

The Effect of the Grindr Mobile App on Rates of Syphilis in the New York City Men Who Have Sex with Men (MSM) Population

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CRC Proposal
November 30, 2011

A. Study Purpose and Rationale

Internet gay sex sites are the leading environments where men meet men for sex in the United States and in similar, developed countries. The main reason for this popularity appears to be the increased ability to help men conveniently and quickly locate sex partners compared to offline methods. Other benefits include anonymity, especially for those who fear stigma; accessibility to more potential partners; and affordability. Also, the Internet offers a sense of protection that often makes people less inhibited in terms of expressing their desires, allowing men to more rapidly find partners who are willing to engage in their sexual fantasies. A 2011 French study of 2058 MSM demonstrated this by showing a significant increase in unprotected anal intercourse (UAI) between partners who met after discussing online the desire to engage in this risky behaviorⁱ. Venue-based surveys have estimated that up to 85% of MSM report some recent Internet use. As many as 94% claim to ever having had sex with a partner met online, and up to 78% report sex with an online partner in the prior 6 monthsⁱⁱ.

Despite this prevalent use of the Internet for sexual encounters in the MSM population, studies looking at the rate of risky behavior – defined as unprotected anal intercourse (UAI) – have found mixed results. A meta-analysis from 2006 examined 22 articles and showed that UAI with male sex partners was more likely between MSM who sought partners online (odds ratio, 1.68; 95% CI, 1.18 – 2.40). This difference was observed for UAI with HIV-serodiscordant as well as HIV-seroconcordant partners, particularly among HIV positive study participantsⁱⁱⁱ. This is concerning given the continued increase in HIV, particularly among young and minority MSM populations. A possible explanation for this observed increase in UAI was posed by another study that showed an element of negotiating or screening online. The authors found that men who prefer condomless sex choose men with online profiles stating a preference for unprotected sex. These men also discuss and negotiate unprotected sex more frequently, compared to men who meet in person^{iv}.

A study that did not find an increase in UAI through online encounters was more recently published in 2011. This paper analyzed MSM in Washington State and found that compared to participants in 2003, participants in 2006 met a greater proportion of their anal sex partners through the Internet (OR = 2.0; 95% CI: 1.2, 3.1). Although the proportion of anal sex partnerships formed online increased between 2003 and 2006, Internet partnerships were not found to be more risky than those initiated offline^v. Other studies have only found significant increased risky behavior depending on the MSM population's living environment. One such study found differences in risky sexual behavior between MSM living in rural compared to urban areas. Rural MSM who used the Internet to meet sex partners were more likely to report UAI (adjusted odds ratio [AOR]: 1.89 [1.12-

3.19]) with the last sex partner than those who did not use the Internet. Interestingly, for urban residents, men who used the Internet to meet sex partners did not more commonly report UAI^{vi}.

The latest innovation in online dating for the MSM population revolves around mobile applications (or apps) that utilize global positioning (GPS) on smart phones to locate potential partners. The first and most popular of these apps is Grindr (www.grindr.com). The app launched on March 29, 2009 and as of September 2011 had over 3 million users in 192 countries (all countries excluding Nauru and Tuvalu) sending about 6 million chat messages daily. Over 52,000 active users are on at any given time, and each user averages 1.5 hours a day on the site. The United States has the largest number of users with 814,200, while London and New York City are the two highest ranking cities with 104,400 and 60,600 users, respectively^{vii}.

This newest form of online sexual interaction retains the elements of Internet dating that make it appealing to the MSM population, such as anonymity, while offering a more immediate and efficient way to actually meet and engage in sexual activity. A study has shown that the actual venue, such as outdoors, parties/events, clubs/bars, bathhouses, and online (not including mobile apps) doesn't lead to increased unprotected anal sex^{viii}, but this study did say that there were venues associated with increase use of alcohol. Combining substance abuse with being able to geolocate and meet up with sexual partners via Grindr could lead to an increase in "heat of the moment" sexual interactions that are unprotected and at higher risk for transmission of sexually transmitted infections (STIs).

Studies have yet to examine the role of the mobile app and risky sexual behavior or transmission of STIs. It is the goal of this study to retrospectively examine the rates of syphilis in the New York City MSM population to see if there is a significant increase that correlates with the launch and increasing use of Grindr.

Study Design and Statistical Analysis

This will be a retrospective study that will utilize data from the New York City Department of Health and Mental Hygiene (NYC DOHMH) to look at rates of syphilis among the MSM population^{ix}.

Patient selection:

Patients include all self-identified MSM of all ages who have a positive RPR test diagnosed and reported within the five boroughs of New York City.

Intervention: None

Outcome Measures:

The outcome measured would be the rates of syphilis infection, as indicated by positive RPR testing.

Future investigation could examine rates of syphilis in London and/or rates of HIV and other STIs in New York City and London, given the availability of demographic information^x.

Statistical Analysis:

The Centers for Disease Control (CDC) estimates between 3 and 5% of the United States population can be included in the MSM group^{xi}. A recent report from the University of Kent argues that 5 to 7% of the United Kingdom population falls into this category^{xii}. Assuming 5%, the number of MSMs in New York City can be approximated at 209,797, given a total population of 8,391,881 (assumed 50% male) as of July 1, 2009^{xiii}.

Grindr launched on March 29, 2009, so the incidence of positive RPR tests in MSM in New York City during the first quarter of 2009 would be most indicative of a pre-Grindr baseline. This can be compared using a chi-squared test with the first quarter 2010 rate, given that it was near this time that the app had reached a critical threshold of 500,000 users^{xiv}.

If the $N=209,797$ and the rate of positive RPR in the first quarters of 2007 and 2008 are 121 and 131, respectively, then the effect size can be estimated using an average rate of 126. This would give a pre-Grindr syphilis proportion of 0.0006 resulting in an effect size that could detect a $p^2 < 0.0004$ and > 0.0008 . Given that the first quarter 2009 rates are actually higher than the 2010 rates (141 versus 127), this analysis does not show significance. However, there is variability in the New York City population and rates of Grindr usership that this does not take into account. Therefore, a trend analysis looking at exact numbers of Grindr downloads and usership – based on the time each user spends on the site – should be collected to further analyze this data and compare it to syphilis rates.

Another factor that could be influencing rates of STIs in this population is drug use/abuse. Previous studies, specifically in the late 1990s and early 2000s, looked at the use of methamphetamine, or crystal meth, in the MSM population and its effect on increasing rates of STIs^{xv}. More recent studies have shown that the use of crystal meth in the mid to late 2000s has remained stable in Caucasian MSM in New York City, but it is actually increasing in racial minority MSM populations (full text of article not available)^{xvi}. The influence of drugs and their effects on STI rates in New York City would have to be further assessed in this trend analysis.

Future analysis could also look at HIV, other STIs, and similar trends in statistics in other cities such as London, which could be adapted to the varying Grindr use in this and other locations compared to New York City.

Study Procedures: As described in "Statistical Analysis" above.

Study Drugs: None

Medical Devices: None

Study Questionnaires: None

Study Subjects: See "Patient Selection" above.

Recruitment of Subjects: No active recruitment

Confidentiality of Study Data:

Data taken from NYC DOHMH is already de-identified with no risk of breaching confidentiality. Other government agencies, such as the Health Protection Agency who collects this data in the UK, have similar collection methods and confidentiality.

Potential Conflict of Interest: None

Location of Study:

New York City, with a potential future site including London.

Potential Risks: None

Potential Benefits:

The increase or lack of significant change in STI rates among the MSM population with the advent of mobile apps has public health implications for this population as well as the population in general. If there is a significant change found on more detailed analysis, then public health could target mobile apps for interventions or messaging to try and decrease risky sexual behavior.

On a much larger scale, these types GPS mobile dating apps are becoming more prevalent, with other dating sites such as Ok Cupid and Blendr (which is also owned by the company who made Grindr) being launched this year for use by non-MSM populations^{xvii}. By utilizing the sexually adventurous MSM population as a pilot study, this could elucidate whether other groups are at risk or not for increasing sexually transmitted infections as these apps become more common.

Alternative Therapies: Not applicable

Compensation to Subjects: None

Costs to Subjects: None

Minors as Research Subjects:

Given that syphilis is a reportable illness, men less than 18 have been included in the data from the NYC DOHMH.

Radiation or Radioactive Substances: None

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