the second panel of Figure A.5, I break down the sample into ads which are explicitly sexual and ads which are not. Similarly, I find that the 1983 spike in ads is driven by ads which are not explicitly sexual. The third panel of Figure A.5 presents the total number of ads which mention 'safety' per issue. I find that there is a significant increase in the number of safety ads during the early years of HIV/AIDS. Ads with safety terms peak in early 1988 and are followed by a downwards trend. The fourth panel of Figure A.5 depicts the total number of ads which mention 'health-related' terms per issue. I find that there is an increase in the total number of ads mentioning health-related language following first reports of HIV/AIDS.

In Figure 3, I present the proportion of ads by type. The first panel presents the proportion of ads which represent a preference for long-term relationships and ads which are explicitly sexual as a share of all ads. As suggested by Figure A.5, I observe a spike in ads which express a preference for long term relationships in 1983 and a dip in the proportion which are explicitly sexual.[40] The second panel of Figure 3 shows that the proportion of ads which include a safety

[38] I only have limited information about distribution over time. I search through old issues of the newspaper for the "Statement of Ownership, Management & Circulation". This provides me with the average number of copies of *the Advocate* distributed in the past 12 months per issue. Figure A.3 presents the distribution statistics in the located statements.

[39] To ensure that this spike is not a result of problems associated with the supervised machine learning model used to classify the data, I present trends of the total number of ads which mention any of the following terms: 'partner', 'boyfriend', 'longterm', 'ltr', 'rel' in Figure A.4. I find that the terms identify a smaller sample of long-term relationship oriented ads than my preferred supervised machine learning model but I still observe a significant spike in late 1983.

[40] In Figure A.7, I present trends in the proportion of ads by subsection. The first panel shows trends in the

term largely follows a similar pattern to the third panel of Figure A.5. The third panel of Figure 3 depicts the proportion of ads representing insertive and receptive anal sex. For the the most part, these trends evolve in parallel. However, in the late 1980s we observe significant decline in the proportion of ads representing receptive anal sex but no decline in the proportion of ads representing insertive anal sex.[41] The last panel of Figure 3 depicts the proportion of health-related ads overtime. In general, there is a significant increase in the proportion of health-related ads following the first reports of AIDS.

3.1.4 Demand and Supply-Side Factors

The number of ads posted in *the Advocate* results from a combination of demand- and supply-side factors. Demand-side factors include behavioral responses to the epidemic, while supply-side factors reflect policy changes implemented by the magazine. Therefore, we cannot interpret temporal changes in the number of ads as solely reflecting changes in preferences. Although the process of posting ads and the format of the classified section remained largely consistent during the period of analysis, the magazine implemented several changes that could have influenced the number of ads posted, independent of any shifts in preferences.

Individuals pay a fee in order to post their ad.[42] Figure A.6 depicts both the nominal price and the inflation-adjusted price in 2024 U.S. dollars for an 81 character ad over time.[43] In general, we observe significant increases in the price of posting an ad, even after accounting for inflation. There are also some changes in the subsections of the classified section and this can affect the types of ads which appear in the magazine. For example, form May 1983 to August 1984, there is a subsection of personals under the title "Women's Ads". This may have attracted a larger number of women advertisers.[44]

Personals subsection, the second panel displays trends in the Models and Masseurs subsection, and the third panel illustrates trends in all other subsections. The share of ads in the Personals subsection follows a trajectory similar to relationship-oriented ads, although Personals consistently account for a larger share of total ads. Likewise, the share of ads in the Models and Masseurs subsection mirrors the pattern observed for explicitly sexual ads, but explicitly sexual ads constitute a larger share of total ads.

[41] This is interesting because receptive anal sex represents a significantly higher level of HIV/AIDS risk compared to insertive anal sex. Shifting away from receptive anal sex may represent a risk mitigation strategy.

[42] Although the prevailing price may be influenced by demand-side factors, I treat it as a supply-side factor in this paper for simplicity, given that various factors beyond demand can affect the price charged by the magazine.

[43] Pricing structures can be more complicated than depicted in Figure A.6. Here, I present the cost of posting a short ad which includes a phone number in regular font. *The Advocate* charges an additional fee when an ad includes a phone number to verify that the provided phone number is accurate. Individuals can also choose to have their ad appear in bold or a larger font for an additional fee. The magazine also offers specials and discounts for ads to be repeated over multiple issues.

[44] In Appendix D, I show that the "Women's Ads" section attracts a larger number of ads from women but it

A further limitation concerns the construction of the ad-level dataset. In some issues, tightly spaced column formatting makes it difficult to determine where one ad ends and the next begins, which may result in either double-counting a single ad or counting multiple ads as one. While, as explained in subsubsection 3.1.2, I am able to extract unique geographic information (by MSA) for roughly 70% of ads, relying solely on trends in the number of ads could still be problematic, as such trends could reflect issue-by-issue variation in my ability to distinguish between one ad and another rather than meaningful behavioral changes.

Taken together, this suggests that trends in the number of ads overtime can represent changes in supply-side factors or trends in the popularity of personal ads in general and should not be interpreted as behavioral responses to the HIV/AIDS epidemic. However, since these factors uniformly impact individuals nationwide, they are unlikely to undermine causal analysis which exploits geographic variation in AIDS incidence.

3.2 Newspaper Reports Database

3.2.1 Data Collection and Cleaning

To explore how newspaper reports respond to the first AIDS case in an MSA, I construct a dataset of leading daily city newspapers. I use Proquest Historical Newspaper database which gives me access to many popular historical newspapers.[45] I include newspapers which are published continuously from 1981-1992. Thereafter, of the newspapers provided by Proquest, I identify the leading newspaper in each city using the Editor & Publisher International year book for 1981.[46] In Table A.3, I provide a list of these newspapers. The table provides the name of the newspapers in my dataset, the city and state they are distributed in, as well their city ranking based on information from the 1981 Editor & Publisher International year book.[47] Since the proquest directory only provides a subset of all newspapers, I don't always observe the leading newspaper in a city (for example, I have access to the Daily News in New York which is the second most popular newspaper in the city but I do not have access to the most

does not explain the spike in long-term relationship ads during the early 1980s in Figure A.5

[45] Several other studies have used this dataset order to study effects of local newspaper reports (Engelberg and Parsons, 2011).

[46] Editor & Publisher International year book provides distribution statistics for each newspaper by the city it is distributed in. It has been used to evaluate the economic performance of newspapers (Angelucci et al., 2024).

[47] A rank of 1 means that of all the newspapers listed in Editor & Publisher International year book for the city, this newspaper is listed as having the greatest distribution.

popular). I also do not have any newspaper from several major cities (for example, I do not have any leading newspaper from Chicago in this dataset). Despite these problems, the newspaper database provides valuable information about local reporting of HIV/AIDS during this period.

Thereafter, I identify all news reports related to the HIV/AIDS epidemic. This involves using Proquest's Text and data mining tool TDM Studio. I search for HIV/AIDS related terms and then use machine learning to ensure that the search result represents an HIV/AIDS related article.[48] This process is described in detail in Appendix C.

3.2.2 Trends over time

The first panel of Figure 4 shows the monthly total of HIV/AIDS articles in the newspaper database. Overall, HIV/AIDS reports increased over the 80s with several spikes around important HIV/AIDS events. In the early years of the virus, there was only sporadic reporting about HIV/AIDS among gay men. In 1983 there were reports of HIV/AIDS among other groups as well as information about the role of blood transfusion contributing to the HIV/AIDS epidemic. Thereafter, there was a large spike in HIV/AIDS reporting when American actor Rock Hudson revealed that he had AIDS in 1985 and his subsequent death. There was another spike in HIV/AIDS reports when professional basketball player Magic Johnson went public about being HIV positive. Observing significant spikes around HIV/AIDS related events lends further credibility to my strategy of identifying HIV/AIDS articles.

3.3 AIDS Public Information Dataset

This paper employs data from the AIDS Public Information Dataset (APID) in order to identify variation in the first reported AIDS case in each metropolitan statistical area (MSA) (Department of Health and Human Services, 2005). APID contains data on monthly counts of AIDS cases by city from 1981-2002. The APID contains data on MSAs with 500,000 or more population. In order to make this data compatible with the personal ads data, I aggregate to the MSA-half year level.

For my main analysis, I exploit variation in the timing of the first reported AIDS case in

[48] For example, the search prompt would pick up an article titled "U.S. aids China in combating bird flu disease."

the data. Although HIV/AIDS was spreading among the U.S. population well before the first reports of AIDS emerged in 1981.[49] Figure A.8 shows the number of MSA's with reports of an AIDS cases over time. By the end of 1981, cases of AIDS had been reported in 18 cities.[50] Thereafter, reports of AIDS emerged in other cities. By the second half of 1985, almost all MSA's in the APID had reports of AIDS.[51]

4 Methodology & Results

Estimating the causal effect of changes in the perceived cost of sexual interactions on behaviors is complicated because changes in risk are often the result of changes in behavior. In order to isolate the causal effect of an increase in the perceived cost of risky sexual behavior on classified ads, I exploit variation in the timing of the first report of an AIDS case across U.S. cities. AIDS represents a late stage of an HIV infection. In the early years of the virus, there was no way to test for HIV. AIDS was only diagnosed through clinical observations and the presence of specific opportunistic infections and cancers which only emerged after significant depletion of the immune system.[52] Since an HIV infection causes only minor symptoms in its early stages, early detection was not possible until the development of an HIV test. Following an HIV infection, HIV enters a latent phase where it results in no or only mild symptoms for several years. This is followed by a symptomatic phase and the development of AIDS. Without treatment, the average time between an HIV infection and the development of AIDS is 10 years. Current patterns of local risky sexual behaviors would not be related to when a city reports its first AIDS case. Therefore, I argue that a city's first AIDS case is exogenous to current sexual behaviors given the 5-10 year incubation period of the virus.[53]

Although I present trends for the entire period that I have access to classified ads in subsubsection 3.2.2, I limit causal analysis to ads posted up until the first half of 1985. During this period, reports of AIDS represent an exogenous shock to the cost of risky behavior.[54] Another

[49] Retrospective studies have found evidence of infections as early as 1969 (AIDS Foundation of Chicago, 2024).

[50] These include Houston, Los Angeles, Cleveland, New Haven, Portlard, Pittsburgh, Miami, Boston, Atlanta, Chicago, Philadelphia, Detroit, Syracuse, Tampa, Hartford, San Francisco, Newyork and Baltimore.

[51] A full list of MSA's and the first half-year they reported an AIDS case can be found in Table A.2.

[52] Scientists discovered that AIDS was caused by a virus which was named the Human Immunodeficiency Virus in 1983. The U.S. Food and Drug Association only approved of a test in 1985.

[53] Spencer (2024) makes a similar arguing when evaluating the effect of AIDS on women's birthrates.

[54] Since the time between infection and the development of AIDS can be as little as 5 years, AIDS cases in later periods could be the result of infections which occurred after first reports of AIDS in the U.S. in 1981

reason to focus on this window is that, as the epidemic progressed, it became increasingly clear that AIDS was "everywhere," and reports of AIDS became inevitable even in areas that had not yet recorded any cases. In such a setting, early reports no longer provide meaningful variation in exposure to information about the epidemic. Additionally, it ensures that my estimates are not contaminated by the Federal Governments AIDS education efforts, which began in 1986.

4.1 First AIDS case as a Proxy for Increased Perceived Risk

There is limited information about perceptions of the cost of risky sexual behaviors, particularly in the early years of the virus. Public health surveillance systems did not collect information about perceptions of HIV/AIDS risk till later years.[55] My preferred estimation strategy assumes that the first reported case of AIDS in a particular city represents an exogenous increase in the perceived cost of risky sex. Although there is no direct way to verify whether this is the case, in this section, I show that the first reported case of AIDS is associated with increased AIDS reporting in the local newspaper. Local newspapers reported extensively about the first local reports of AIDS in the city. I provide some examples of these reports in Figure A.9.

I then use Proquest Historical Newspaper database in order to construct a database of leading local newspapers in 73 cities. Thereafter, I employ ProQuest's TDM Studio to identify all articles related to HIV/AIDS.[56] I first present trends in AIDS reports over time in the first panel of Figure 4. In the early years of the virus, there was only sporadic reporting, but this increased over time. I observe significant spikes in the number of AIDS-related articles around major AIDS-related events. For example, the number of AIDS-related articles surged when famous figures such as Rock Hudson and Magic Johnson revealed their HIV-positive status. These trends indicate that the constructed dataset credibly captures variation in HIV/AIDS reporting. In the second panel of Figure 4, I show that areas with higher rates of AIDS also had a greater number of AIDS related articles in their local newspaper.[57] This suggests that

(Poorolajal et al., 2016). Limiting analysis to ads posted till the first half of 1985, ensures that the treatment variable represents an exogenous shock.

[55]The National Health Interview Survey (NHIS) and Behavior Risk Factor Surveillance System (BRFSS) only began collecting information about perceptions of HIV/AIDS risk in 1987 and 1988 respectively. Others have used information from these surveys to show that higher rates of AIDS are associated with higher perceived risks of contraction (Spencer, 2024).

[56]This process is described in detail in Appendix C

[57]In the second panel of Figure 4, in order to isolate spacial variation in HIV/AIDS reporting, I pool together rates for AIDS from 1981-1986 for all MSAs that are present in the APIDs as well as the constructed AIDS News dataset. This pooled rate is presented on the horizontal axis. The total number of AIDS articles published in

HIV/AIDS risk was more salient in cities with higher rates of HIV/AIDS.

In order for the first AIDS case to represent an increase in the perceived cost of risky sexual behavior, we would expect that the first case be accompanied by an increase in AIDS reporting. In order to test whether this is the case, I estimate the following equation:

$$\#\text{ of AIDS Articles}_{mt} = \alpha + \sum_{l=-6}^{9} \beta_l \text{ First AIDS Case[t=l]}_{mt} + \gamma_t + a_m + \epsilon_{mt} \tag{1}$$

where the dependant variable represents the the number of AIDS articles in the local newspaper of a particular MSA, m, in period, t. The treatment variable First AIDS Case[t=l]$_{mt}$ is an indicator variable which equals 1 when an observation represents an MSA, m, that is l months relative to the first report of an AIDS case. l ranges from 6 months before and 9 months after the first reported AIDS case. γ_t represents period fixed effects and a_m represents MSA fixed effects. Given recent developments in the difference-in-differences literature which identify significant flaws with linear regressions and fixed effects specifications with staggered treatment timing and treatment effect heterogeneity, in my preferred specification, I use the Imputation Estimator developed by Borusyak et al. (2024). This estimator is robust to heterogeneity in treatment timing and effects.

Estimates for Equation 1 are provided in the third panel of Figure 4. The figure suggests that the first report of an AIDS case in an MSA is associated with a significant and persistent increase in HIV/AIDS reporting. This suggests that the first AIDS case represented a non-trivial increase in the salience of HIV/AIDS. The increased coverage is expected to either reflect growing concerns about HIV/AIDS risk or induce fears of contraction.

4.2 Effect of First AIDS Case on Classified Ads

After showing that the first reported AIDS case represents a salient increase in the cost of risky sexual behavior, I then explore how classified ads respond to this change. To estimate the effect of the first reported AIDS case on classified ads, I employ an event study design similar to

the local newspaper from the years 1981-1986 is presented on the verticle axis.

Equation 1. I opt for a difference-in-differences event study design as my main specification because it allows me to observe time-varying treatment effects and test for differences in pre-existing trends in classified ads. To conduct this analysis, I first aggregate the personal ads data to the MSA-half-year level.[58] Thereafter, I estimate the following equation:

$$\frac{\#\text{ Classified Ads}_{mst}}{\text{Avg \# of Classified Ads before 1981}_m} = \alpha + \sum_{l=-6}^{7} \beta_l \text{ First AIDS Case[t=l]}_{mst} + X_{mt} + \gamma_t + \delta_{sm} + \epsilon_{mt} \tag{2}$$

where # Classified Ads_{mst} represents the number of classified ads posted in the magazine over the half-year period in MSA, m, in season, s, and half-year, t.[59] Avg # of Classified Ads before 1981_m represents the average number of classified ads in MSA, m in the half-years prior to the first reported case of AIDS in the U.S. The treatment variable First AIDS Case[t=l]_{mst} is an indicator which equals 1 when an observation represents an MSA, m, in season, s, that is l half-years relative to the first report of an AIDS case. l ranges from 6 half-years (3 years) before and 7 half-years (3.5 years) after the first reported AIDS case. X_{mt} contains a set of time variant controls including the population of an MSA as well as the state unemployment rate.[60] In addition to controlling for period fixed effects (γ_t) and MSA fixed effects (a_m), I also control for season-MSA fixed effects (δ_{sm}) to account for any seasonal variation in classified ads. In order to account for heterogeneity in treatment timing and effects, I employ the imputation estimator developed by Borusyak et al. (2024). Standard errors are clustered at the MSA-level.

Estimates for Equation 2 are presented in the first panel of Figure 5. The event study suggests that the first AIDS case is associated with a significant and persistent decrease in the total number of ads posted.[61] Thereafter, I explore effects on the content of classifed ads. The second panel of Figure 5 presents the effect on the number of ads which mention "safety". This suggests that individuals respond to an increase in the perceived cost of risky sexual behavior

[58] Pooling over multiple issues allows for greater precision given the large amount of variation in the number of classified ads posted for each MSA per issue.

[59] Season, s, refers to whether the observation represents the first six months of the year or whether the observation represents the last months of the year

[60] Unemployment statistics were obtained from the Bureau of Labor Statistics (BLS, 2002).

[61] Interpretation of pre and post coefficients are different for the Imputation Estimate and a regular TWFE estimator. In this case, the reference period for the periods before treatment is period -7 instead of period -1 and the reference period for the post period is the average of all the pre-periods rather than period -1.

brought about by the first reported AIDS case by expressing a preference for "safe-sex".[62]

I also examine effects on ads seeking long-term relationships and those that are explicitly sexual in the third and fourth panels of Figure 5. Individuals seeking long-term relationships may be viewed as engaging in relatively lower-risk behavior, while those placing explicitly sexual ads are more likely to be higher-risk. I find that the first AIDS case is associated with a short-term decline in relationship-oriented ads, with smaller declines in explicitly sexual ads. Under the assumption that individuals use classified ads in a stable and consistent manner over time, shifts in the composition of ads are more indicative of changes in market participation than of individuals switching between relationship-oriented and explicitly sexual ads. This pattern aligns with the seminal contribution of Kremer (1996), which predicts that increases in HIV risk induce behavioral adjustments primarily among those with lower baseline risk, with limited effects among higher-risk individuals. It is also possible that pursuing a long-term monogamous relationship is itself a risk-reducing strategy, as documented in Spencer (2024) and Shahid (2024). In this context, the decline in relationship-oriented ads suggests that lower-risk individuals initially responded not by substituting into other types of ads, but by withdrawing from the market altogether.

In the final panel of Figure 5, I examine effects on ads that mention health-related language. As a risk-mitigation strategy, individuals may respond to the increasing cost of risky sexual behaviors by seeking partners they perceive as low risk. My estimates, although not statistically significant, provide suggestive evidence that some of the increase in the proportion of health-related ads documented in Figure A.5 may be causally related to the rising cost of risky sexual behaviors. While others have documented a significant rise in the desirability of gym-going gay men in the 1980s, further research is needed to determine whether this shift was directly linked to the AIDS epidemic (Schwartz and Andsager, 2011). Changes in the cost of risky sexual behaviors may affect who is deemed desirable in addition to the types of sexual acts individuals choose.

[62]In my preferred specification, I present the outcome variable as a ratio rather than using alternative transformations of the numerator that express percentage changes such as log-like transformations. Some researchers have expressed concerns with using log-like transformations to evaluate percentage effects when the outcome variable often equals zero. This is particularly relevant when evaluating effects on "safe-sex" ads where treatment may increase the outcome variable from zero to a positive number (Chen and Roth, 2024). As depicted in the third panel of Figure 3, prior to the first reports of AIDS, only a small proportion of ads mention safety. Chen and Roth (2024) recommends using poisson regressions. Although poisson regressions are incompatible with the preferred imputation estimator specification, I present results from a poisson TWFE model in Figure A.10. The estimates are largely similar to my main specification.

I then present estimates on the effects of the first reported AIDS case on anal insertive and anal receptive ads in the first two panels of Figure A.12. The event studies follow a similar trend and I find no evidence of a differential reduction in anal receptive ads despite the higher risk of HIV/AIDS transmission.

To summarize the event study estimates into a single estimate, I also estimate the following equation, which combines both pre and post periods:

$$\frac{\#\text{ Classified Ads}_{mst}}{\text{Avg \# of Classified Ads before 1981}_{m}} = \alpha + \beta_l \text{ First AIDS Case}_{mst} + X_{mt} + \gamma_t + a_m + \delta_{sm} + \epsilon_{mt} \quad (3)$$

Now, First AIDS Case$_{mst}$ is an indicator variable that is equal to one for all periods following the first reported AIDS case in an MSA. All other features of Equation 3 are identical to Equation 2.

Estimates for Equation 3 are provided in Table 2. Each outcome is constructed as the number of ads in an MSA–half-year divided by that MSA's pre-AIDS average total number of ads. As a result, the coefficients can be interpreted as proportional changes relative to the pre-AIDS number of classified ads. Column (1) shows a sizable contraction in total ads. The number of ads falls by 0.32 relative to the pre-AIDS average, which is approximately 30 percent of the sample mean. Columns (2) to (5) show meaningful shifts in the types of ads placed. Safety-related ads increase by 0.007, which corresponds to roughly 78 percent of the sample mean for safety ads. Relationship-oriented ads fall by 0.195, about 62 percent of the sample mean, while explicitly sexual ads fall by 0.188, about 25 percent of the sample mean. Health-related ads increase by 0.025, approximately 13 percent of the sample mean, although this estimate is imprecisely estimated.

Overall, I find that the emergence of AIDS prompted a clear behavioral response in classified ads. The first reports of the virus resulted in significant reductions in the total number of ads posted in *the Advocate*. This decline in ads was driven largely by reductions in relationship-oriented postings which likely represent lower-risk individuals. I find smaller effects on explicitly sexual ads which likely represent higher risk individuals. Among those who continued to participate, there is an increase in ads signaling a preference for safe sex, indicating early attempts

to mitigate risk. These patterns could reflect behavioral changes among existing advertisers or compositional shifts in who uses classified ads. One potential source of compositional change is substitution across venues for meeting partners. Unlike bars or bathhouses where encounters were largely anonymous, classified ads allowed individuals to screen partners and communicate safety preferences in advance. If ads became relatively more attractive as HIV/AIDS risks increased, the observed changes could partly reflect who uses the classifieds rather than how existing users behave.[63]

5 Subsection Analysis

Another way to get at changes in the composition of classified ads, is to explore how AIDS may affect the total number of ads appearing in specific subsection of the classifieds. Personals and models-and-masseurs are the most popular subsections in the classifieds. In general, the personal subsection comprises of ads from individuals seeking companionship, relationships, or sexual encounters, whereas the models and masseurs subsection contains advertisements for commercial services, many of which explicitly offer the sale of sex. While there is substantial apparent misclassification, including sex-work solicitations appearing in personals and relationship-oriented ads appearing within the models-and-masseurs subsection, different effects in these subsections can shed light on which types of advertisers respond to changes in the cost of risky sex and which types of behaviors are most responsive.

In this section, I reestimate Equation 2 for ads appearing in the personals subsection, the models-and-masseurs subsection and other subsections. Estimates are reported in Figure 6. The first and second panel of Figure 6 show effects on ads appearing in the personals subsection and the models and massuers subsection respectively. Interestingly, I find that the first reported AIDS case is associated with fewer ads in the Personals subsection and a greater number of ads in the Models and Masseurs subsection. Under the assumption that individuals use these subsections in a stable and consistent manner over time, shifts in the composition of ads across subsections are more indicative of changes in who is participating in the market, rather than individuals switching between Personals and Models and Masseurs. This pattern aligns with the mechanism highlighted in Kremer (1996) suggesting that increases in HIV risk induce behavioral

[63] section 6 uses panel data to help distinguish between these interpretations.

adjustments primarily among those with lower baseline risk. Some individuals with sufficiently high baseline risk may even exhibit fatalistic preferences, for whom it may be logical to increase their consumption of risky sexual behavior because the marginal cost of additional perceived risk is essentially zero. The documented effects in the Models and Masseurs subsection is consistent with this idea, as those already engaging in high-risk behavior may see little additional cost to continued or increased participation.

6 Panel Analysis

The trends documented in the study represent behaviors of a changing sample population. Changes in the content of the ad could either represent advertisers who have previously posted in the magazine recognizing differences in risk and deciding to post a different ad in response, or it could represent changes in the composition of individuals posting ads. Compositional changes could arise through multiple channels. First, classified ads may have become relatively more attractive to lower-risk individuals as HIV/AIDS risks increased. Unlike encounters in bars or bathhouses, ads allowed individuals to explicitly state safety preferences before meeting, potentially offering greater control over risk exposure.[64] This type of substitution would increase the share of lower-risk, safety-conscious individuals in the classified ads pool. However, policy responses to the epidemic may have worked in the opposite direction. Beginning in 1984, San Francisco closed its bathhouses to curb the spread of HIV/AIDS (Binson and Woods, 2013), and other cities took similar measures. These closures may have pushed some bathhouse users, potentially higher-risk individuals, into classified ads. The net compositional effect is therefore ambiguous: the pool of classified advertisers may have become safer due to screening advantages, riskier due to bathhouse closures, or experienced both forces simultaneously in different subpopulations.

To explore whether this is the case, I use phone numbers and P.O. box numbers shared in the ads to track individual advertisers over time. Most individuals who share this identifying information in their classified ad can be tracked over multiple issues.[65] Although I am able to

[64] Cunningham and Kendall (2011) make a similar argument in the context of online prostitution, noting that Internet-based solicitation allowed sex workers to screen clients and communicate service preferences in advance, unlike street-based solicitation where such pre-meeting communication was not possible.

[65] The first panel of Figure A.13 presents the total number of ads which include no form of identification, a phone number, a P.O. Box Number, or both. The figure shows that approximately 60% of ads include some form

track individuals over multiple issues of *the Advocate*, I can only follow them over short periods of time. The third panel of Figure A.13 shows the time difference between the first and last time I observe an individual in my dataset. Most individuals can only be followed over less than 6 months.[66] I have a smaller sample of individuals that I can follow over longer periods of time. Although these sample sizes are too small to conduct causal analysis similar to my main specification, I can create smaller subsets of consistent populations whom I follow over time.

Therefore, I create 9 subsets of my data of consistent groups of individuals who post multiple ads that are over 1 year apart. For example, the first group includes all individuals who post an ad on the second half of 1980 or the first half of 1981 and the second half of 1982 or the first half of 1983.[67] I then plot changes in the content of the personal ads of these consistent groups over time in Figure 7. I use a different line for each group and the size of each dot is associated with the the number of individuals who represent the group. My methodology yields 9 consistent groups with each group consisting of at least 170 individuals. In these graphs, slopes of individual lines represent changing content of ads within a consistent group of individuals and jumps between lines represent across group differences in ads.

The first panel of Figure 7 shows trends in the proportion of individuals mentioning safety terms in their ads for each group. This graph follows a similar trend to the second panel of Figure 3 which presents the overall proportion of safety ads over time. This suggests that we can rule out that the increase in the proportion of personal ads mentioning safety was driven solely by different groups of individuals who started posting safety related ads. We see clear evidence of individuals who have used the classified section in the past adjusting their ads over time. The second and third panel of Figure 7 present trends in the proportion of ads which are long-term relationship oriented or are explicitly sexual. Although the combination of lines in these graphs follow a similar trend to the overall proportion of long-term relationship oriented ads and explicitly sexual ads presented in the first panel of Figure 3, most of the lines are flat and there are significant jumps between the different groups. This indicates that while there may be an overarching trend in long-term relationship oriented ads and explicitly sexual ads

of identification. The second panel of Figure A.13 shows the number of times I observe the identification across my sample of ads. I find that most advertisers post ads multiple times.

[66] There are several reasons why I only observe individuals for short periods of time. They may only actively use the personals section for a short period of time. Individuals also regularly move and change P.O. Box and phone numbers which makes it impossible to track future posts.

[67] The second group includes all individuals who post an ad in the second half of 1981 or the first half of 1982 and the second half of 1983 or the first half of 1984. Other groups are constructed using a similar strategy.

over time, much of this change is likely driven by shifts in the composition of individuals placing the ads rather than changes within a consistent group of advertisers. This is in line with our assumption that individuals use classified ads in consistent ways. Finally, the last panel of Figure 7 shows trends in the proportion of ads that include health-related language. Here, we see sloped lines that reflect changes in the ads posted by a consistent group of individuals over time, as well as clear jumps between groups that reflect differences across cohorts. This suggests that the rise in health-related language is driven both by changing behavior among returning advertisers and by shifts in who is placing ads.

7 Exploring Mechanisms: Comparing San Francisco and New York

The previous sections document that the first AIDS case is associated with increased adoption of safety language in classified ads. However, the mechanism driving this behavioral response remains unclear. The second panel of Figure 5 reveals a delayed response: the estimates show muted effects in the first few periods following the first reported case, with larger effects emerging only later. This delay suggests that information flows about transmission risks and prevention strategies may have played an important role in driving behavioral change.

In this section, I explore this possibility by comparing San Francisco and New York City, two early epicenters that both reported their first AIDS cases in 1981. While my main results capture an average effect across all cities, the actual adoption of safety language may have been driven by local information shocks and community responses that differed in timing and intensity. Despite both cities reporting first cases in 1981, they experienced bathhouse debates at different times. Bathhouses are commercial establishments where gay men can meet for sexual encounters, and by the early 1980s they had become focal points for debates about AIDS transmission and appropriate public health responses. These debates received extensive media coverage and involved questions about whether such establishments should be regulated, modified to promote safer sex, or closed entirely to prevent disease transmission. San Francisco's bathhouse debate took place beginning in early 1984, while New York's debate did not emerge until 1985.[68] This

[68] While pinpointing exact starting dates is difficult, San Francisco's public bathhouse debate intensified dramatically on March 27, 1984, when activist Larry Littlejohn announced a ballot initiative to prohibit sexual activity in bathhouses (Disman, 2013). New York's comparable public discourse occurred in 1985 (Walker, 2010).

variation in timing provides an opportunity to examine whether local debates about AIDS transmission accelerated the adoption of safety language beyond what disease prevalence alone would predict.

Figure 8 presents trends in AIDS cases and classified ads for San Francisco and New York City from 1980 to 1987. The first panel shows that both cities experienced substantial increases in AIDS cases during the early years of the epidemic.[69] The second panel shows total ads declined largely in parallel in both cities following the first AIDS reports in 1981. The third panel shows the proportion of ads with safety language. San Francisco shows earlier and more sustained adoption of safety language beginning around 1984, coinciding with its bathhouse debate. New York's adoption of safety language lags behind and accelerates around 1985, when its own bathhouse debate emerged. These patterns suggest that local information shocks may have played an important role in driving the adoption of safety language. Despite experiencing similar epidemic trajectories, the cities show divergent timing in safety language adoption that aligns with the timing of their respective public debates about sexual transmission and bathhouses.

8 Sexually Transmitted Infection (STI) Dataset

Although this paper documents a significant increase in the proportion of safety ads in response to the HIV/AIDS epidemic, changes in the content of classified ads are not necessarily indicative of changes in behavior. This is particularly relevant given that most ads which mention 'safety', do not specify specific risk mitigation strategies they wish to employ.[70] Moreover, what constituted "safe sex" was itself evolving and contested during this period. Early years were marked by significant misinformation: some theories attributed the disease to recreational drug use, particularly alkyl nitrites known as "poppers" (Los Angeles Times, 1986), while others suggested a cumulative exposure model requiring repeated sexual contacts to trigger illness (Sonnabend

While these debates differed in their specific contours and outcomes, my focus here is on their timing as public information shocks about AIDS transmission and sexual risk.

[69] While New York had more cases in absolute terms, this likely reflects its larger overall population. The number of AIDS cases is not a perfect proxy for epidemic intensity or perceived risk within each city's gay community.

[70] Figure A.14 shows the proportion of safety ads with the term used to identify the ad as a safety ad. Most ads are identified as safety ads with the term 'safe'. Very few of these ads mention the use of condoms.

et al., 1983). Even widely-distributed risk mitigation materials contained misinformation.[71] Given this ambiguity, I compare changes in classified ads to changes in rates of sexually transmitted infections (STIs) to assess whether the patterns reflect effective risk-reducing behaviors.

8.1 Data

Although publicly available STI data exists for more recent years, I acquired the STI data specific to my years of analysis through a special request from the Centers for Disease Control (CDC). This request granted me access to state-level rates of gonorrhea and syphilis for the years 1963 onwards.[72] Since I do not have access to STI rates at a more granular geographic level, I am unable to use my preferred estimation strategy to estimate the the causal effects of HIV/AIDS on other STI rates.[73] Therefore, I compare state-level changes in the take-up of safety language during the early years of the virus to changes in rates of STIs to test whether the changing behaviors reported in the personal ads correspond to lower rates of STIs.

I present national trends in rates of syphilis and gonnorhea per 100,000 population by sex in Figure 9. The figure suggests that prior to the HIV/AIDS epidemic, rates of syphilis were trending upwards for men but there was a significant decline following the HIV/AIDS epidemic.[74] Gonorrhea, on the other hand, was already trending downward prior to 1981 and continued to do so after the first reports of AIDS

8.2 Analysis

Men who have sex with men (MSMs) account for a disproportionate share of syphilis cases. Although national statistics on STI rates by sexual behaviors are not available for this period, many studies document that MSMs represent a significantly larger share of Syphilis cases than other STIs. For example, Judson et al. (1980) documents that MSMs accounted for approximately 60% of Syphilis infections and 35% of Gonorrhea infections. Other research also

[71] The 1983 manual "How to Have Sex in an Epidemic" based its recommendations on the flawed cumulative exposure theory, though it nevertheless advocated reducing partners and practicing safer sex (Callen and Berkowitz, 1983).

[72] Rates of chlamydia are only available after 1996. I am also unable to differentiate between primary or secondary syphilis during my period of analysis.

[73] County level rates of Syphilis do not become available till 1984 and county level rates of gonorrhea and chlamydia in 1995 and 1996.

[74] Others have documented falling rates of STIs among MSMs during this period. CITE

consistently finds that policies affecting sexual minority men impact rates of syphilis but not other STIs (Nikolaou, 2023a; Nikolaou, 2023b; Dee, 2008 Francis et al. (2012)).

The first panel of Figure 10 compare state-level changes in rates of syphilis among men to changes in proportion of safety ads. To estimate this change, I pool together rates of STIs over three years before the start of the HIV/AIDS epidemic (1978-1981) and three years after most cities have reported their first AIDS case (1984-1987).[75] I pool together the proportion of safety ads in the same way.[76] The figure shows that states which experienced a greater take-up of safety language in the classified ads also experienced the greatest declines in rates of syphilis. This indicates that changes in the content of ads represent broader shifts in behavior. In the second and third panel of Figure 10, I compare changes in women's syphilis rate and men's gonorrhea rate to changes in the proportion of safety ads. I find no evidence that these are related. To ensure that the negative relationship between safety language in the ads in the early 1980s and syphilis rate is not the result of pre-existing trends, I conduct a placebo test where I change the vertical axis to represent changes in men's syphilis rate between periods before the first reports of AIDS (I compare changes in men's syphilis rates from the period 1971-1974 to 1977-1980). I find no evidence that the take-up of safety language in personal ads during the early years of the HIV/AIDS epidemic is associated with changes in rates of syphilis in the 1970s.

9 Conclusion

In this study, I explore behavioral responses to the increasing cost of risk in the context of the HIV/AIDS epidemic. I use Optical Character Recognition (OCR) and machine learning to construct a unique rich dataset of over 170,000 men's personal ads posted in the oldest and largest national LGBT publication in the United States, from 1975 to 1992. I first document trends in the overall number of ads posted overtime. I show that the number of ads increases in the years leading up to the first reports of HIV/AIDS in mid-1981. Ads continue to rise and peak in late 1983 and are followed by a large decline thereafter. Thereafter, I employ machine learning techniques and search for specific terms to analyze how the content of the ads evolves

[75] STI rates are measured per 100,000 population

[76] Pooling over multiple time periods allows for greater precision given the large amount of variation in STI rates and safety ads in the personals.

overtime. Most notably, I find a significant increase in the proportion of ads which include safety or health-related language.

During the early years of the virus, the first reports of AIDS represented an exogenous increase in the cost of risky sexual behavior, as infections could only be detected in the late phases of the virus (approximately 10 years after infection). Therefore, I exploit variation in the timing of the first reports of AIDS in a Metropolitan Statistical Areas to estimate the causal effect of a change in the cost of risk on behavior. To ensure that the first AIDS case represents a salient increase in the perceived cost of risky sexual behavior, I demonstrate that the first reported AIDS case is associated with a significant increase in local HIV/AIDS reporting. This could either represent heightened concerns about HIV/AIDS or could induce fears of contraction. In either case, it signifies an increase in the perceived cost of engaging in risky sexual behavior. Thereafter, I use an event-study difference-in-differences design to estimate the causal effect of the first reported AIDS case on classified ads. I show that the first AIDS case is associated with a significant decline in the total number of ads. I also document significant changes to the content of the ads. First, I find strong evidence that individuals responded to the first reported AIDS case by expressing a greater preference for safe sex. This suggests that affected populations enacted meaningful risk-mitigation behaviors. Second, I show that while the number of both relationship-oriented and explicitly sexual ads declined, the reduction was larger for ads seeking long-term relationships. Under the assumption that individuals who use the classifieds to seek long-term relationships represent a lower baseline risk than those posting explicitly sexual ads, and that individuals use the classifieds in consistent ways over time, the evidence indicates that the higher cost of risky sexual behavior prompted behavioral adjustments among those with lower baseline risk. This result is consistent with Kremer (1996), which predicts that increases in the cost of risky sexual behavior lead lower-risk individuals to exit the market, leaving behind a higher-risk pool of sexually active individuals and making each subsequent sexual encounter more risky.

This paper provides novel evidence of behavioral responses to risk during the earliest years of the HIV/AIDS epidemic. I show that individuals who appear to have lower baseline risk were more likely to reduce their participation in the classified ads market when the perceived cost of risky sexual behavior increased, while those with higher baseline risk remained active. At the same time, there is clear evidence of meaningful risk-mitigating behavior, as reflected

in the growing use of safety and health-related language within ads. Together, these findings highlight two distinct behavioral margins of adjustment: exiting the market entirely and altering behavior within the market. Understanding how individuals respond to increases in the cost of risky behavior deepens our understanding of sexual decision-making under uncertainty and can inform the design of more effective, targeted public health interventions.

10 Figures

Figure A.1 : Page From Classifieds

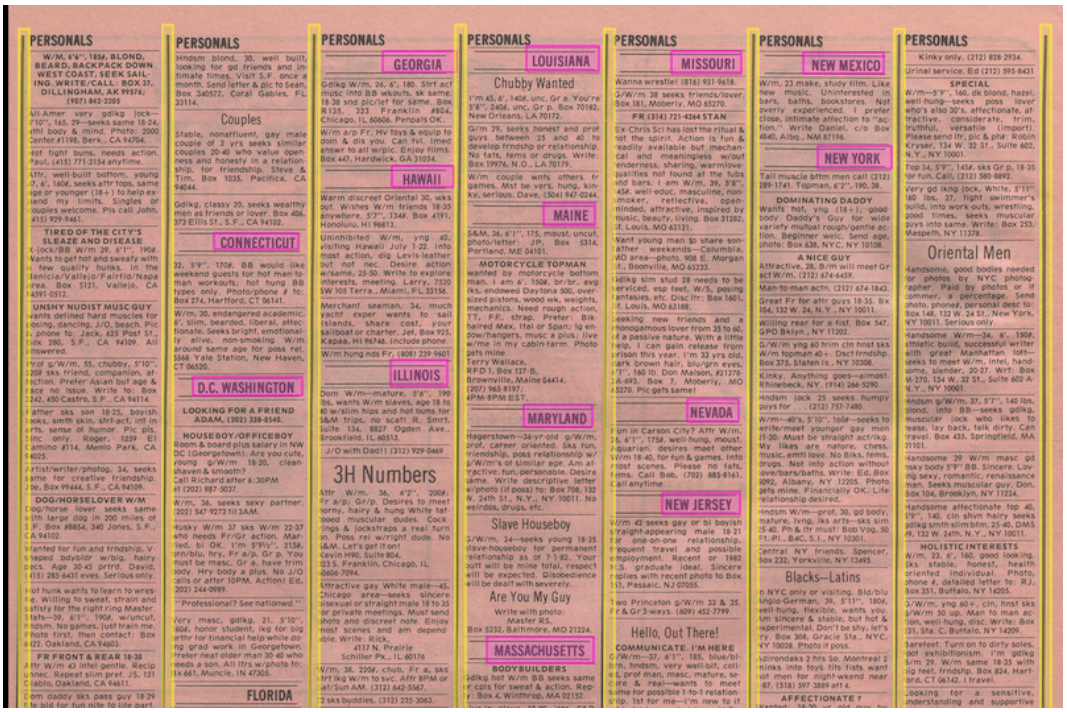


Figure 1: Source: Advocate Classified Ads
Notes: This figure presents a page from *the Advocate* personals section

Figure 2 : Total Ads Over time

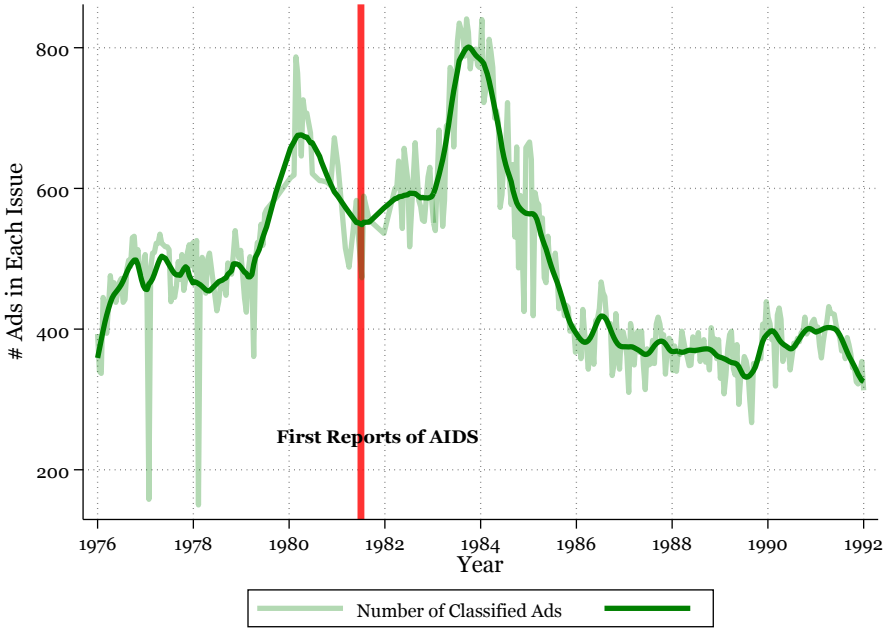


Figure 2: Source: Advocate Classified Ads
Notes: This figure represents the total number of ads posted in each issue of *the Advocate* personals section over time. The light line represents the exact number of ads in an issue while the darker line represents a smoothed version obtained from a locally weighted regression.

Figure 3 : Proportion of Ads by Type Over time

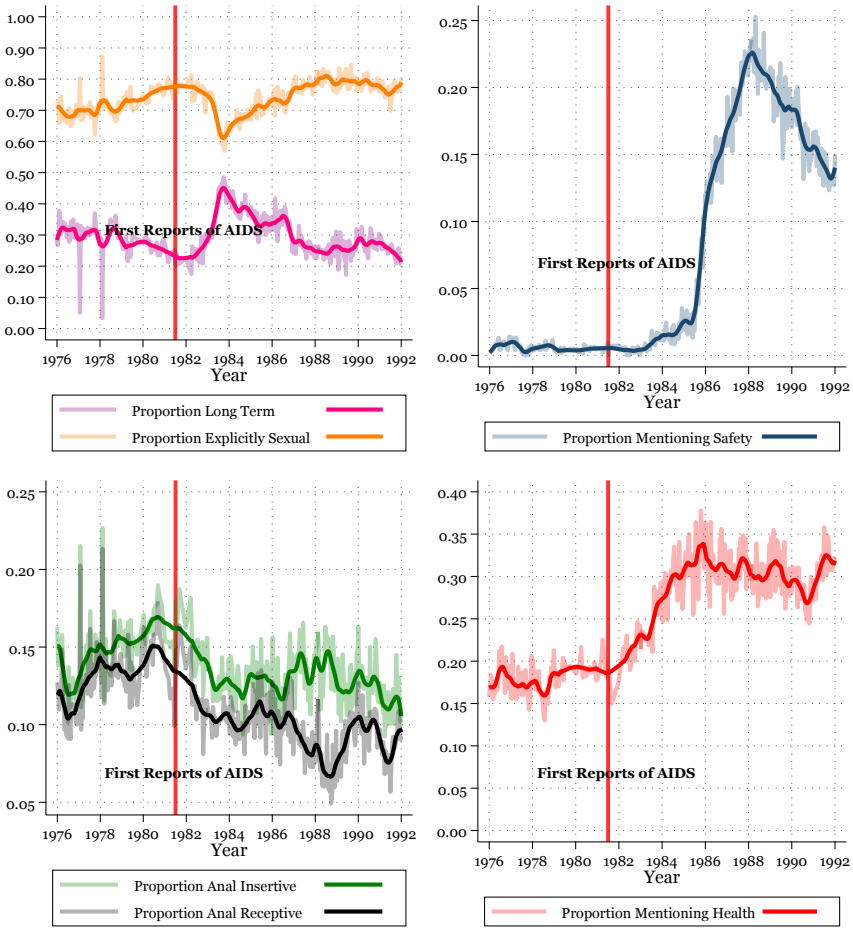


Figure 3: Source: Advocate Classified Ads
Notes: These figures represent the proportion of a particular type of ad posted in each issue of *the Advocate* personals section over time. The light line represents the exact proportion of ads in an issue while the darker line represents a smoothed version obtained from a locally weighted regression. The first figure represents the proportion of ads which are long term relationship oriented in and explicitly sexual overtime. The second figure depicts the proportion of ads which include a safety term. The third figure depicts the the proportion of ads seeking anal insertive sex and anal receptive sex. The fourth figure depicts the proportion of ads which represent the sale of sex.

Figure 4 : AIDS News

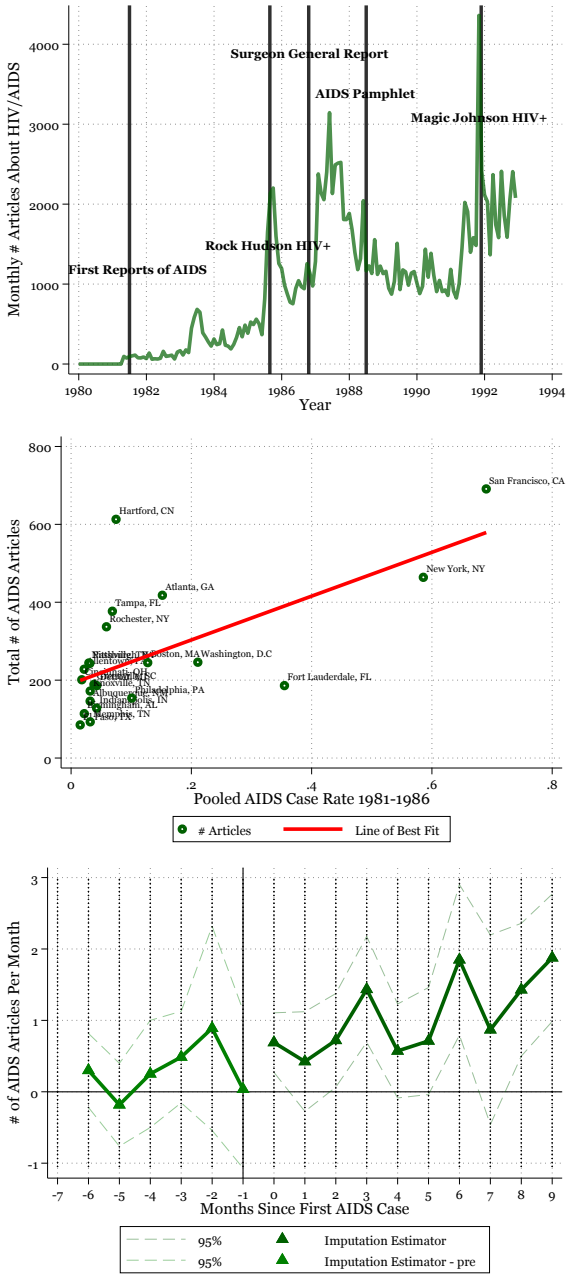


Figure 4: Source: ProQuest Historical Newspapers and AIDS Public Information Dataset
Notes: The first panel depicts the total number of HIV/AIDS related articles in the local newspapers listed in Table A.3. The second panel depicts a scatter plot of the total number of HIV/AIDS articles in each MSA against the pooled AIDS case rate from 1981-1986. The third panel depicts difference-in-differences event study estimates from Equation 1 measuring the effect of the first reported AIDS case on local newspaper reports about HIV/AIDS using the Imputation Estimator developed by Borusyak et al. (2024). Estimates control for period fixed effects and MSA fixed effects. Standard errors are clustered at the MSA level.

Figure 5 : Event Studies

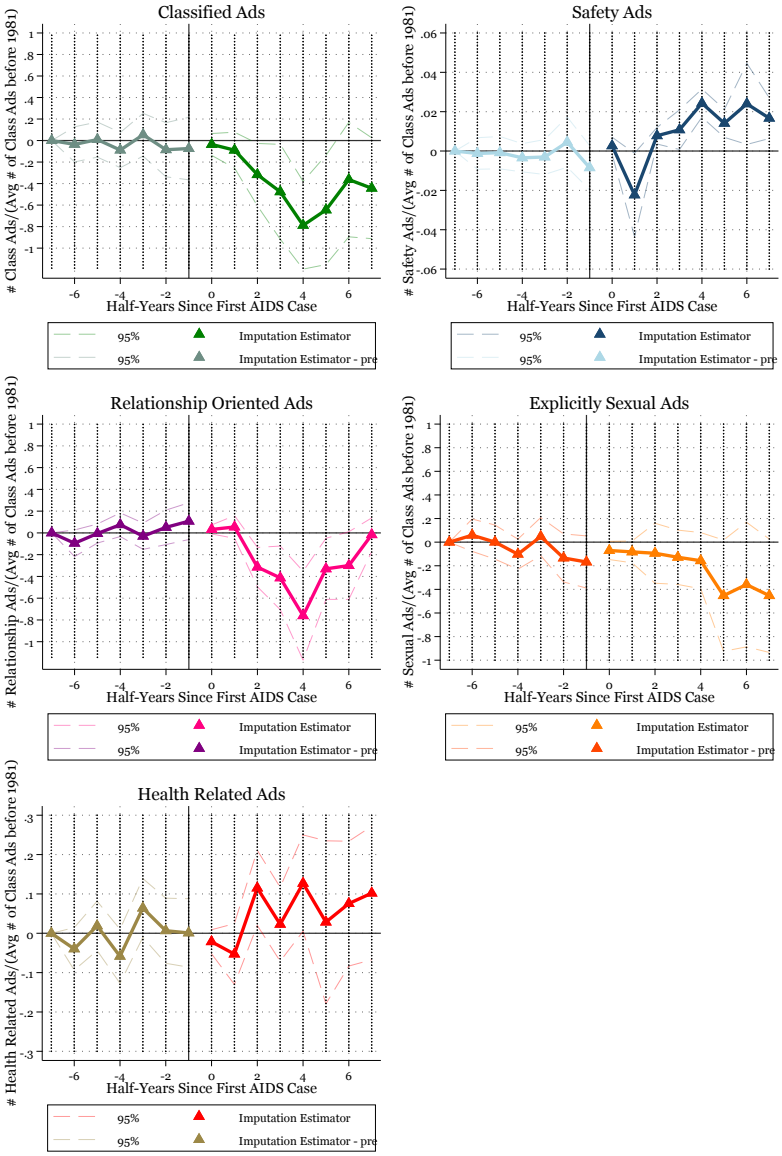


Figure 5: Source: Advocate Classified Ads and AIDS Public Information Dataset
Notes: These figures depict event study estimates of Equation 2 measuring the effect of the first reported AIDS case on personal ads using the Imputation Estimator developed by (Borusyak et al., 2024). The first figure depicts effects on the total number of personal ads. The second figure depicts effects on the number of ads which include safety terms. The third figure depicts effects on the number of ads which are long-term relationship oriented. The fourth figure depicts effects on the number of ads which are explicitly sexual. All estimates control for period fixed effects, and season-MSA fixed effects. Standard errors are clustered at the MSA-level.

Figure 6 : Event Studies for different subsection

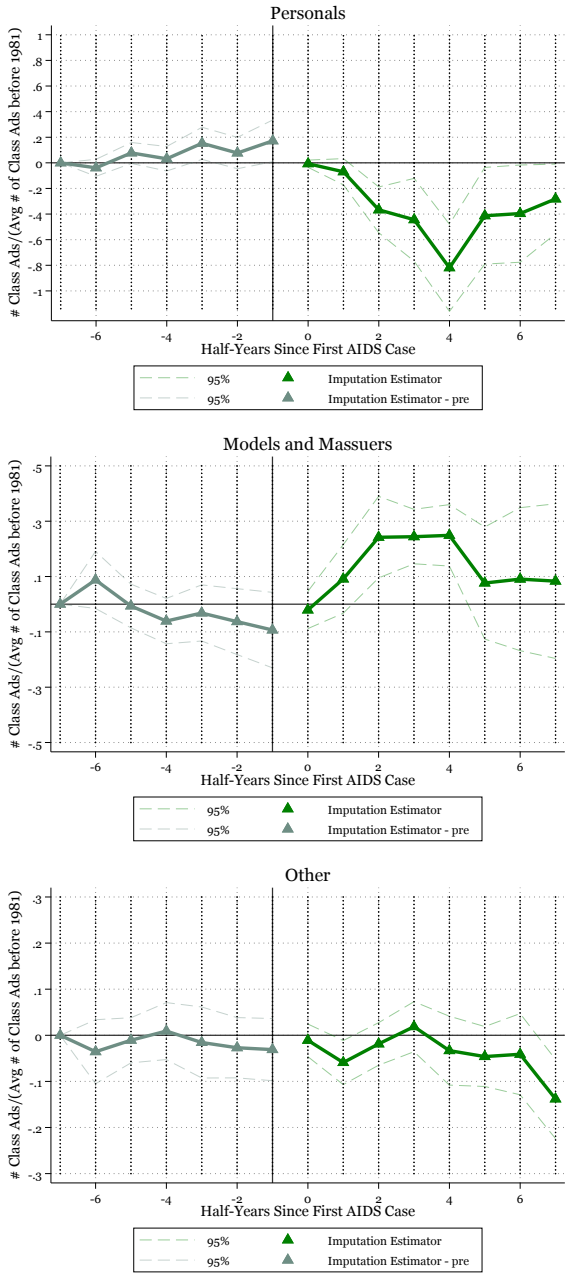


Figure 6: Source: Advocate Classified Ads and AIDS Public Information Dataset
Notes: These figures depict event study estimates of Equation 2 measuring the effect of the first reported AIDS case on ads placed in different subsections using the Imputation Estimator developed by (Borusyak et al., 2024). The first figure depicts effects on the personal ads subsection. The second figure depicts effects on the models and massuers subsection. The third figure depicts effects on other subsections. All estimates control for period fixed effects, and season-MSA fixed effects. Additionally, all estimates also control for MSA population, and state-level unemployment rates. Standard errors are clustered at the MSA-level.

Figure 7 : Panel Analysis

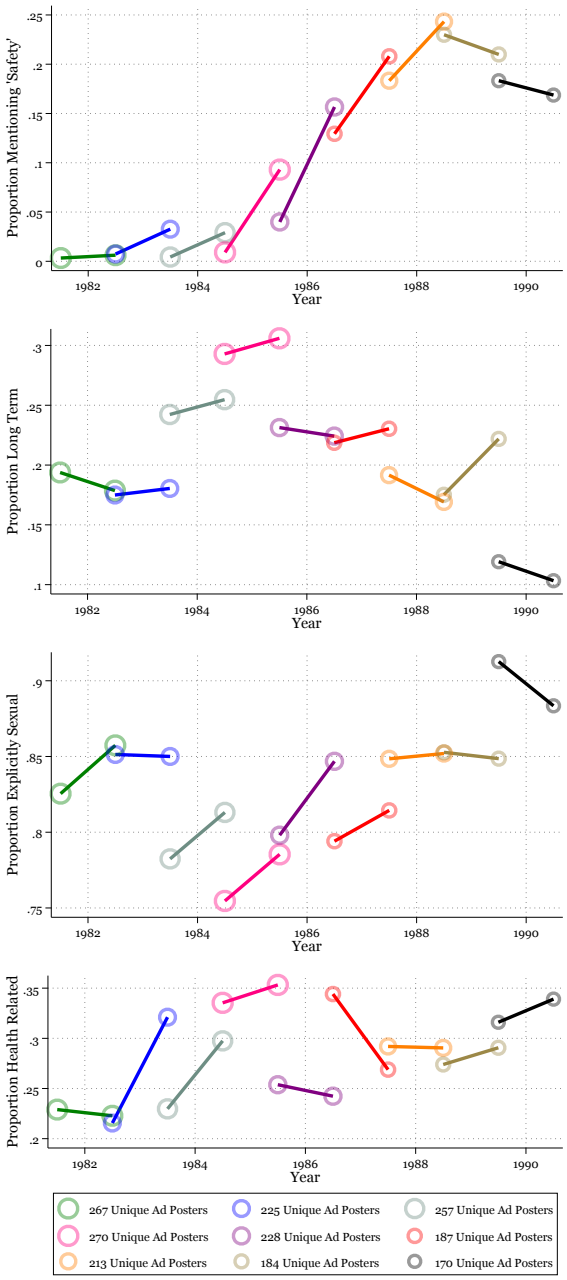


Figure 7: Source: Advocate Classified Ads
Notes: These figures depict trends in the proportion of certain types of personal ads over consistent sample populations. Each sample depicts a consistent sample of repeat posters. The first panel shows trends in the proportion of ads which include a safety term. The second panel shows trends in the proportion of ads which are long-term relationship oriented. The third panel depicts trends in the proportion of ads which are explicitly sexual.

Figure 8 : New York and San Francisco

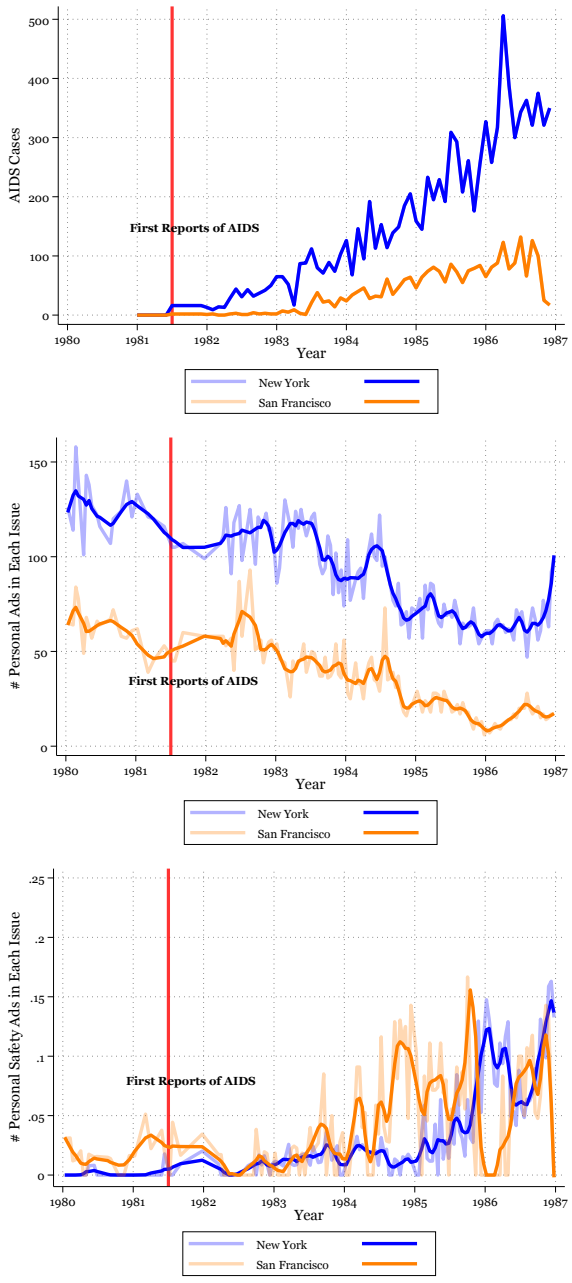


Figure 8: Source: Advocate Classified Ads
Notes:

Figure 9 : STI's over time

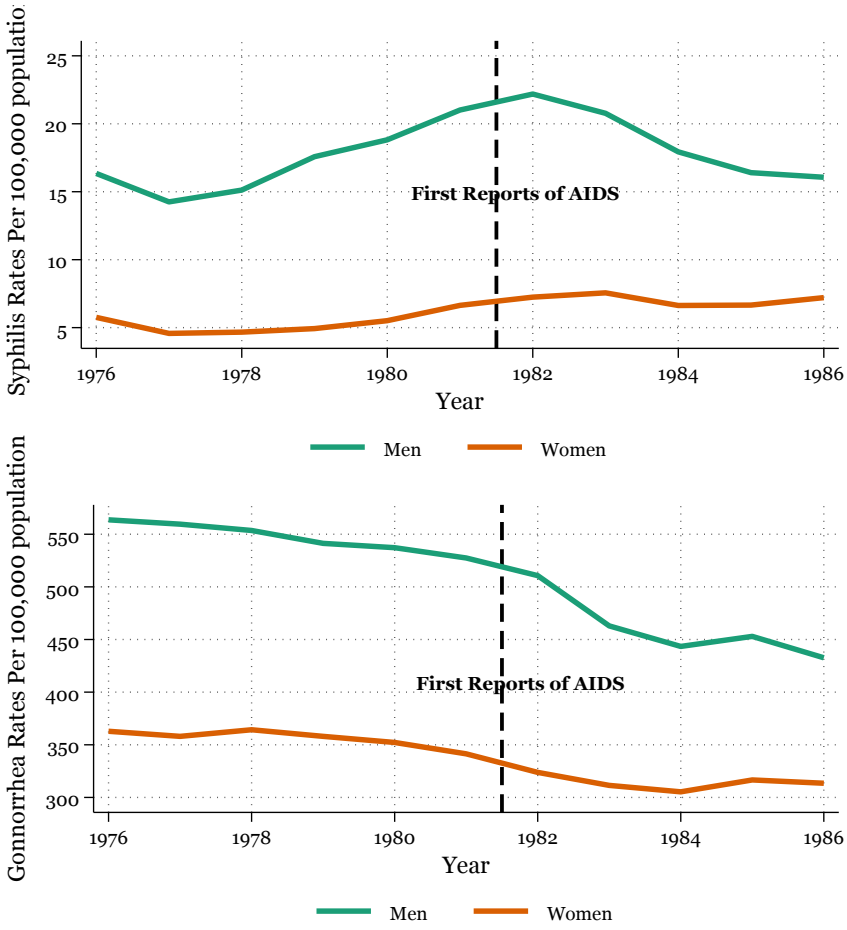


Figure 9: Source: CDC
Notes: These figures depict trends in the rates of sexually transmitted infections (STIs) by sex over time. The first panel depicts trends in rates of syphilis per 100,000 population for men and women overtime. The second panel depicts trends in the rates of Gonorrhea per 100,000 population for men and women overtime.

Figure 10 : Changes in STI rates

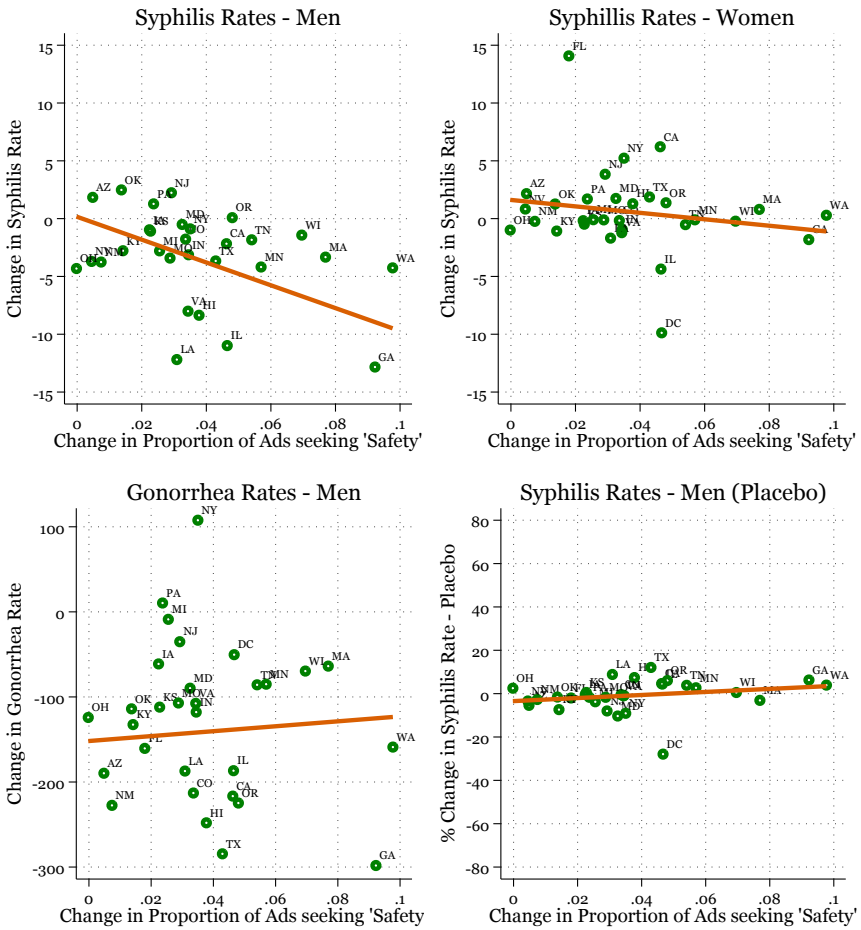


Figure 10: Source: CDC and Advocate Classified Ads
Notes: The first three figures depict scatter plots and lines of best fit for state-level percentage changes in rates of STIs to percentage changes in the proportion of ads which include safety terms from before the start of the HIV/AIDS epidemic (1978-1981) to several years after the first reports of AIDS in the country (1984-1987). The first figure shows this comparison for men's syphilis rate. The second figure shows this comparison for women's syphilis rate. The third figure shows this comparison for men's gonorrhea rate. The fourth figure has the same x-axis as the previous figures but the y-axis now represents changes in rates of syphilis in the decade prior to the HIV/AIDS epidemic.

11 Tables

Table 1: Summary Statistics of Personal Ads

White	0.877
	(0.328)
Black	0.063
	(0.243)
Asian	0.032
	(0.176)
Race Not Reported	0.375
	(0.484)
Age	31.495
	(10.699)
Age Not Reported	0.505
	(0.500)
Long Term Relationship Oriented	0.307
	(0.461)
Explicitly Sexual	0.728
	(0.445)
Safety	0.069
	(0.254)
Insertive Anal Intercourse	0.135
	(0.341)
Receptive Anal Intercourse	0.108
	(0.311)
Selling Sex	0.132
	(0.338)
State- California	0.458
	(0.498)
State- New York	0.246
	(0.431)
State- Illinois	0.036
	(0.187)
State- Florida	0.025
	(0.157)
State- Texas	0.025
	(0.156)
State - Not Identified	0.288
	(0.453)
MSA - Los Angeles-Long Beach-Santa Ana, CA	0.357
	(0.479)
MSA - New York-Newark-Jersey City, NY-NJ	0.252
	(0.434)
MSA - San Francisco-Oakland-Hayward, CA	0.085
	(0.279)
MSA - Chicago-Naperville-Elgin, IL-IN-WI	0.036
	(0.186)
MSA - Miami-Fort Lauderdale-West Palm Beach, FL	0.023
	(0.149)
MSA - Not Identified	0.288
	(0.453)
Observations	176901

mean coefficients; sd in parentheses

Table 1: Source: Advocate Classified Ads
Notes: This table presents summary statistics from the all ads posted in the Advocate from 1975-1992.

Table 2: Estimates from Equation 3 - The Effect of First Local AIDS Case on Personal Ads

	(1) Classified Ads	(2) Safety Ads	(3) Relationship Oriented Ads	(4) Explicitly Sexual Ads	(5) Health Related Ads
First AIDS Case	-0.31961^{***}	0.00703^{**}	-0.19505^{***}	-0.18792^{**}	0.02465
	(0.096)	(0.003)	(0.052)	(0.074)	(0.023)
Observations	1235	1235	1235	1235	1235
Period FE	Yes	Yes	Yes	Yes	Yes
Season-MSA FE	Yes	Yes	Yes	Yes	Yes
Mean	1.049	0.009	0.317	0.761	0.190

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Source: Advocate Classified Ads and AIDS Public Information Dataset
Notes: This table presents estimates from Equation 3 measuring the effect of the first reported AIDS case on personal ads using the Imputation Estimator developed by (Borusyak et al., 2024). The first column depicts effects on the total number of personal ads. The second column depicts effects on the number of ads which include safety terms. The third column depicts effects on the number of ads which are long-term relationship oriented. The fourth column depicts effects on the number of ads which are explicitly sexual. All estimates control for period fixed effects, and season-MSA fixed effects. Standard errors are clustered at the MSA-level.

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Appendices

A Additional Figures and Tables

Table A.1: Other Papers using Personal Ads Data

Author(s)	Newspaper/Website	Years Covered	Obs	Country
Lee, 1976	The Advocate	1970s	876	U.S.
Lumby, 1978	The Advocate	1976	1,111	U.S.
Laner and Kamel, 1978	The Advocate	1977	359	U.S
Davidson, 1991	The Village Voice	1978, 1982, 1985, 1988	844	U.S.
Gonzales and Meyers, 1993	Several U.S. Newspapers	1988-1989	2008	U.S.
Hatala and Prehodka, 1996	Several U.S. Newspapers	1993-1994	396	U.S.
Hatala et al., 1998	San Francisco Bay Guardian, SF Weekly, Bay Times	1995-1996	100	U.S.
Thorne and Coupland, 1998	Several U.K. Newspapers	1995-1996	200	U.K.
Bartholome et al., 2000	Canadian Telephone Ad System	1997	167	Canada
Smith, 2000	Outrage Magazine	1985-1996	591	Australia
Baker, 2003	Gay Times (formerly Gay News)	1973, 1982, 1991, 2000	1,350	U.K.
Tewksbury, 2003	Unnamed website	2003	880	U.S.
Grov, 2010	Craigslist	2009	1,438	U.S.

Table A.1: Source:
Notes: This table presents a list of papers using data from personal ads from LGBT newspapers, magazine, or other sources.

Figure A.1 : Page From Classifieds

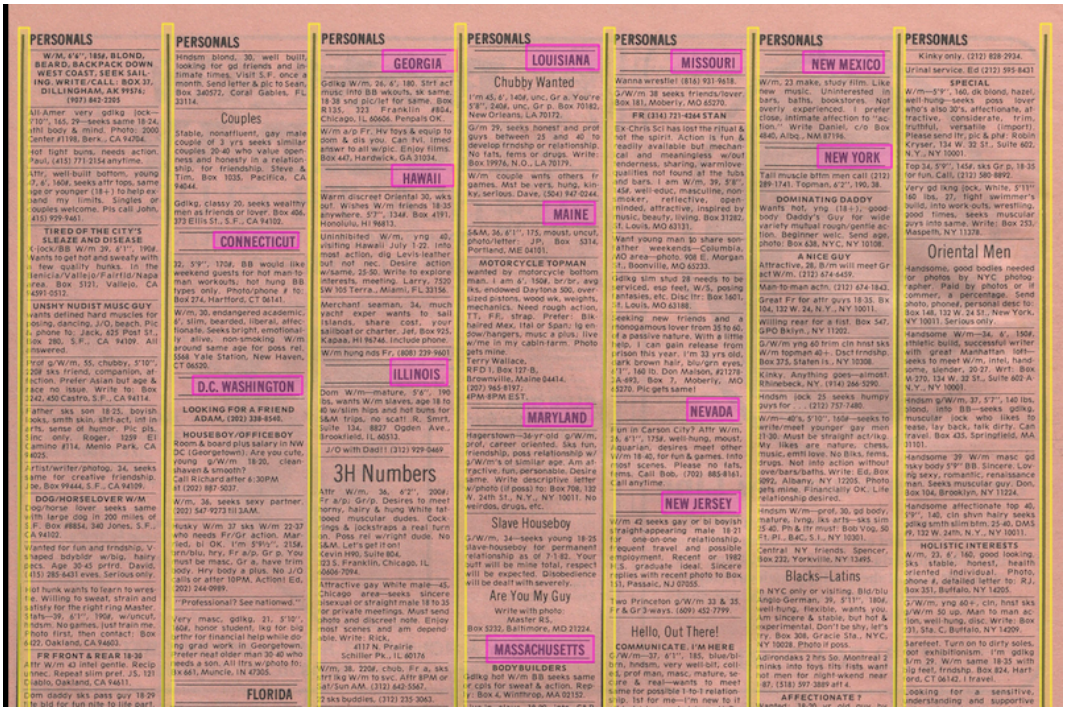


Figure A.1: Source: Advocate Classified Ads
Notes: This figure presents a page from *the Advocate* personals section

Figure A.2 : Age Distribution

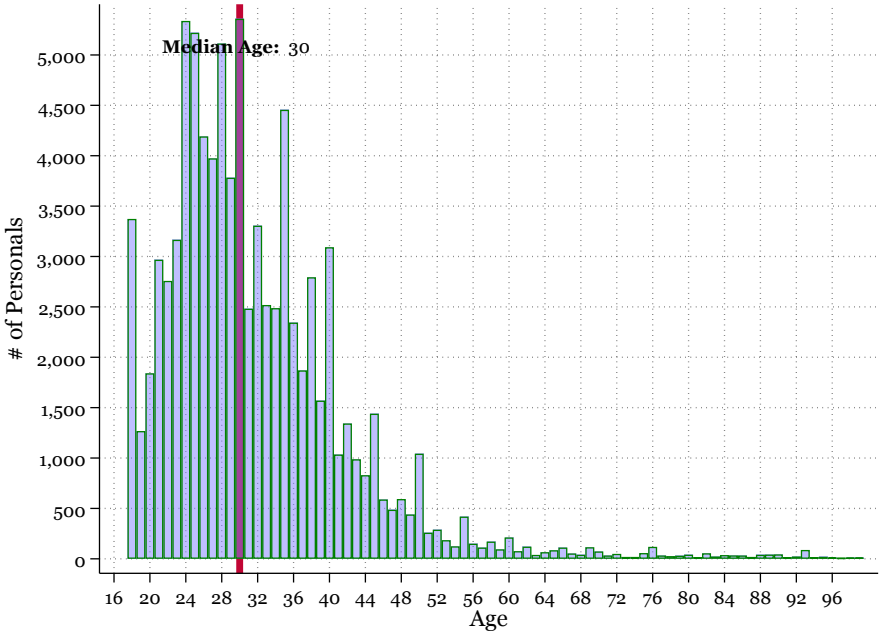


Figure A.2: Source: Advocate Personal Ads
Notes: This table presents the age distribution of individuals who post personal ads in *the Advocate*.

Figure A.3 : Copies Distributed Per Issue

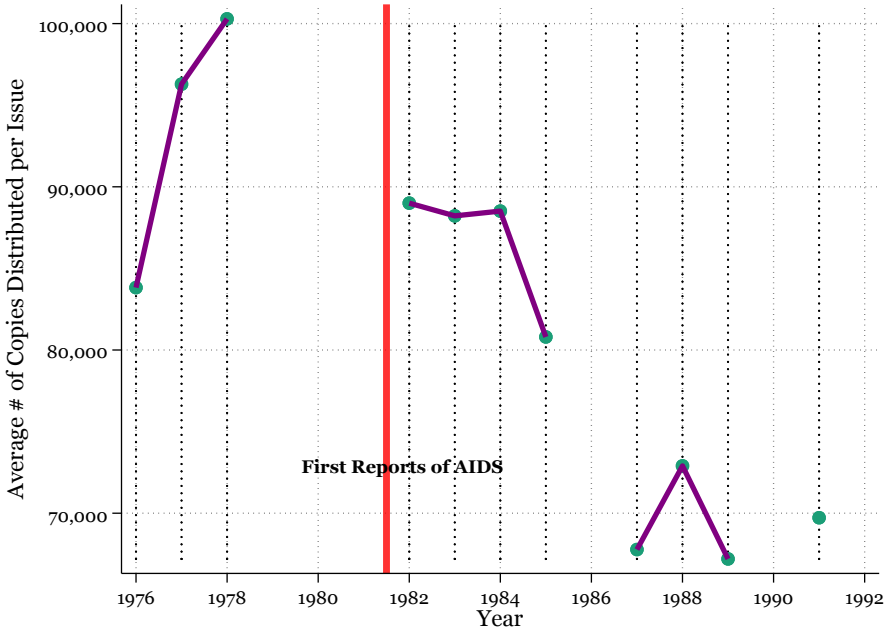


Figure A.3: Source: Advocate Personal Ads
Notes: This figure presents distribution statistics from located "Statement of Ownership, Management & Circulation" from issues of *the Advocate*. The vertical axis represents the average number of copies distributed per issue over the past 12 months.

Figure A.4 : Total Ads with Relationship Terms

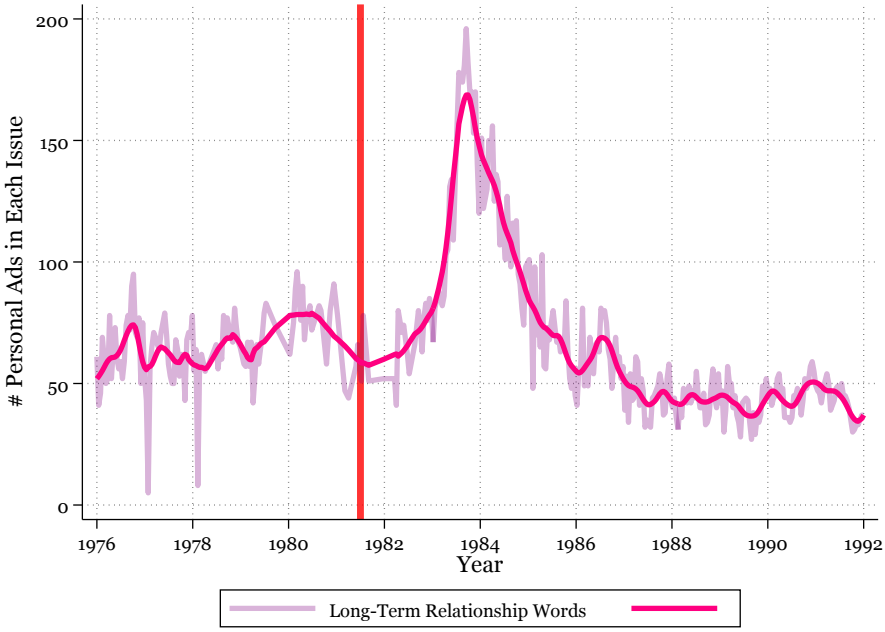


Figure A.4: Source: Advocate Personal Ads
Notes: This figure represents the total number of ads which include a relationship term posted in each issue of *the Advocate* personals section over time. The light line represents the exact number of ads with relationship terms in an issue while the darker line represents a smoothed version obtained from a locally weighted regression. These terms include 'partner', 'boyfriend', 'longterm', 'ltr', and 'rel'.

Figure A.5 : Total Ads by Type Over time

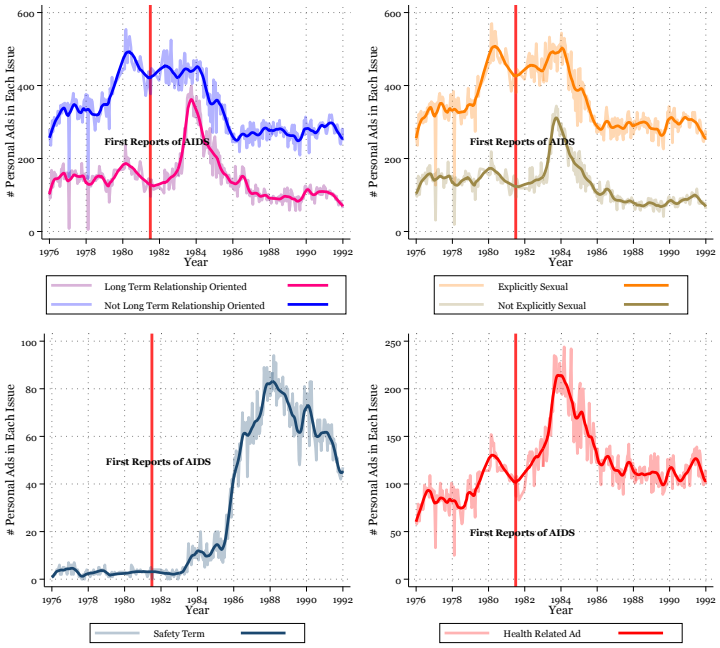


Figure A.5: Source: Advocate Classified Ads
Notes: These figures represent the number of a particular type of ad posted in each issue of *the Advocate* personals section over time. The light line represents the exact number of ads in an issue while the darker line represents a smoothed version obtained from a locally weighted regression. The figure shows trends in the number of ads that are long term relationship oriented and the number of ads that are not long-term relationship oriented. The second figure shows trends in the number of ads that are explicitly sexual and the number of ads that are not explicitly sexual. The third figure shows trends in the number of ads that include a 'safety term' and the number of ads that do not.

Figure A.6 : Price of an Ad

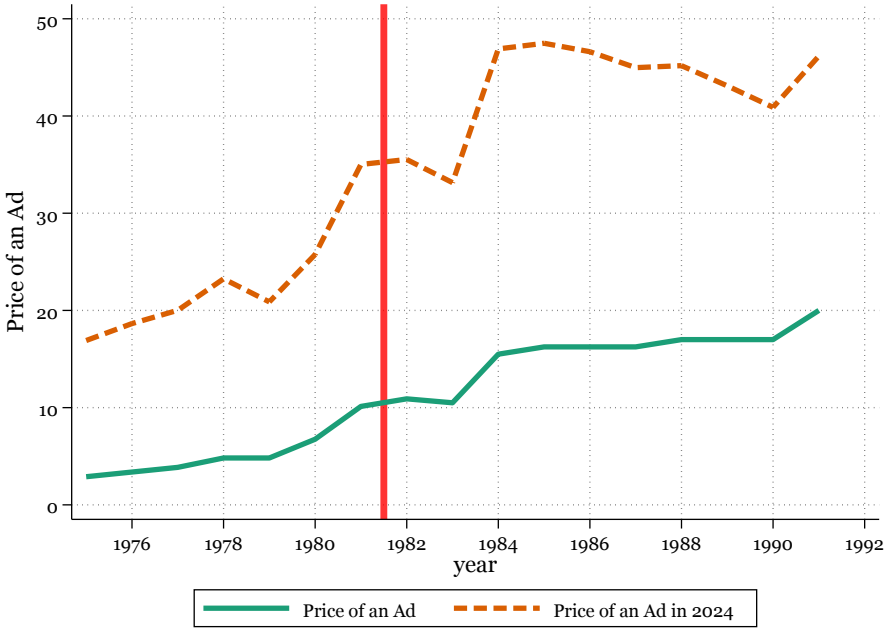


Figure A.6: Source: Advocate Personal Ads
Notes: This figure represents the price of posting an 81 character ad.

Figure A.7 : Share of Ads in subsections

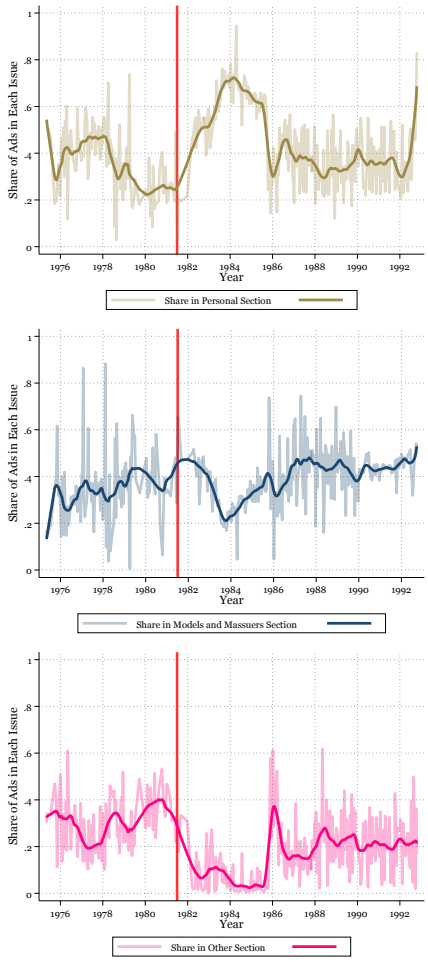


Figure A.7: Source: Advocate Personal Ads
Notes: These figures represent the proportion of ads in a specific subsection in each issue of the Advocate classifieds over time. The light line represents the exact proportion of ads in the subsection of an issue while the darker line represents a smoothed version obtained from a locally weighted regression. The first figure represents the proportion of ads in the personals subsection. The second figure depicts the proportion of ads in the models and massuers subsection. The third figure depicts the proportion of ads in other subsections.

Table A.2: Year of First Reports AIDS Case

	MSA Name	First AIDS Case
1	Houston-Pasadena-The Woodlands, TX	1981.5
2	Los Angeles-Long Beach-Anaheim, CA	1981.5
3	Cleveland, OH	1981.5
4	New Haven, CT	1981.5
5	Portland-Vancouver-Hillsboro, OR-WA	1981.5
6	Pittsburgh, PA	1981.5
7	Miami-Fort Lauderdale-West Palm Beach, FL	1981.5
8	Boston-Cambridge-Newton, MA-NH	1981.5
9	Atlanta-Sandy Springs-Roswell, GA	1981.5
10	Chicago-Naperville-Elgin, IL-IN	1981.5
11	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	1981.5
12	Detroit-Warren-Dearborn, MI	1981.5
13	Syracuse, NY	1981.5
14	Tampa-St. Petersburg-Clearwater, FL	1981.5
15	Hartford-West Hartford-East Hartford, CT	1981.5
16	San Francisco-Oakland-Fremont, CA	1981.5
17	New York-Newark-Jersey City, NY-NJ	1981.5
18	Baltimore-Columbia-Towson, MD	1981.5
19	Sacramento-Roseville-Folsom, CA	1982
20	Denver-Aurora-Centennial, CO	1982
21	Dallas-Fort Worth-Arlington, TX	1982
22	San Diego-Chula Vista-Carlsbad, CA	1982
23	Minneapolis-St. Paul-Bloomington, MN-WI	1982
24	Virginia Beach-Chesapeake-Norfolk, VA-NC	1982
25	Rochester, NY	1982
26	St. Louis, MO-IL	1982
27	Phoenix-Mesa-Chandler, AZ	1982
28	North Port-Bradenton-Sarasota, FL	1982
29	Youngstown-Warren, OH	1982.5
30	Orlando-Kissimmee-Sanford, FL	1982.5
31	Washington-Arlington-Alexandria, DC-VA-MD-WV	1982.5
32	Allentown-Bethlehem-Easton, PA-NJ	1982.5
33	Akron, OH	1982.5
34	Harrisburg-Carlisle, PA	1982.5
35	Scranton–Wilkes-Barre, PA	1982.5
36	Columbus, OH	1982.5
37	Birmingham, AL	1982.5
38	Seattle-Tacoma-Bellevue, WA	1982.5
39	Colorado Springs, CO	1982.5
40	San Antonio-New Braunfels, TX	1983
41	Cincinnati, OH-KY-IN	1983
42	Buffalo-Cheektowaga, NY	1983
43	Wichita, KS	1983
44	Milwaukee-Waukesha, WI	1983
45	Providence-Warwick, RI-MA	1983
46	Austin-Round Rock-San Marcos, TX	1983
47	Riverside-San Bernardino-Ontario, CA	1983
48	Raleigh-Cary, NC	1983
49	Columbia, SC	1983
50	Indianapolis-Carmel-Greenwood, IN	1983
51	Bakersfield-Delano, CA	1983
52	Urban Honolulu, HI	1983
53	Oxnard-Thousand Oaks-Ventura, CA	1983
54	Charleston-North Charleston, SC	1983
55	Oklahoma City, OK	1983
56	Springfield, MA	1983
57	Kansas City, MO-KS	1983
58	Nashville-Davidson–Murfreesboro–Franklin, TN	1983
59	New Orleans-Metairie, LA	1983
60	Tulsa, OK	1983
61	San Juan-Bayamón-Caguas, PR	1983
62	Las Vegas-Henderson-North Las Vegas, NV	1983
63	Albany-Schenectady-Troy, NY	1983
64	Tucson, AZ	1983
65	Louisville/Jefferson County, KY-IN	1983
66	Dayton-Kettering-Beavercreek, OH	1983
67	Charlotte-Concord-Gastonia, NC-SC	1983.5
68	Jacksonville, FL	1983.5
69	Salt Lake City-Murray, UT	1983.5
70	San Jose-Sunnyvale-Santa Clara, CA	1983.5
71	Richmond, VA	1983.5
72	Mobile, AL	1983.5
73	Baton Rouge, LA	1983.5
74	Greenville-Anderson-Greer, SC	1983.5
75	McAllen-Edinburg-Mission, TX	1984
76	Vallejo, CA	1984
77	Omaha, NE-IA	1984
78	Fresno, CA	1984
79	Greensboro-High Point, NC	1984
80	El Paso, TX	1984
81	Memphis, TN-MS-AR	1984
82	Deltona-Daytona Beach-Ormond Beach, FL	1984.5
83	Albuquerque, NM	1984.5
84	Little Rock-North Little Rock-Conway, AR	1985
85	Ann Arbor, MI	1985
86	Stockton-Lodi, CA	1985
87	Toledo, OH	1985
88	Knoxville, TN	1985
89	Grand Rapids-Wyoming-Kentwood, MI	1985
90	Fort Wayne, IN	1985.5

Table A.2: Source: AIDS Public Information Dataset
Notes: This table presents the first half-year period when an MSA reports their first AIDS case.

Figure A.8 : AIDS Public Information Dataset (APID)

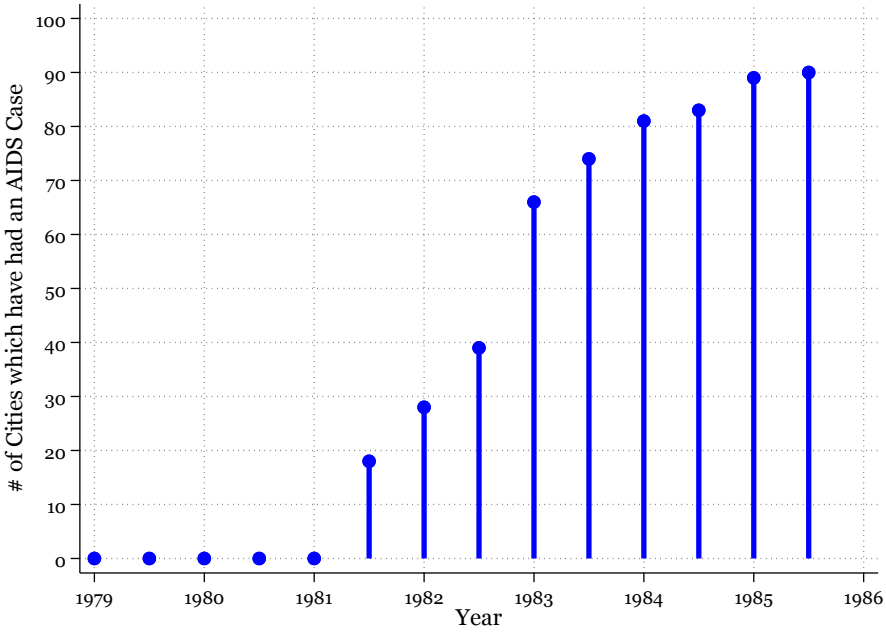


Figure A.8: Source: US Department of Health and Human Services (US DHHS) (2005)
This figure depicts the total number of cities which have reported an AIDS case in the APIDs dataset by half-year.

Table A.3: Newspaper Reports

Newspaper Name	Circulation City	State	rank
Birmingham Post - Herald	Birmingham	AL	2
Los Angeles Times	Los Angeles	CA	1
Record Searchlight	Redding	CA	1
The San Francisco Examiner	San Francisco	CA	2
The Hartford Courant	Hartford	CN	1
The Washington Post	Washington	DC	1
Sun-Sentinel	Fort Lauderdale	FL	1
Fort Myers News-Press	Fort Myers	FL	1
Palm Beach Daily News	Palm Beach	FL	1
The Tampa Tribune	Tampa	FL	1
The Atlanta Journal	Atlanta	GA	1
Des Moines Register	Des Moines	IA	1
Iowa City Press-Citizen	Iowa City	IA	1
Evansville Press	Evansville	IN	1
The Indianapolis news	Indianapolis	IN	1
The Lafayette Journal and Courier	Lafayette	IN	1
Muncie Evening Press	Muncie	IN	1
Palladium - Item	Richmond	IN	1
The Daily Advertiser	Lafayette	LA	1
Daily World	Opelousas	LA	1
The Times	Shreveport	LA	1
Boston Globe	Boston	MA	1
The Daily Times	Salisbury	MD	1
The Times Herald	Port Huron	MI	1
Detroit Free Press	Detroit	MI	1
Lansing State Journal	Lansing	MI	1
Hattiesburg American	Hattiesburg	MS	1
Clarion-Ledger	Jackson	MS	1
Great Falls Tribune	Great Fall	MT	1
The Record	Hackensack	NJ	1
The Courier-News	Bridgewater-Plaifield	NJ	1
Courier - Post	Camden	NJ	1
Daily Record	Morristown	NJ	1
Albuquerque Journal	Albuquerque	NM	1
Star-Gazette	Elmira	NY	1
Ithaca Journal	Ithaca	NY	1
Daily News	New York	NY	2
Poughkeepsie Journal	Poughkeepsie	NY	1
Democrat and Chronicle	Rochester	NY	1
Chillicothe Gazette	Chillicothe	OH	1
The Cincinnati Post	Cincinnati	OH	2
The Coshocton Tribune	Coshocton	OH	1
Lancaster Eagle-Gazette	Lancaster	OH	1
News Journal	Mansfield	OH	1
The Marion Star	Marion	OH	1
The Advocate	Newark	OH	1
News Herald	Port Clinton	OH	1
The Times Recorder	Zanesville	OH	1
Statesman Journal	Salem	OR	1
The Morning Call	Allentown	PA	1
Philadelphia Daily News	Philadelphia	PA	2
Pittsburgh Press	Pittsburgh	PA	1
The Greenville News	Greenville	SC	1
Argus Leader	Sioux Falls	SD	1
The Leaf-Chronicle	Clarksville	TN	1
Jackson Sun	Jackson	TN	1
The Knoxville News-Sentinel	Knoxville	TN	1
The Commercial Appeal	Memphis	TN	1
The Daily News-Journal	Murfreesboro	TN	1
The Tennessean	Nashville	TN	1
Abilene Reporter - News	Abiline	TX	1
El Paso Herald - Post	El Paso	TX	1
Daily Press	Newport News	VA	1
Burlington Free Press	Burlington	VT	1
The Spokesman-Review	Spokane	WA	1
The Post-Crescent	Appleton	WI	1
Green Bay Press Gazette	Green Bay	WI	1
Herald Times Reporter	Manitowoc	WI	1
Marshfield News-Herald	Marshfield	WI	1
The Oshkosh Northwestern	Oshkosh	WI	1
The Sheboygan Press	Sheboygan	WI	1
The Daily Tribune	Wisconsin Rapids	WI	1

Table A.3: Source: ProQuest Historical Newspapers
Notes: This table lists all the local newspapers obtained from ProQuest Historical Newspapers database used for analysis. I only include the most popular newspaper in each MSA that is available in this dataset. This is determined from the 1981 Editor & Publisher International year book (edi, 1981).

Figure A.9 : Examples of Local News Reports



Vermont's First AIDS Case Reported

By TED TEDFORD

them to be on the watch for potential AIDS victims might seek treatment.

First AIDS Case In Del. Reported In Rehoboth

By MICHAEL MILLS
Times Siussex Bureau

because most of the cases have been reported in the past few months and death is usually slow

for the post.

First AIDS case confirmed

MADISON, Wis. (AP) — The first confirmed case of AIDS has been reported at the Veterans Administration Hospital, associate director Robert Stott said Friday.

Stott would release no further details about the case.

Previously, two people with symptoms of Acquired Immune Deficiency Syndrome were being watched in the city, according to state epidemiologist Jeffrey Davis.

AIDS, a mysterious disease which destroys the body's immunity system and leaves it open to a host of life-threatening conditions has primarily affects homosexual men, intravenous drug users, hemophiliacs and Haitians.

More than 2,000 cases have been reported nationwide to the Centers for Disease Control during the past two years.

First Iowa victim of AIDS found

By BILL GORDON

County resident is AIDS victim

Shasta County has its first reported case of Acquired Immune Deficiency Syndrome (AIDS), officials confirmed today.

said.

There is no known cure to the disease, doctors say.

Figure A.9: The figure presents examples of local newspaper reports about the first local reported AIDS case. First Panel: Burlington Free Press, 1983. Second Panel: The Daily Times, 1983. Third Panel: The Post-Crescent, 1983. Fourth panel: Des Moines Register, 1983. Fifth Panel: Record Searchlight, 1983.

Figure A.10 : Poisson

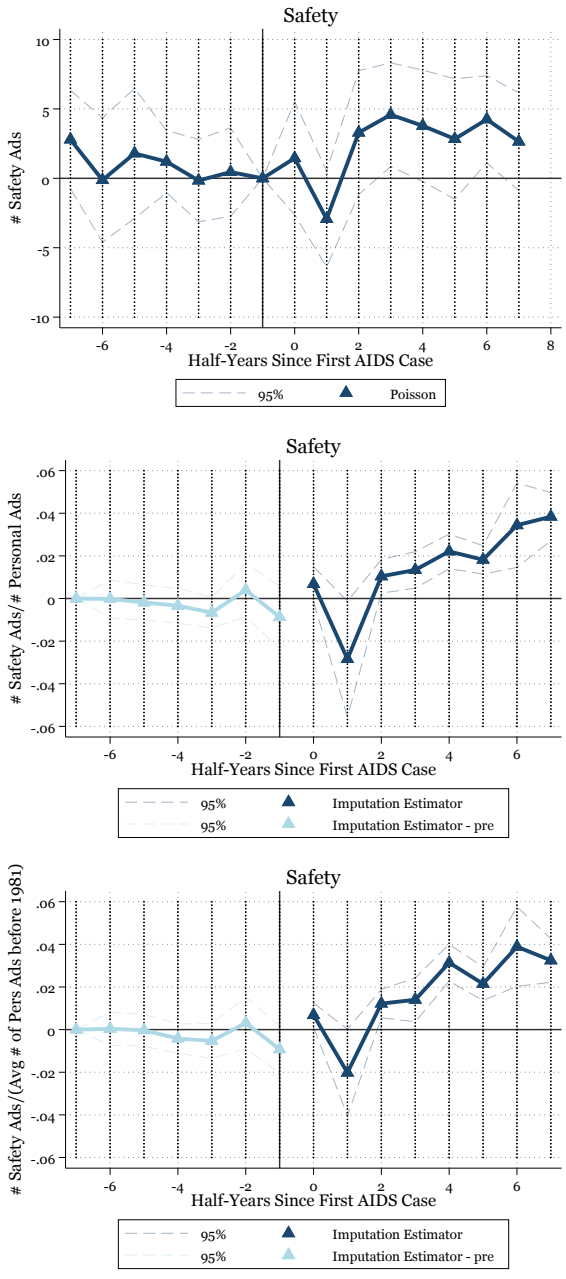


Figure A.10: Source: Advocate Personal Ads and AIDS Public Information Dataset
Notes: These figure depict event study estimates of Equation 2 measuring the effect of the first reported AIDS case on personal ads using the poisson pseudo-likelihood regression. The figure depicts effects on the number of ads which include safety terms. All estimates control for period fixed effects, and season-MSA fixed effects. Standard errors are clustered at the MSA-level.

Figure A.11 : Proportion of Ads by Treatment Time

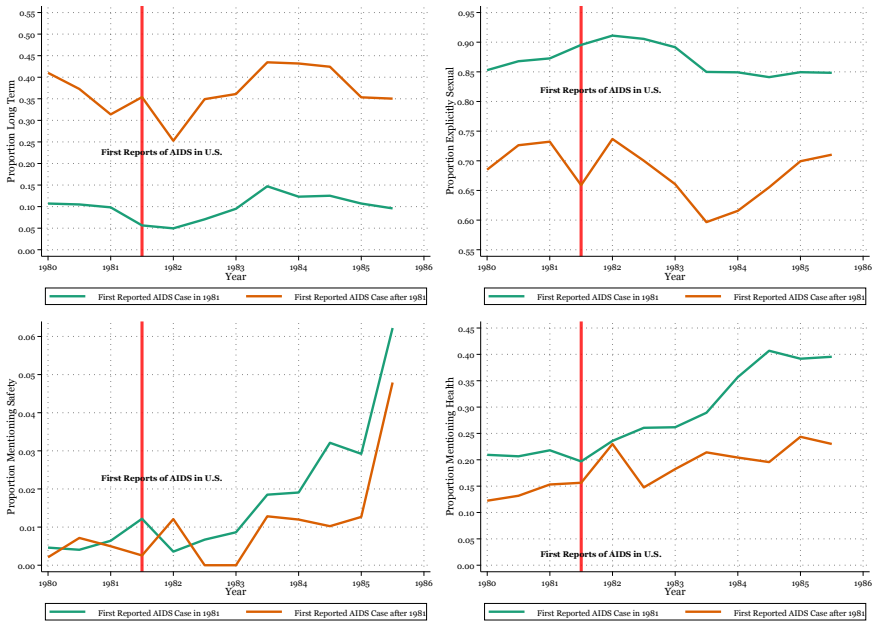


Figure A.11: Source: Advocate Personal Ads
Notes: This figure presents trends in the proportion of certain types of ads in MSA's which reported their first AIDS case 1981 and MSA's which reported their first AIDS case later on. The first figure shows these trends for the proportion of long term-relationship oriented ads. The second term shows these trends for the proportion of explicitly sexual ads. The third term shows these trends for ads which mention a safety term.

Figure A.12 : Additional Event Studies

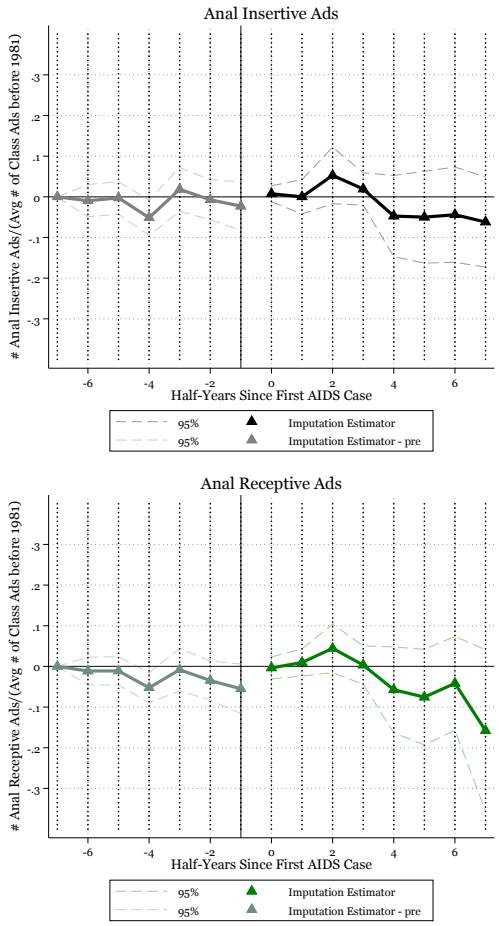


Figure A.12: Source: Advocate Personal Ads and AIDS Public Information Dataset
Notes: These figures depict event study estimates of Equation 2 measuring the effect of the first reported AIDS case on personal ads using the Imputation Estimator developed by (Borusyak et al., 2024). The first figure depicts effects on the number of personal ads seeking anal insertive sex. The second figure depicts effects on the number of ads which seek anal receptive sex. The third figure depicts effects on the number of ads which represent the sale of sex. All estimates control for period fixed effects, and season-MSA fixed effects. Standard errors are clustered at the MSA-level.

Table A.2: Year of First Reports AIDS Case

	Drop Lowest 10 Percentile				
	(1)	(2)	(3)	(4)	(5)
	Classified Ads	Safety Ads	Relationship Oriented Ads	Explicitly Sexual Ads	Health Related Ads
First AIDS Case	−0.31961***	0.00703**	−0.19505***	−0.18792**	0.02465
	(0.096)	(0.003)	(0.052)	(0.074)	(0.022)
Observations	1235	1235	1235	1235	1235
Period FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Season-MSA FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Mean	1.049	0.009	0.317	0.761	0.761
Lowest Total Number of Classifieds in MSA	13	13	13	13	13
	Drop Lowest 25 Percentile				
	(1)	(2)	(3)	(4)	(5)
	Classified Ads	Safety Ads	Relationship Oriented Ads	Explicitly Sexual Ads	Health Related Ads
First AIDS Case	−0.36546***	0.00701**	−0.21024***	−0.23106***	0.02206
	(0.101)	(0.003)	(0.055)	(0.078)	(0.024)
Observations	1140	1140	1140	1140	1140
Period FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Season-MSA FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Mean	1.056	0.009	0.319	0.769	0.769
Lowest Total Number of Classifieds in MSA	20	20	20	20	20
	Drop Lowest 50 Percentile				
	(1)	(2)	(3)	(4)	(5)
	Classified Ads	Safety Ads	Relationship Oriented Ads	Explicitly Sexual Ads	Health Related Ads
First AIDS Case	−0.47565***	0.00630**	−0.24909***	−0.31570***	0.03861*
	(0.130)	(0.003)	(0.065)	(0.104)	(0.022)
Observations	855	855	855	855	855
Period FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Season-MSA FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Mean	1.070	0.009	0.321	0.777	0.777
Lowest Total Number of Classifieds in MSA	61	61	61	61	61

Table A.4: Source: Advocate Personal Ads and AIDS Public Information Dataset
Notes: This table presents estimates from Equation 3 measuring the effect of the first reported AIDS case on personal ads, using the Imputation Estimator developed by (Borusyak et al., 2024). The estimates are reported after progressively dropping MSAs within the lowest 10th percentile, 25th percentile, and 50th percentile. The first and second columns present the effects of the first AIDS case on the number of personal ads and safety ads for MSAs after dropping the lowest 10th percentile of observations in the dataset. In this sample, the lowest total number of personal ads includes MSAs with 9 observations. The third and fourth columns present the effects of the first AIDS case on the number of personal ads and safety ads for MSAs after dropping the lowest 25th percentile of observations in the dataset. In this sample, the lowest total number of personal ads includes MSAs with 20 observations. The fifth and sixth columns present the effects of the first AIDS case on the number of personal ads and safety ads for MSAs after dropping the lowest 10th percentile of observations in the dataset. In this sample, the lowest total number of personal ads includes MSAs with 61 observations.

Figure A.13 : Constructing a Panel

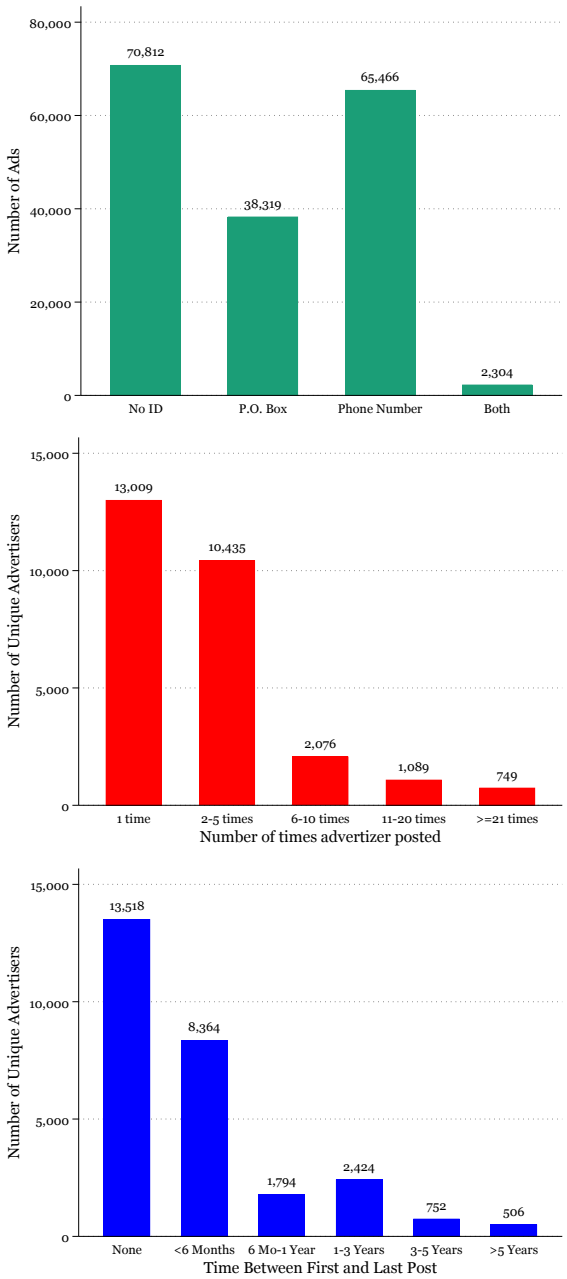


Figure A.13: Source: Advocate Personal Ads
Notes: These figure depict sample sized when using the personal ads data for panel analysis. The first figure depicts the number of ads which provide no form of identification, a P.O.Box number, a phone number of both a P.O.Box and phone number. The second figures depicts the number of unique advertizers and the number of times they post ads. The this panel shows the length of time they can be followed in the dataset.

Figure A.14 : Proportion of Safety Ads by Term

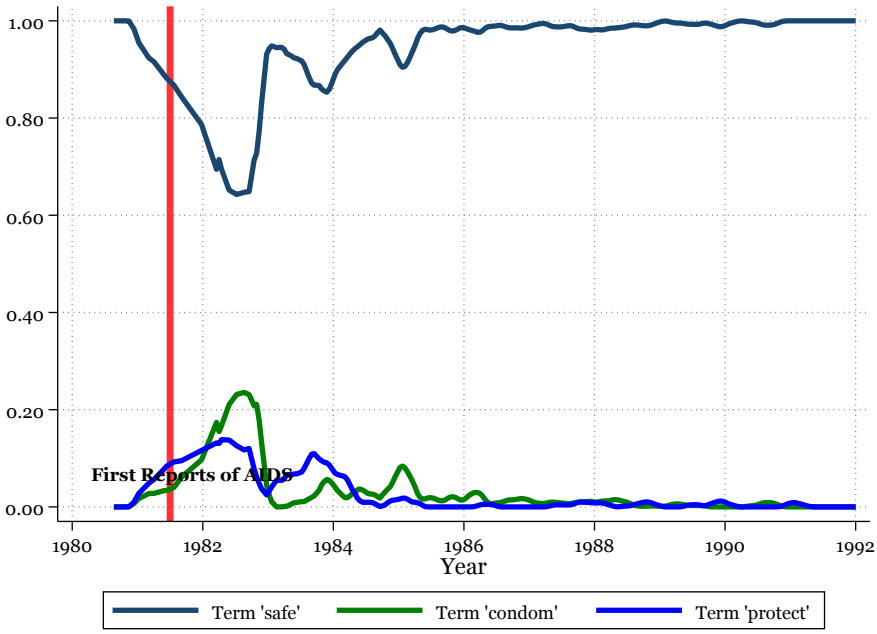


Figure A.14: Source: Advocate Personal Ads.
Notes: This papers searches for the terms 'safe', 'condom', and 'protect' to identify ads which mention safety-terms. In this figure I show the proportion of safety-ads that are identified using each term.

Figure A.15 : Changes in STI rates and take-up of health related language

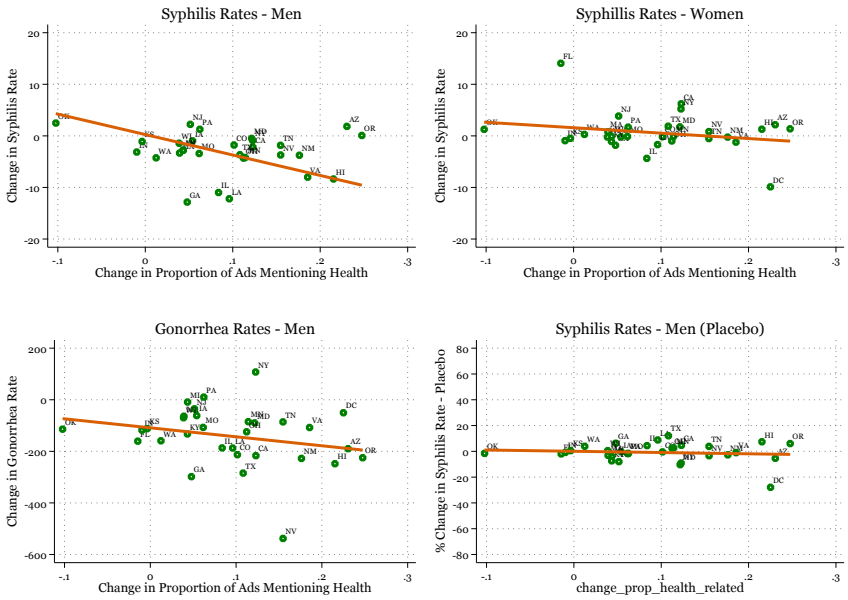


Figure A.15: Source: CDC and Advocate Personal Ads
Notes: The first three figures depict scatter plots and lines of best fit for state-level percentage changes in rates of STIs to percentage changes in the proportion of ads which include health related terms from before the start of the HIV/AIDS epidemic (1978-1981) to several years after the first reports of AIDS in the country (1984-1987). The first figure shows this comparison for men's syphilis rate. The second figure shows this comparison for women's syphilis rate. The third figure shows this comparison for men's gonorrhea rate. The fourth figure has the same x-axis as the previous figures but the y-axis now represents changes in rates of syphilis in the decade prior to the HIV/AIDS epidemic.

B Cleaning Personals Data

In order to construct the main dataset of personal ads from *the Advocate*, I exploit the contours in the classified section of the newspapers. The ads are presented in vertical columns one after the other as depicted in the first panel of Figure B. I go across each page and search for the proportion of dark pixels across the page. The second panel of Figure B shows the proportion of dark pixels across the X-coordinates of the page. I am able to identify the coordinates which divide the personal ads. Thereafter, I break down the ads into singular vertical strips of personal ads as depicted in the first panel of Figure B. Then, I use Optical Character Recognition (OCR) to digitize the the text in each individual column as depicted in the second panel of Figure B. Now the text in each ad is presented one after the other and separated by a space. I use these spaces to create a dataset where each observation represents the text in each personal ad. In this dataset, most observations represent personal ads but there is a significant number of observations which include other, non-personal ad, information. This includes advertisements for other business or the titles of columns such as the "personals" highlighted in the second panel of Figure B. Therefore, I use machine learning to identify and drop all observations which do not represent personal ads. From the dataset, I randomly select 500 and manually identify whether the ads represent a personal ads. I use this as training data. I use a supervised machine learning model to classify the ads. The model is trained on the manually labeled subset of 500 ads, which have been identified as either personal ads or not.[77] The trained model is then applied to the entire dataset to automatically categorize the remaining ads.

[77] I use Term Frequency-Inverse Document Frequency (TF-IDF) to vectorize the ads. This involves measuring the importance of words in the ads of a specific category. It discounts words that are common throughout the document.

Figure B : Digitizing Personal Ads 1

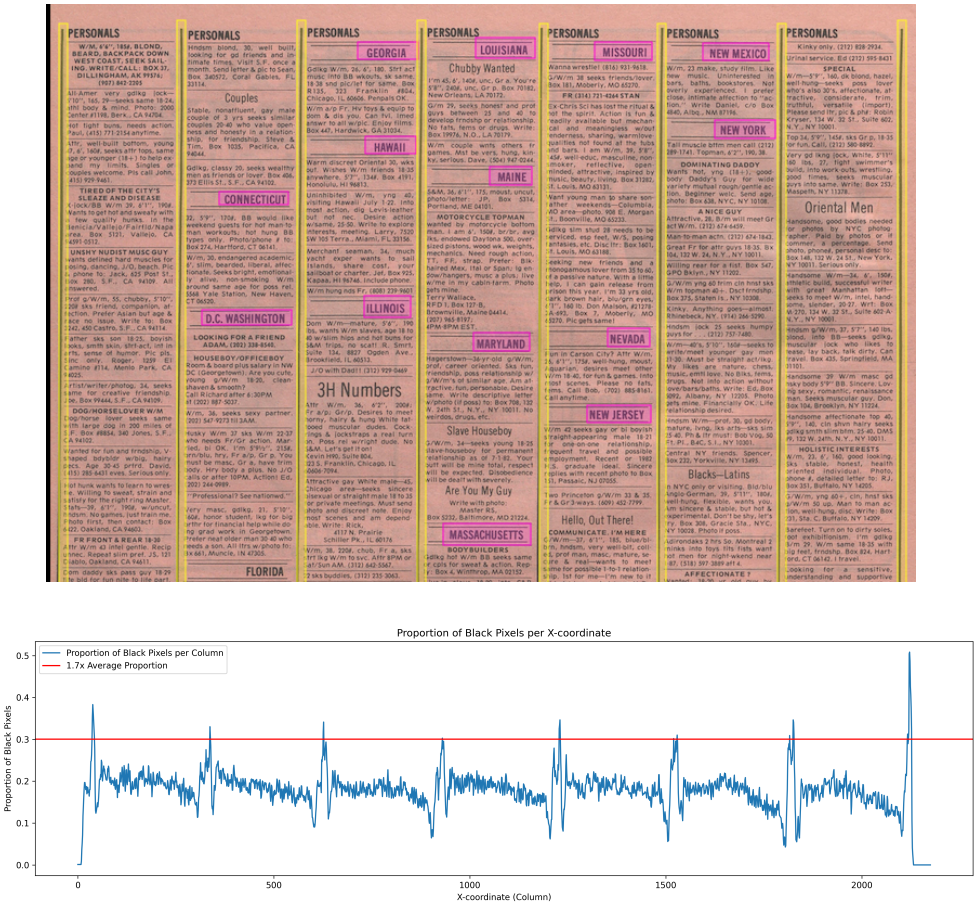
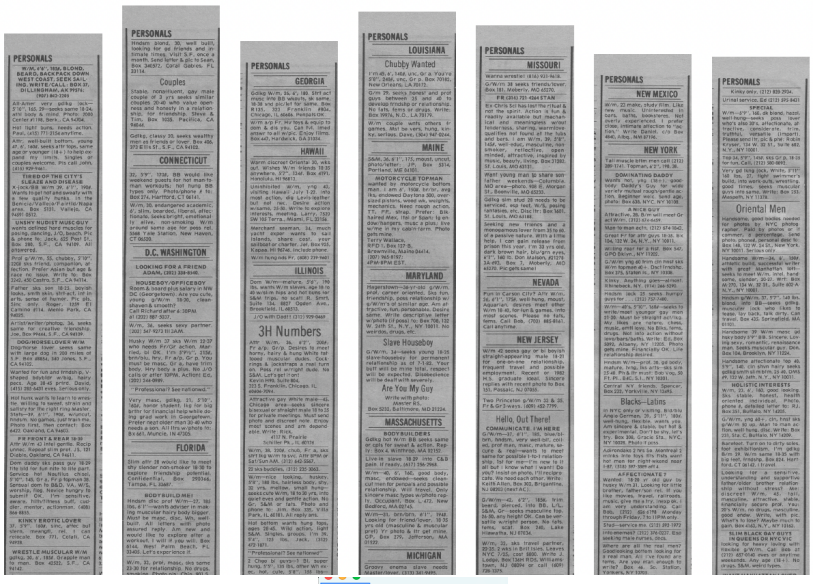


Figure B.1: Source: Advocate Personal Ads
Notes: This figure shows the methodology used to construct the personal ads dataset.

Figure B : Digitizing Personal Ads 2



PERSONALS

W/M, 6'6'', 185#, BLOND, BEARD, BACKPACK DOWN WEST COAST, SEEK SAIL-ING. WRITE/CALL: BOX 37, DILLINGHAM, AK 99576; (907) 842-2205

All-Amer very gdikg jock-5'10", 165, 29-Seeks same 18-24, athi body & mind. Photo: 2000 Center #1198, Berk., CA 94704.

Hot tight buns, needs action. Paul, (415) 771-2154 anytime.

Attr, well-built bottom, young 47, 6', 160#, Seeks attr tops, same age or younger (18+) to help ex-pand my limits. Singles or couples welcome. Pls call John, (415) 929-9461.

TIRED OF THE CITY'S SLEAZE AND DISEASE X-jock/BB W/m 39, 6'1'', 190#. Wants to get hot and sweaty with a few quality hunks. In the Benicia/Vallejo/Fairfid/Napa area. Box 5121, Vallejo, CA 94591-0512.

UNSHY NUDIST MUSC GUY wants defined hard muscles for posing, dancing, J/O, beach, Pic & phone to: Jack, 625 Post St., Box 280, S.F., CA 94109. All answered.

Prof g/W/m, 55, chubby, 5'10', 220# sks friend, companion, af-fection. Prefer Asian but age & race no issue. Write to: Box 3242, 450 Castro, S. CA 94114.

Father sks son 18-25, boyish looks, smth skin, strt-act, int in arts, sense of humor. Pic pls. Sinc only. Roger, 1259 El Camino #114, Menlo Park, CA 94025.

Artist/writer/photog, 34, seeks same for creative friendship. Joe, Box 99444, S.F., CA 94109.

DOG/HORSELOVER W/M Dog/horse lover seeks same with large dog in 200 miles of S.F. Box #8854, 340 Jones, S.F., CA 94102.

Wanted for fun and frndship, V-shaped bdybldr w/big, hairy pecs. Age 30-45 prfrd. David, (415) 285-6431 eves. Serious onl

Figure B.2: Source: Advocate Personal Ads
Notes: This figure shows the methodology used to construct the personal ads dataset.

C Identifying HIV/AIDS-Related Articles

In order to identify HIV/AIDS related articles in local newspapers, I employ TDM Studio. TDM studio is a text and data mining platform developed by proquest which allows me to search through the text of each of these newspapers. To identify AIDS-related articles, I use the following search prompt:

("AIDS" AND ("disease" OR "pneumonia")) OR ("HIV" AND ("homosexual" OR "gay" OR "disease" OR "virus" OR "cancer")) OR (("gay" OR "homosexual") AND ("disease" OR "pneumonia" OR "cancer" OR "virus"))

The promt produces a list of articles but many articles match the search criteria but are not related to the HIV/AIDS virus.[78] To address this concern, I randomly choose 500 search results, I manually identify whether these results represent HIV/AIDS related articles or something else. I use machine learning to predict whether the remaining articles are HIV/AIDS related.

[78] For example, the search prompt would pick up an article titled "U.S. aids China in combating bird flu disease."

D Women's Ads

Form May 1983 to August 1984, there is a subsection of personals under the title "Women's Ads". This may have attracted a larger number of women advertisers. Although a small number of women's ads appear in other issues of the advocate, they appear alongside men's personal ads in the general personals section. It is likely that the new "Women's Ads" section attracted a larger number of lesbian advertisers. Figure D.1 depicts trends in the number of ads which include any of the following terms: 'lesbian', 'women', 'female', '/f', 'girl'. These ads likely represent ads from women. I observe a significant increase in the number of women's ads between May 1983 and August 1984 which have a separate Women's Ads section. Since lesbian women may be more likely to post long term relationship oriented ads relative to gay men, the spike in long-term relationship oriented ads between 1983 and 1985 may be driven by the influx of lesbian advertisers. I explore this possibility more closely in Figure D.2. The first panel depicts the proportion of ads per issue that are long term relation oriented. The spike in long-term relationship ads coincides with the "Women's Ads" section. The second panel depicts trends from ads which we confidently identify as ads from men because they include one of the following terms: 'm/', 'boy', '/m', 'guy'. This implies that the spike is likely unrelated to the new "Women's Ads" section. Although I do not find evidence that the "Women's Ads" section explains the spike in long term-relationship ads, it still highlights the possibility that trends in the number of ads overtime can represent changes in supply-side factors and should not be interpreted as behavioral responses to the HIV/AIDS epidemic.

Figure D.1 : Women's Ad

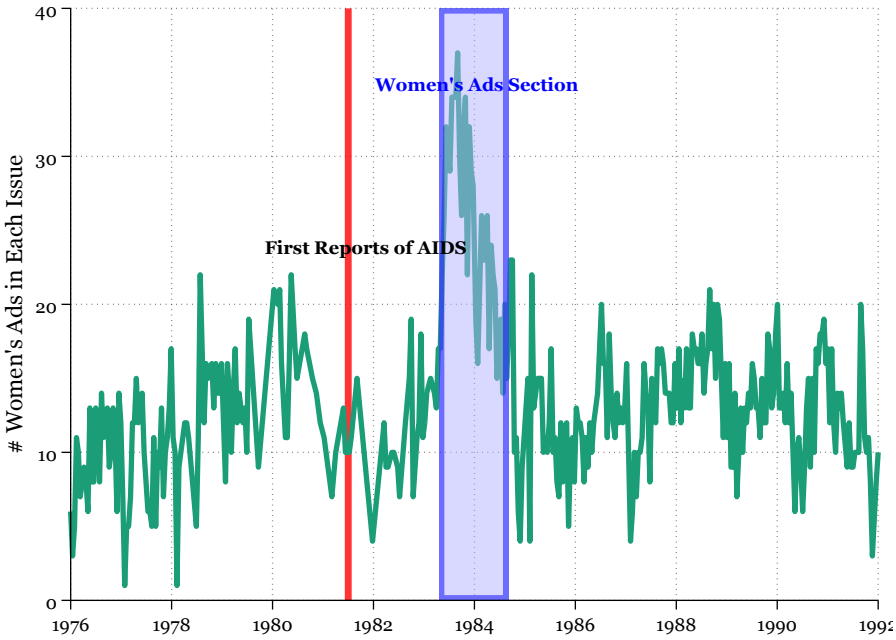


Figure D.1: Source: Advocate Personal Ads
Notes: This figure represents trends in the number of ads which include the following terms: 'lesbian', 'women', 'female', '/f', 'girl'. These terms likely represent ads posted by women. The area shaded in blue represents ads in issues with a "Women's Ads" section.

Figure D.2 : Proportion of Ads that are Long Term-Relationship Oriented.

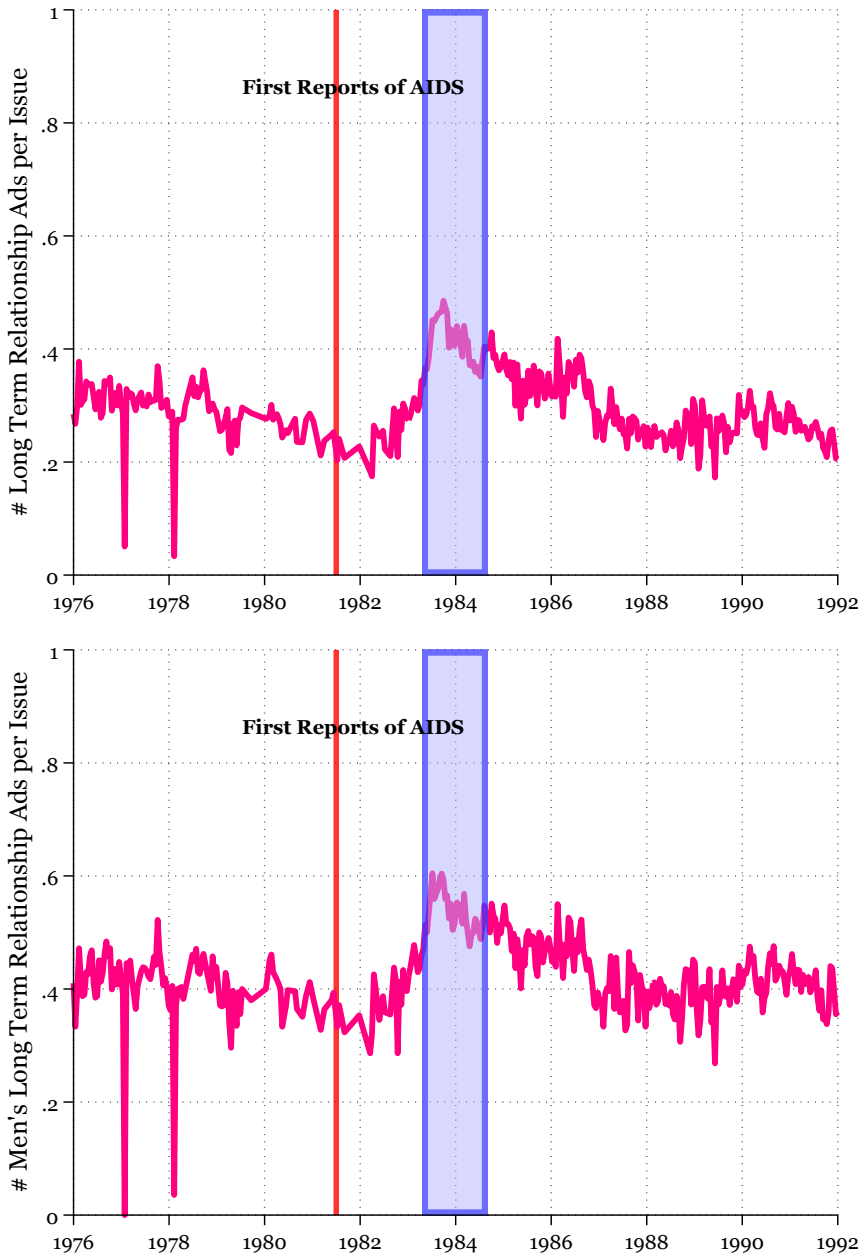


Figure D.2: Source: Advocate Personal Ads
Notes: This figure represents trends in the proportion of ads which are long-term relationship oriented per issue, overtime. The first panel depicts trends for all ads. The second panel depicts ads which we can confidently identify as ads from men because they include any of the following terms: 'm/', 'boy', '/m', 'guy'. The area shaded in blue represents ads in issues with a "Women's Ads" section.

E Robustness

E.1 Drop Earliest Treated

To ensure that the main findings are not driven by the unique characteristics of the earliest affected cities, I re-estimate my model after excluding metropolitan statistical areas (MSAs) that reported their first AIDS case in 1981. This is important for several reasons. Firstly, earliest treated cities are systematically different from later treated cities. These early-treated cities, like San Francisco and New York, were major centers of the gay community and faced the brunt of the HIV/AIDS epidemic, leading to potentially different behavioral responses compared to later-treated cities. Secondly, being the first in the country to experience cases of the virus may have triggered a distinct response compared to cities which faced the epidemic later on. Thirdly, a large proportion of the personal ads represent earliest treated MSAs.[79] Estimates for Equation 3 after dropping MSAs which experienced their first AIDS case in 1981 are presented in the first four columns of Table E.1. Although the estimates are similar to my main specification in direction they have significantly different magnitudes. My main specification suggests that individuals respond to the first reports of AIDS by increasing the number of safety ads posted by 45% but my restricted sample suggests that safety ads increase by approximately 11%. This suggests that behavioral shifts were much larger in the earliest treated MSAs. The earliest treated MSAs also experienced higher rates of HIV/AIDS thereafter. These findings are in line with estimates in Table F.1 which explores the intensive margin and finds that higher rates of AIDS are associated with larger behavioral responses.

E.2 Alternative Treatment

In my main specification, I exploit variation in the timing of the first reported AIDS case. An alternative approach would be to simply compare personal ads in MSAs that were more affected by HIV/AIDS to MSAs which were less affected.[80] Formally, I estimate the following equation:

[79] Approximately 80% of personal ads are from MSAs which experienced their first AIDS case in 1981.
[80] Shahid (2024) uses a similar methodology to estimate the effect of the virus on marriage rates.

$$\text{Log(Number of Personals + 1)}_{mst} = \alpha + \beta_l \text{ stdz(Pooled AIDS Rate)}_m + X_{mt} + \gamma_t + a_m + \delta_{sm} + \epsilon_{mt} \tag{E.1}$$

All features of this equation are identical to my main specification, Equation 3, but the treatment variable, stdz(Pooled AIDS Case Rate)$_m$ now represents the standardized form of the pooled AIDS rate from 1981-1985 for each MSA, m.[81,82] Estimates for Equation E.1 are provided in columns 5 to 7 of Table E.1. The estimates suggest that 1 standard deviation increase in pooled AIDS rate is associated with a 15% increase in the number of safety ads. Similar to my main specification, I find no evidence of effects on other types of ads.

E.3 Inclusion of Additional Time Variant Control

In my main specification, I choose not to include time-varying controls which may have been influenced by the HIV/AIDS epidemic. The HIV/AIDS epidemic had significant effects on LGBTQ+ spaces. MSM had alternatives to posting in *the Advocate*, such as meeting other men in bars and bathhouses. During the early years of the epidemic, the number of gay bars and bathhouses changed significantly (Woods et al., 2003) with many cities adopting policies which policed LGBTQ+ spaces as a means to prevent the spread of HIV/AIDS.[83] In Figure E.1, I show estimates from my main specification while controlling for number of gay bars and bathhouses in an MSA.[84] This provides some evidence that the estimates documented in this study cannot be attributed solely to changes in LGBTQ+ spaces during this period.

[81] I use the standardized form for ease of interpretation.

[82] Pooling AIDS rate over multiple years rather than using the rate for a specific year allows for greater precision given the large amount of variation in AIDS Rate over time.

[83] In 1984, San Francisco's Department of Public Health ordered the closure of its bathhouses. The following year, New York State enacted legislation aimed at closing bathhouses, though enforcement was left to local authorities. Similar regulations were implemented in other cities (Woods and Binson, 2003).

[84] Information about the number of gay bars and bathhouses is obtained from a recent effort to digitize records from the Damron's Guidebook, a gay men's travel guide (Regan and Gonzaba, 2019).

Table E.1: Robustness

	Drop First Treated - Imputation Estimator					Alternative Treatment - TWFE				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Classified Ads	Safety Ads	Relationship Oriented Ads	Explicitly Sexual Ads	Health Related Ads	Classified Ads	Safety Ads	Relationship Oriented Ads	Explicitly Sexual Ads	Health Related Ads
First AIDS Case	−0.25344	0.00851**	−0.12948	−0.18907	0.02457					
	(0.177)	(0.004)	(0.096)	(0.134)	(0.040)					
stdz(Pooled AIDS Case Rate)						−0.04546**	0.00221***	−0.03921***	−0.00376	0.00994**
						(0.018)	(0.001)	(0.012)	(0.012)	(0.004)
Observations	1007	1007	1007	1007	1007	1653	1653	1653	1653	1653
Period FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Season-MSA FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Mean	1.067	0.009	0.412	0.730	0.167	1.129	0.016	0.333	0.829	0.225

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table E.1: Source: Advocate Classified Ads and AIDS Public Information Dataset
Notes: This first four column of this table presents estimates from Equation 3 measuring the effect of the first reported AIDS case on personal ads using the Imputation Estimator developed by (Borusyak et al., 2024) for MSAs which reported their first AIDS case after 1981. The first column depicts effects on the total number of personal ads. The second column depicts effects on the number of ads which include safety terms. The third column depicts effects on the number of ads which are long-term relationship oriented. The fourth column depicts effects on the number of ads which are explicitly sexual. The next four columns of this table presents estimates from Equation E.1 measuring the effect of a 1 standard deviation increase in the pooled AIDS rate for the years 1981-1985 using a TWFE estimator. The fifth column depicts effects on the total number of personal ads. The sixth column depicts effects on the number of ads which include safety terms. The seventh column depicts effects on the number of ads which are long-term relationship oriented. The eighth column depicts effects on the number of ads which are explicitly sexual. All estimates control for period fixed effects, and season-MSA fixed effects and standard errors are clustered at the MSA-level.

Figure E.1 : Event Studies with Time Variant Controls

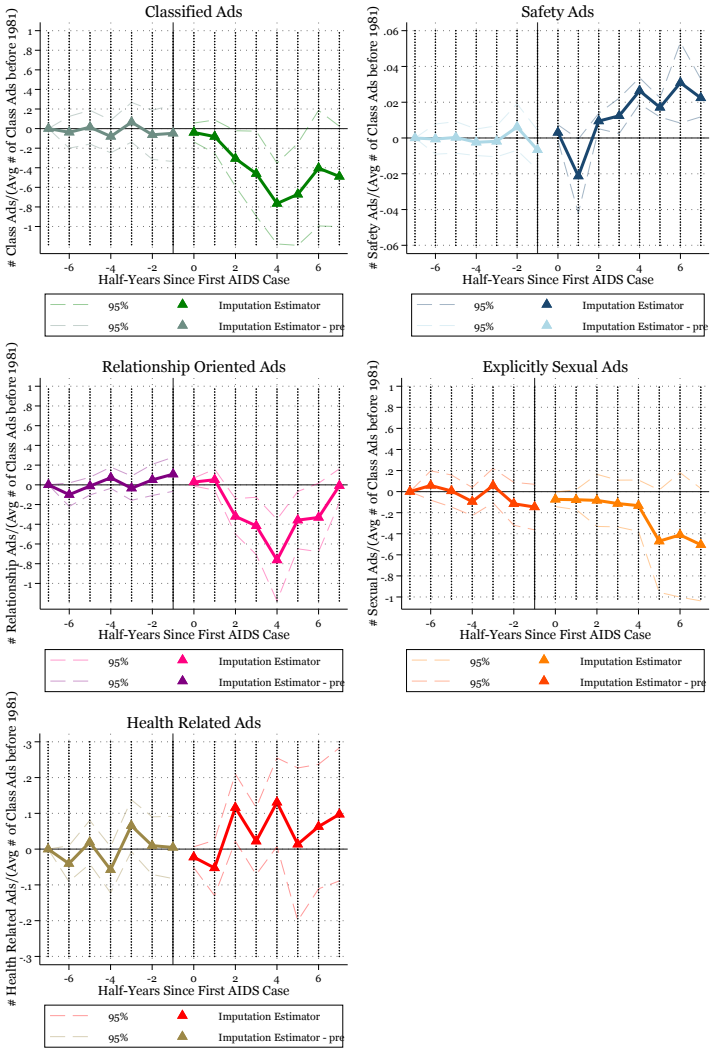


Figure E.1: Source: Advocate Classified Ads and AIDS Public Information Dataset
Notes: These figures depict event study estimates of Equation 2 measuring the effect of the first reported AIDS case on personal ads using the Imputation Estimator developed by (Borusyak et al., 2024). The first figure depicts effects on the total number of personal ads. The second figure depicts effects on the number of ads which include safety terms. The third figure depicts effects on the number of ads which are long-term relationship oriented. The fourth figure depicts effects on the number of ads which are explicitly sexual. All estimates control for period fixed effects, and season-MSA fixed effects. Additionally, all estimates also control for MSA population, state-level unemployment rates, the number of bars and bathhouses in an MSA. Standard errors are clustered at the MSA-level.

F The Intensive Margin

This paper argues that given the long incubation period of HIV, the first reported AIDS case in an MSA represents an exogenous increase in the perceived cost of risky sexual behavior. A similar argument could be made for AIDS incidence more generally. Although there may be non-linearities in the relationship between AIDS incidence and the perceived cost of risky sexual behavior, even after the first reported case of AIDS, individuals may exhibit greater fear of contracting the virus when there is a higher rate of AIDS in their MSA. In this section, I account for this intensive margin.

Unlike the first reported AIDS case in an MSA, AIDS incidence evolves dynamically. Therefore, I rely on a two-way fixed effects specification rather than an event-study model. Formally, I estimate the following equation:

$$\frac{\#\text{ Personal Ads}_{mst}}{\text{Avg \# of Classified Ads before 1981}_{m}} = \alpha + \beta_l \text{ stdz(AIDS Rate)}_{mst} + X_{mt} + \gamma_t + a_m + \delta_{sm} + \epsilon_{mt} \quad \text{(F.1)}$$

The treatment variable $\text{stdz(AIDS Rate)}_{mst}$ now represents the standardized form of of the AIDS case rate in MSA, m, in season, s, in half-year, t. I use the standardized form of the AIDS case rate for ease of interpretation. All other features of this equation are identical to my main specification.

Estimates for Equation F.1 are provided in Table F.1. The estimates suggest that a 1 standard deviation increase in AIDS rate is associated with a 4% decrease in the number of ads. There is also evidence that higher rates of AIDS results in an increase in the number of safety ads, and a decrease in the number of relationship oriented ads and explicity sexual ads. These estimates are largely in line with my main specification.

Table F.1: Estimates from Equation F.1 - The Intensive Margin

	(1) Classified Ads	(2) Safety Ads	(3) Relationship Oriented Ads	(4) Explicitly Sexual Ads	(5) Health Related Ads
stdz(AIDS Case Rate)	−0.04222***	0.00247***	−0.02739***	−0.01861***	0.00042
	(0.010)	(0.000)	(0.007)	(0.006)	(0.004)
Observations	1235	1235	1235	1235	1235
Period FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Season-MSA FE	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table F.1: Source: Advocate Classified Ads and AIDS Public Information Dataset
Notes: This table presents estimates from Equation F.1 measuring the effect of 1 standard deviation increase in AIDS rate on personal ads using TWFE. The first column depicts effects on the total number of personal ads. The second column depicts effects on the number of ads which include safety terms. The third column depicts effects on the number of ads which are long-term relationship oriented. The fourth column depicts effects on the number of ads which are explicitly sexual. All estimates control for period fixed effects, and season-MSA fixed effects. Standard errors are clustered at the MSA-level.