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Anna M. Civitarese, Author

A Spatial Analysis of Condom Availability in Rhode Island

and

Optimizing an Existing Condom Distribution Program for Rhode Island's Adolescents: Key Informant Perspectives

By

Anna Civitarese

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Thesis

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This thesis by Anna Civitarese is accepted in its present form by
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for the degree of Master of Public Health.

Date: _____ _____

Jaime Comella, MPH
Thesis Advisor

Date: _____ _____

Katie Biello, PhD, MPH
Thesis Reader

Date: _____ _____

Patrick M. Vivier, MD, PhD
Director, Master of Public Health Program

Approved by the Graduate Council

Date: _____ _____

Andrew G. Campbell
Dean of the Graduate School

VITA

Anna Civitarese was born and has lived her entire life in southeastern Massachusetts. She first discovered her interest in Biology in middle school and began looking into the field of public health in her senior year of high school following an independent study project on the field of Epidemiology. She graduated with High Distinction from Worcester Polytechnic Institute in 2015 with a B.S. in Biology/Biotechnology and a minor in Bioinformatics. She came to Brown School of Public Health immediately after graduation with a declared focus in Epidemiology and a specific interest in infectious disease. Anna began interning with the Rhode Island Department of Health, Center for HIV, Hepatitis, STD, and TB Epidemiology (CHHSTE) in September 2015, where she remained until December 2016. She worked on various topic areas while in CHHSTE, including latent tuberculosis, babesia, and sexually transmitted infections. She began this thesis project as an internship project in the CHHSTE after receiving training in GIS from Brown University. Currently, Anna serves as a Research Assistant at the Rhode Island Department of Health, Division of Primary and Rural Health, assisting with multiple survey-related projects and GIS work.

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ABSTRACT

OBJECTIVES: The purpose of this study was to use spatial analysis to identify potential gaps in adolescent access of the condom distribution program of the Rhode Island Department of Health (RIDOH).

BACKGROUND: RIDOH receives dedicated funding for the distribution of condoms to high-risk populations and distributes over 250,000 condoms annually as one of its core HIV and sexually transmitted infections (STI) prevention strategies. Disparities exist in age, race, ethnicity, and neighborhood of residence that influence STI transmission. Using Geographic Information Systems (GIS) and spatial analysis, the current distribution of RIDOH-sponsored free, publicly available condoms was analyzed.

METHODS: Multiple data sets were utilized for the analysis to create layers in ArcMap 10.4.1. Locations of free, publicly available condom dispensers and their spatial correlation to adolescent chlamydia diagnoses, high schools, and race and ethnicity in the state and in the city of Providence were analyzed. Spatial clustering was assessed using Nearest Neighbor, Local Anselin Spatial Clustering, and Optimized Hot Spot analysis. Ordinary Least Squares Regression was performed to check for significant associations between layers.

RESULTS: Geographically, publicly available dispensers are clustered on both the state level (NNR = 0.60, Z = -5.31, P=0.00) and within Providence itself (NNR = 0.70, Z = -3.25, P=0.00), as well as within specific neighborhoods in Providence. Out of 129 schools, 35 schools (27.1%) are within a 15-minute walk of a publicly available dispensing location. Providence accounts for 70.2% of the publicly available dispensers in the state but only 32.3% of all reported adolescent chlamydia cases. Sixty-eight percent (68.6%) of reported cases of adolescent chlamydia occurred

in just six municipalities. In Providence, 2015 adolescent chlamydia case counts were not significantly associated with dispenser count, but were significantly associated with ethnicity and borderline significant with race, when analyzing by neighborhood.

CONCLUSIONS: Spatial analysis reveals that publicly available dispensers are highly clustered and therefore inaccessible to the majority of adolescents in the state, particularly some minority populations and adolescents living in areas of high chlamydia burden. The RIDOH should consider expanding geographic access by adding more dispensers throughout Providence and the state. Additional research is needed to understand the underlying social and behavioral factors associated with adolescent condom use in Rhode Island.

INTRODUCTION

National STI Burden

In 2013, the Centers for Disease Control and Prevention (CDC) estimated approximately 20 million new cases of the eight major, notifiable, sexually transmitted infections (STIs) occur per year in the United States. (1) Of these STIs, three have federally funded control programs: chlamydia, gonorrhea, and syphilis. (2) After years of decline, rates of chlamydia, the most common STI, have been increasing since 2011. Rates of gonorrhea and syphilis have experienced a similar trend. (2)

A conservative estimate (i.e., excluding "intangible costs" such as loss of productivity) of the lifetime medical cost per case of treating the 20 million STIs acquired in 2013 is nearly $16 billion. (1) There are also various long-term health effects of STIs in addition to short-term sequalae. In women, untreated chlamydia and gonorrhea can lead to Pelvic Inflammatory Disease (PID); up to 10-20% of women with one of these infections may develop PID, which can cause tubal infertility (8% of women), ectopic pregnancy (9% of women), and chronic pelvic pain (18% of women). (3)

STI burden disproportionately affects youth aged 15-24, who are responsible for 50% of all STIs despite only comprising 25% of the sexually active population. (4, 5) In the case of chlamydia, the burden is even more disproportionate. In 2014, 66% of all chlamydia cases (948,102 cases out of 1,441,789 cases total) in the US occurred in youth aged 15-24 years old. (2) According to the CDC, "due to a combination of behavioral, biological, and cultural reasons," this age group is at a higher risk for STI acquisition. (6) In the year 2000, the lifetime financial burden of STIs acquired by American youth alone was $6.5 billion. (1)

STIs also disproportionately affect Blacks and Hispanics, largely due to economic disadvantages experienced by these populations including increased poverty, income inequality, decreased employment rates, and lower educational status. Chlamydia rates are highest among non-Hispanic Black males and females, with 15-19 year-olds accounting for second highest rate, after 20-24 year-olds. In 2015, chlamydia rates for adolescent 15-19 year-old Black females were 4.7 times higher than adolescent White females and 8.8 times higher for adolescent Black males than adolescent White males. Hispanics had twice the chlamydia rate of Whites. Similar trends in racial disparities were similar for gonorrhea and syphilis. (7)

Local Chlamydia Burden

According to the 2014 Rhode Island HIV/AIDS and STI Surveillance Report, Rhode Island (RI) has seen chlamydia cases increase 33% percent between 2005-2014 – it remains the most common STI. In 2014, the rate of chlamydia among youth 19 years and younger was 446 per 100,000. Overall, chlamydia rates are significantly higher than other STIs in the state. (8)

Racial and ethnic disparities in chlamydia rates in RI parallel the national trends. In 2014, the rate of chlamydia was 1654.3 cases per 100,000 for Blacks and 1182.0 cases per 100,000 for Hispanics, compared to 229.4 cases per 100,000 among Whites. (8)

RIDOH Condom Distribution Program

Currently, the Center for HIV/AIDS, Viral Hepatitis, STDs, and TB Epidemiology at the RIDOH administers a condom distribution program in which various community organizations may request free dispensers, condoms, lubricants, and other safer sex materials. This condom distribution program began in 1993 when condoms purchased by the RIDOH were given free of charge to AIDS Care Ocean State for distribution in bars and nightclubs catering to gay, bisexual, and other men who have sex with men (GBMSM) throughout Providence. Sometime

between 2009 and 2011, the condom distribution program was formalized; glass "fishbowls" used in the nightclubs to hold condoms were largely replaced with plastic dispensers, the number of community organizations engaged in the program increased, and the administration of the condom distribution program was centralized to the RIDOH office. Orders are now placed via an online ordering system maintained by the RIDOH, and condoms are ordered and available for pick up by these organizations.

In 2012, RI received funding in the form of an HIV Prevention Grant from the CDC that provided funds to continue this program. (9) Between 2012-2016, over 1,208,000 condoms were distributed through the program.

As part of this program, there are currently 105 total of dispensers located throughout RI in a variety of settings including but not limited to universities, substance abuse facilities, homeless shelters, bars/clubs, and clinical settings, as well as counseling, treatment, and referral centers and community-based rapid HIV testing organizations. Of these 105 dispensers, 47 are freely available to the public. The locations of the publicly available dispensers include social service agencies, clinics, universities, bars/clubs, homeless shelters, and substance abuse facilities. Of the 47 publicly available dispensers, 32 are located in Providence.

Study Purpose

While the locations of these dispensers increase access to condoms for some specific high-risk populations, it is unclear whether the locations of the condom dispensers are accessible for adolescents, especially minority adolescents, who are at increased risk for STIs. Condom distribution and access are important for reducing STI transmission and acquisition in both the short- and long-term.

Adolescents may be faced with a particularly complex, multilevel set of barriers to condom access and use, including stigma, embarrassment, family and partner relationship dynamics, poverty, cost of condoms, physical provision of condoms in the community, lack of transportation to places to obtain condoms, and more. (5, 10) These barriers are particularly pronounced in racial and ethnic minority populations, as minority status is linked to several types of community disadvantage and increased risk of STIs. (7)

This project sought to describe the spatial clustering of condom dispensers in Rhode Island, and assess the geographic correlation between RIDOH's condom dispensers, the distribution of adolescent chlamydia diagnoses, the locations of high schools, and race and ethnicity, to identify potential gaps in service and areas of improvement.

METHODS

Data on condom dispenser locations and chlamydia diagnoses were provided by RIDOH and geocoded using ArcMap 10.4.1 (ESRI, Redlands, CA). Dispenser locations were individually geocoded to the address-level, and chlamydia diagnoses were geocoded to the address-level then aggregated to the neighborhood level. Other data, including state municipalities and Providence neighborhoods, was obtained from the Rhode Island Geographic Information Systems (RIGIS) portal and required no manipulation. Census data on race and ethnicity were mapped to the census tract-level then aggregated to neighborhood level for analysis. Data on locations of high schools was obtained from RIGIS, manipulated for the needs of this project, then geocoded manually.

Various spatial analysis tools were utilized, and analysis using Ordinary Least Squares (OLS) Regression was performed to explore associations between chlamydia, condom dispensers, and race and ethnicity spread.

Notably, New Shoreham (known locally as "Block Island") was not included in the maps in this analysis, as it is twelve miles off the coast of mainland Rhode Island and subsequently impacts spatial clustering analysis. New Shoreham has one high school and no condom dispenser locations, and has only approximately 1,000 year-round residents. (11)

Condom Dispensers

A list of locations of RIDOH-sponsored condom dispenser locations was provided by the RIDOH. To confirm accuracy of the list, all sites were contacted to verify address, dispenser size, type of organization, contact information, and accessibility to the public. The addresses for each location were then validated and geocoded. A total of 105 unique dispensers are contained in this list, which is accurate as of December 17th, 2016; for the purposes of this analysis, only the 47 publicly available dispensers were included. For Providence, the total number of condom dispensers per neighborhood was calculated.

Adolescent Chlamydia

Chlamydia diagnoses are reportable to the state in Rhode Island. Case information is gathered from case report forms and laboratory reports and is then entered into an electronic database (STD*MIS) where it can be accessed for analysis. Individual and address-level data was obtained from this database, cleaned, and geocoded. Those included as "adolescents" in this study included males and females aged 15-19 years old as of the last calendar day of the year of diagnosis with a chlamydia case reported between January 1, 2012 and December 31, 2015 who resided in Rhode Island.

Of the 4,532 unique cases of chlamydia in 2015 for all ages, approximately 90% (n ≈ 4,050) of eligible addresses representing place of residence at time of diagnosis were initially accepted by ArcMap for geocoding. The remaining 10% (n ≈ 450 cases) were manually verified; this process involved using Google Maps to verify addresses were valid and had the correct corresponding zip code. Once the address were verified with GoogleMaps, the address was analyzed with an internal RIDOH GIS address verifier to ensure it would be accepted by the ArcMap programs. Ultimately, 99% of all 2015 chlamydia cases were able to be geocoded. The remaining 1% of cases were excluded from analyses.

Of all geocoded 2015 cases, a total of 264 of these cases represent adolescents in Providence. These cases were used to generate a new layer in ArcMap representing only 2015 adolescent cases in Providence. Notably, during map generation, neighborhoods with less than 5 cases were suppressed; neighborhoods with zero cases were still reported.

For the creation of a different layer, total annual adolescent chlamydia counts by municipality for 2012, 2013, and 2014 were obtained from the STD Epidemiologist. Data for these three years was combined due to low adolescent case counts in some municipalities in specific years. This aggregate 2012-2014 adolescent chlamydia case count data was combined with the 2015 adolescent chlamydia case count data for RI to produce the 2012-2015 adolescent chlamydia data used in this spatial analysis. This data was manually mapped on the municipality level.

High Schools

Information on high school locations was obtained from the "Schools" file from RIGIS. All schools (private, public, charter, and special needs) serving 9th-12th grade students were selected for inclusion. The data was published in 2008, so it was verified that each school was

still operational at the time of this project. Any schools which had been closed were excluded from analysis. Additionally, any high schools that had opened after 2008 were not included in this original document and thus could not be included in analysis. However, it was known that three additional high schools had opened after 2008 because of the presence of RIDOH-sponsored condom dispensers at these schools. Therefore, these three schools were manually added to the list. A total of 129 schools fit the inclusion criteria and were included in this spatial analysis.

Race & Ethnicity

Because of the disproportionate burden of chlamydia on Blacks and Hispanics, information from the 2010 U.S. Census was obtained in order to map census tract-level race and ethnicity data. Census variables corresponding to number of Black and Hispanic residents were determined based on the survey codebook. These variables were then used to calculate population percentages for both Blacks and Hispanics in each census tract in Providence. Later, means of these census tract values were averaged at the neighborhood level for spatial analysis.

Data Analysis

All analysis was performed using ArcGIS Pro Version 1.3.0 (ESRI, Redlands, CA).

The Getis-Ord Gi* Bin Statistic (Gi*) was obtained using Optimized Hot Spot Analysis for race and ethnicity in order to identify the clustering of areas within Providence where Blacks and Hispanics reside. The Mean Gi* Bin value is the average Getis-Order Index (Gi) value, which is a Z-score, for all census tracts aggregated to the neighborhood level in Providence. For positive scores, the higher the score, the more intense the spatial clustering of high values is; for negative scores, the lower the scores, the more intense spatial clustering of low values. In this case, higher positive values indicate higher concentrations of people identifying as “Black” for

race or “Hispanic” as ethnicity. Lower negative values indicate higher concentrations of people not identifying as “Black” or “Hispanic.”

Average Nearest Neighbor ratio (ANN) statistics, which compares the observed mean distance between condom dispensers compared to the expected if dispensers were randomly distributed, were obtained using the Nearest Neighbor tool for dispensers at the state-level and for Providence to determine if clustering of dispensers was observed. If the ANN was less than 1, the distribution was clustered; if the ANN was greater than 1, distribution was dispersed.

To assess spatial clustering of condom dispenser locations within Providence specifically, the Local Anselin Moran’s I Statistic (LMIindex) was calculated using Cluster and Outlier Analysis. For the Local Moran’s I Index Statistic, positive values indicate similar neighbors, or clusters, and negative values indicate dissimilar neighbors. Additionally, the larger the value, the more significant the clustering is. This analysis was also run on the 2015 adolescent chlamydia count data for the neighborhood level in Providence.

The minimum, maximum, and average distances from schools to the nearest condom dispensers were calculated using the Nearest Distance function. Network analysis was performed using the “Determine Service Areas” to establish a 15-minute walkable buffer area around each included school. The “Intersect” tool was then utilized to determine how many schools had at least one condom dispenser in their respective buffers. Ordinary Least Squares (OLS) regressions were performed to investigate spatial associations between condom dispensers, chlamydia counts, and race and ethnicity on the neighborhood level.

The total count of dispensers per neighborhood was utilized as the dependent variable during OLS Regression to explore the correlation between dispenser locations and race and ethnicity spread in Providence. The total count of adolescent chlamydia cases for 2015 per

neighborhood in Providence was utilized in an OLS Regression as the dependent variable to explore the correlation between adolescent chlamydia in Providence and condom dispenser locations in Providence. Additionally, the total number of adolescent chlamydia cases for 2015 per neighborhood was utilized as the dependent variable during OLS Regression analysis to explore the correlation between chlamydia counts and race and ethnicity spread in Providence. Finally, was incorporated as the dependent variable in an OLS Regression analysis to explore the correlation between race and ethnicity.

RESULTS

Dispenser Locations

Rhode Island has 39 recognized municipalities (including New Shoreham). (Figure 1) As of December 2016, there were 47 actively maintained, publicly available RIDOH-sponsored dispensers at 38 different locations throughout the state. (Figure 1) Condom dispensers were not evenly distributed throughout the state, but rather clustered within the state (NNR= 0.58; Z-score = -5.13; P-value = 0.00) and in Providence (NNR = 0.69; Z-score = -3.18; P-value = 0.00). Specifically, the majority of Providence's 32 publicly available dispensers are clustered in the neighborhoods with the highest LMiIndex values, which were Downtown (LMiIndex =0.001787) and Upper South Providence (LMIindex = 0.002455). Notably, Providence alone has 68.1% of all publicly available dispensers in the state. (Figures 1-3)

Of the publicly available locations, nearly half (23 of 47) of these locations are GBMSM bars/clubs, universities, homeless shelters, and substance abuse facilities. Due to age restrictions and the specific populations which these locations cater to, at-risk adolescents may have limited access to condoms in these locations. This leaves 24 locations in the state where adolescents of any age could walk in and access condoms– locations such as community health centers, non-

profits, and social service agencies. Of these locations, 16 are located in Providence and 3 are located in Pawtucket. There are no publicly available condom dispensers in Central Falls, Woonsocket, or Cranston, which experience high rates of adolescent chlamydia.

An OLS Regression indicated that condom dispenser locations were not significantly associated with racial composition (Coefficient = 0.44; Standard Error (SE) = 0.33; P-value = 0.20) or ethnic composition (Coefficient = -0.23; SE = 0.25; P-value = 0.37) of neighborhoods of Providence, indicating that publicly available condom dispensers are not more likely to be located in communities with high percentages of Black and Hispanic residents.

Chlamydia Burden

Between 2012 – 2015, there were 3,745 reported cases of chlamydia among adolescents in Rhode Island. Providence (1,344 cases) accounted for 35.89% of these cases. Pawtucket (349 cases), Cranston (331 cases), Woonsocket (227 cases), Central Falls (165 cases), and Warwick (151 cases) also had high case counts, accounting for 32.66% of the adolescent cases in the state. (Figure 1) When considering only 2015 adolescent chlamydia count data, the neighborhoods in Providence with the most cases were West End (n=35), Upper South Providence (n=22), Lower South Providence (n=21), and Wanskuck (n=20). (Figure 2)

An OLS regression indicated that there was no significant correlation between 2015 chlamydia cases and condom dispensers on the neighborhood level (p=0.12) in Providence, indicating that dispensers are not more likely to be located in neighborhoods where adolescent chlamydia counts are highest. An OLS regression indicated that, in Providence, 2015 adolescent chlamydia counts were significantly associated with ethnic composition (Coefficient = 1.77; SE = 0.78; P=0.03), and borderline significantly associated with racial composition (Coefficient =

1.89; SE = 1.07; P=0.09), indicating that higher chlamydia rates were more likely to be observed in areas with higher percentages of Black and Hispanic residents.

High Schools

In Rhode Island, the distance from any given high school to any given condom dispenser ranged from 0.05 miles to 19.45 miles with an average distance of 2.83 miles. In Providence, the distance ranged from 0.05 miles to 1.25 miles, with an average distance of 0.48 miles. While 35 of the 47 dispensers (77.5%) in the state are within a 15-minute walk from a high school, out of 129 schools, only 35 distinct schools (27.1%) are within a 15-minute walk of any dispensing location, based on pedestrian routes. Of these 35 schools, 23 (65.7%) are in Providence, with 6 in Pawtucket, 2 in Newport, 2 in Central Falls, 1 in Lincoln, and 1 in South Kingstown. (Figure 1) Six of the schools in Providence had more than 10 dispensers within a 15-minute walk. Of these 6 schools, 4 were in Upper South Providence and 1 was in Lower South Providence. The highest number of dispensers accessible via a 15-minute walk from any one school was 18.

Race & Ethnicity

Optimized Hotspot Analysis using race and ethnicity data revealed significant clustering of specific groups in certain neighborhoods in Providence using the Mean Gi* Bin value. Most neighborhoods that have more intense clustering of Black populations tend to be the same neighborhoods that have the most intense clustering of Hispanic populations. (Figure 3) There are some neighborhoods that have higher concentrations of Blacks but not Hispanics (Mount Hope, Charles, and Mount Pleasant), and some neighborhoods with higher concentrations of Hispanics but not Blacks (Manton, Hartford, and Silver Lake). (Figure 3) The neighborhoods that have the highest positive values for race are Lower South Providence (Gi* = 2.96) and Upper South Providence (Gi* = 2.82) (Figure 3, Top Right), and the neighborhoods with the

highest positive values for ethnicity are Elmwood (Gi* = 2.97), Olneyville (Gi* = 2.78), and Lower South Providence (Gi* = 2.72). (Figure 3, Bottom Right) Overall, the association between race and ethnicity was highly significant (Coefficient = 0.544; SE = 0.11; P-value = 0.00).

DISCUSSION

The original intent of RIDOH's condom distribution program was to specifically target populations at high risk for HIV, including GBMSM, homeless, intravenous drug users, and racial and ethnic minorities. Since its inception, the program has expanded considerably and condoms are now available in a variety of locations and organizations.

However, even these expanded locations may be missing adolescents, another high-risk group. For this population, the existing condom distribution program may not have reached this target group. Despite the fact that that six different municipalities account for over two-thirds of adolescent chlamydia, most of the state's publicly available dispenser locations (32 of 47 different dispensers) are located in Providence, with an additional 3 in Pawtucket and 1 in Warwick. Most municipalities in the state lack even one publicly available dispenser location; there are no publicly available dispensers in Woonsocket, Central Falls, or Cranston. Interestingly, Central Falls and Woonsocket had the highest adolescent birth rates in the state for 2009-2013. (12) It is recommended that the RIDOH consider seeking out new community partners to host condom dispensers in these municipalities. A goal of the program may be to have at least one publicly available dispenser in every municipality in the state.

While the physical proximity of condom distribution locations is important, the type of facility in which the condoms are located plays an important role, as well as their availability to the public. As of December 17th, 2016, less than half (47 of the 96) of the total existing condom locations were available to the public. Current locations without publicly available condoms that

restrict their access are often clinical locations, homeless shelters or substance abuse facilities, or closed academic settings. It is important that the RIDOH consider the current types of facilities in which condoms are available, and how easily adolescents might access condoms in these locations.

The significant clustering of dispensers at both the state-level and in Providence suggests that most students throughout the state could not access condoms in proximity to their school if desired. The average value of 2.83 miles from a school to a publicly available dispenser is too far to realistically expect adolescents to walk. Slightly more than one-quarter of students are within a walkable distance to a dispenser, but the majority of these schools are located in Providence, and students from 33 of the 39 municipalities in the state don't have walkable access to a dispenser from school. Adeboyejo and Omotayo (2016) performed geospatial analysis on contraceptives access in the Osun state of Nigeria and found that, similar to Rhode Island's condom dispensers, more contraceptive locations were located in urban areas versus rural areas; also similar to Rhode Island, they noted that that schools exhibited a more dispersed pattern throughout the area that was not well aligned with the clustering of contraceptive locations. (13)

Across multiple studies, it has been consistently found that condom availability in high schools increases condom use (14-16) and does not increase sexual activity (14-18). Some studies have shown variable effects on actual condom use (18, 19); however, it is noted in the literature that self-reported condom use may be subjected to substantial reporting bias (20). This further reinforces the point of integrating condoms into schools. The presence of condoms in schools not only eliminates physical barriers to access, but may also reduce stigma surrounding condoms as they become more commonplace.

Chlamydia and condom dispensers were not significantly related in this analysis. This may be construed as a negative thing: there are no dispensers where they are needed most. However, this highlights the larger issue of accessibility versus use – the physical presence of free condoms in a community does not necessarily increase use. This analysis cannot provide an answer to this, and therefore, it is recommended that the RIDOH work with areas in the state which report the highest counts of chlamydia to attempt to understand patterns of condom use and barriers to use amongst adolescents with positive STI results.

The level of significance between locations where Blacks and Hispanics reside with the 2015 adolescent chlamydia counts suggests that these populations may need specific, targeted outreach regarding condom use practices. It was noted that the areas in Northern Providence where many Blacks tend to reside (Wanskuck, Smith Hill, and Mount Hope neighborhoods) had very few Hispanic residents; similarly, Olneyville, Silver Lake, and Hartford in the western portion of Providence had high numbers of Hispanic residents but not Blacks. However, despite these two populations not overlapping in these neighborhoods, all six of these neighborhoods had some of the lowest condom dispenser counts in the city. Most importantly, dispenser locations were not significantly correlated with race or ethnicity, signaling that condoms are not available in locations where the highest-risk minority populations reside. It is imperative that condoms are provided in neighborhoods with high percentages of minority populations and high chlamydia counts, as this analysis shows that this is currently not the case. With knowledge of the disproportionate STI and social burdens faced by these adolescent minority populations, the RIDOH should consider designing a plan which addresses this major gap in access.

Finally, the neighborhood of Upper South Providence presents as an interesting indicator in this study, and could serve as a case study to pilot new interventions. Each of the 4 high

schools in Upper South Providence has accessibility to more than 10 publicly available condom dispensers, yet this neighborhood has one of the highest 2015 adolescent chlamydia counts. This is likely associated with the high numbers of Blacks and Hispanics living in Upper South Providence, and the disproportionate impact of STIs on this population. This finding suggests that despite the physical presence of condoms, increased adolescent chlamydia persists. This may be attributable to a lack of knowledge of the presence of free, publicly available condoms. It is therefore recommended that the RIDOH implement steps to increase knowledge amongst adolescents of the locations of free condoms in their communities, especially near their schools. To support this, a publicly viewable, web-based map of RIDOH-sponsored condom dispenser locations was generated as a part of this study. Recommended next steps would include dissemination of this information using social media platforms and public information campaigns targeting this age group, with Upper South Providence serving as an ideal neighborhood for intervention implementation.

Limitations

Limitations include nuances in the use of geographic information systems (GIS), such as the program's inability to match every address perfectly. This may result in slightly imprecise measurements. For example, the shortest distance between any one high school and any one dispenser is 0.05 miles. However, they should be 0.00 miles apart, if they are in the same location.

Information on race and ethnicity was obtained from the 2010 US Census, which does not perfectly reflect the population present in 2015.

Date of birth, not date of diagnosis, was considered when determining the age of each case. Because of this, the cut-off was chosen as the last day of the calendar year, and this resulted

in the exclusion of some younger cases and the exclusion of some older cases. For example, a case could be 14 years-old at diagnosis, but if they turned 15 years-old during that calendar year, they would be included in this analysis as a 15 year-old. Similarly, a case could be 19 years-old at diagnosis but turned 20 years-old during the calendar year and thus would be considered 20 years-old and excluded from this analysis.

Rate data was not able to be calculated for adolescent chlamydia due to the lack of a readily available neighborhood-based denominator for 15-19 year-olds. Chlamydia counts are based on reported cases; many cases of chlamydia go undiagnosed every year, and thus, actual infection rates are likely much higher, but unable to be captured. Finally, all analyses are correlational and are not meant to be interpreted as causal.

CONCLUSIONS

Geospatial analysis of the associations between condom dispensing locations and other factors such as disease burden and demographic spread for adolescents has not previously been explored in the literature. From a basic assessment of the geographic locations of the publicly available condom dispensers, analysis shows a significant gap in access for most municipalities, most high school students, and racial and ethnic minority populations in Providence. For the fraction of adolescents who are proximal to dispensers, many are likely to find dispensers lacking in their communities if they are a racial or ethnic minority.

It is recommended that the RIDOH continue to support the inclusion of condoms in schools due to ease of accessibility for this age group. In addition to addressing access, RIDOH should support efforts to understand and reduce other social, environmental, and structural factors that influence adolescent condom access. To conclude, it is recommended that the RIDOH generate a plan going forward which addresses the three main findings of this report: the

lack of free condom locations in specific portions of the state and the city of Providence, the lack of adolescent-friendly facilities where condoms can be accessed, and the disparate lack of access to free condoms for minority populations in Providence.

TABLES & FIGURES

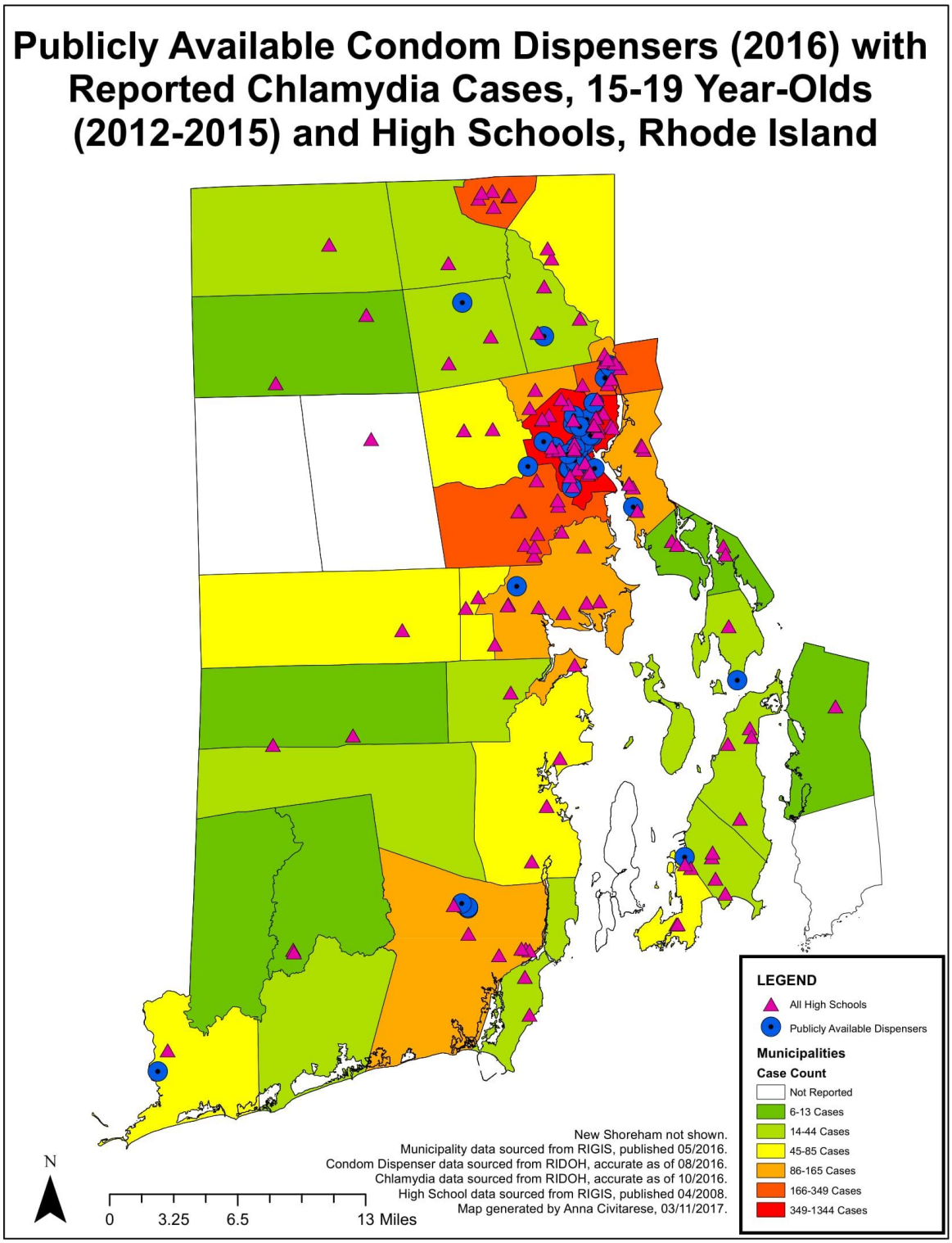

Figure 1: *Locations of Publicly Available Condom Dispensers with High Schools and Reported Chlamydia Cases for 15-19 Year-Olds, for 2012-2015 Combined, by Municipality, Rhode Island.*

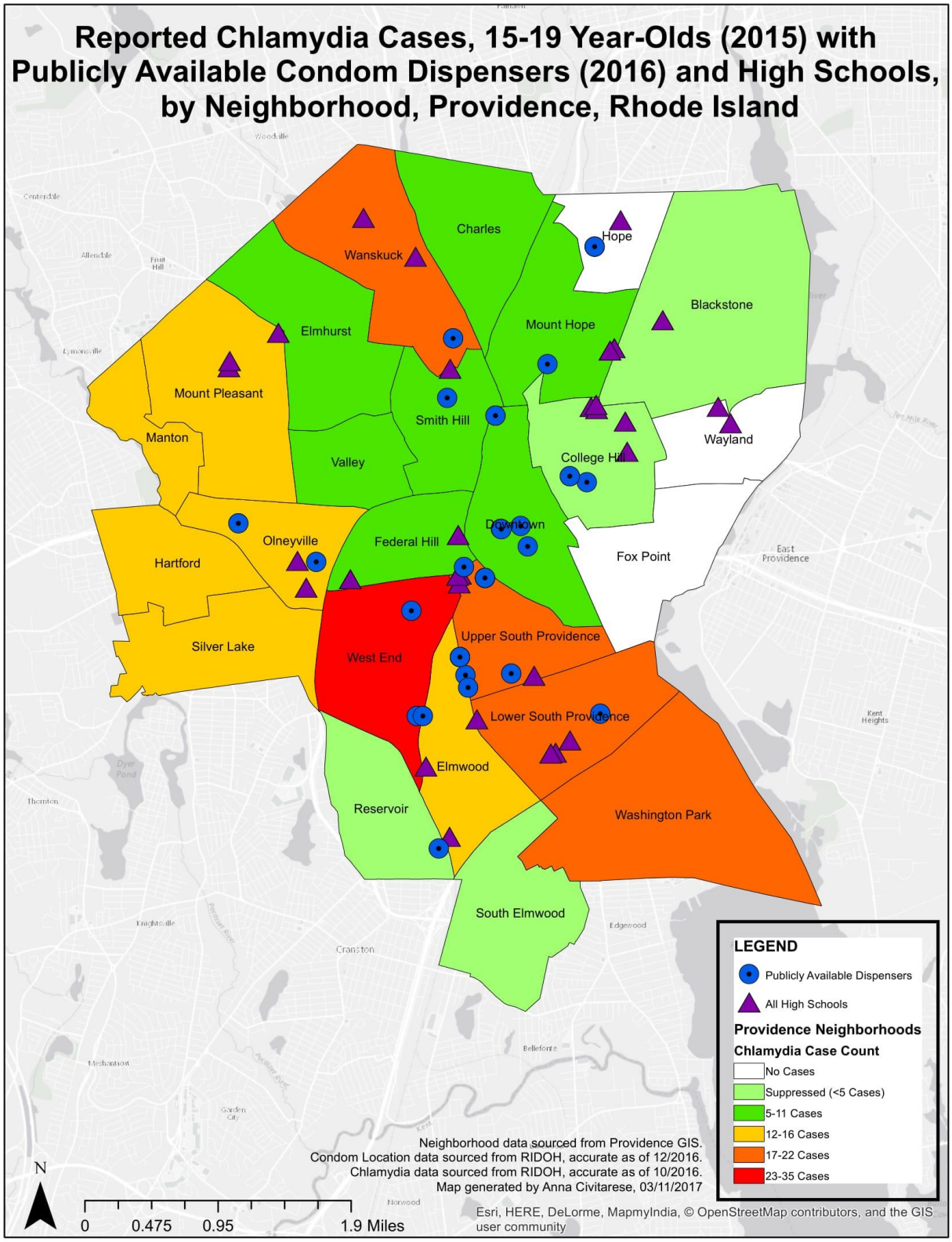

***Figure 2**: Publicly Available Condom Dispensers with High Schools and Reported Chlamydia Cases for 15-19 Year-Olds, for 2015 Only, by Neighborhood, Providence, Rhode Island*

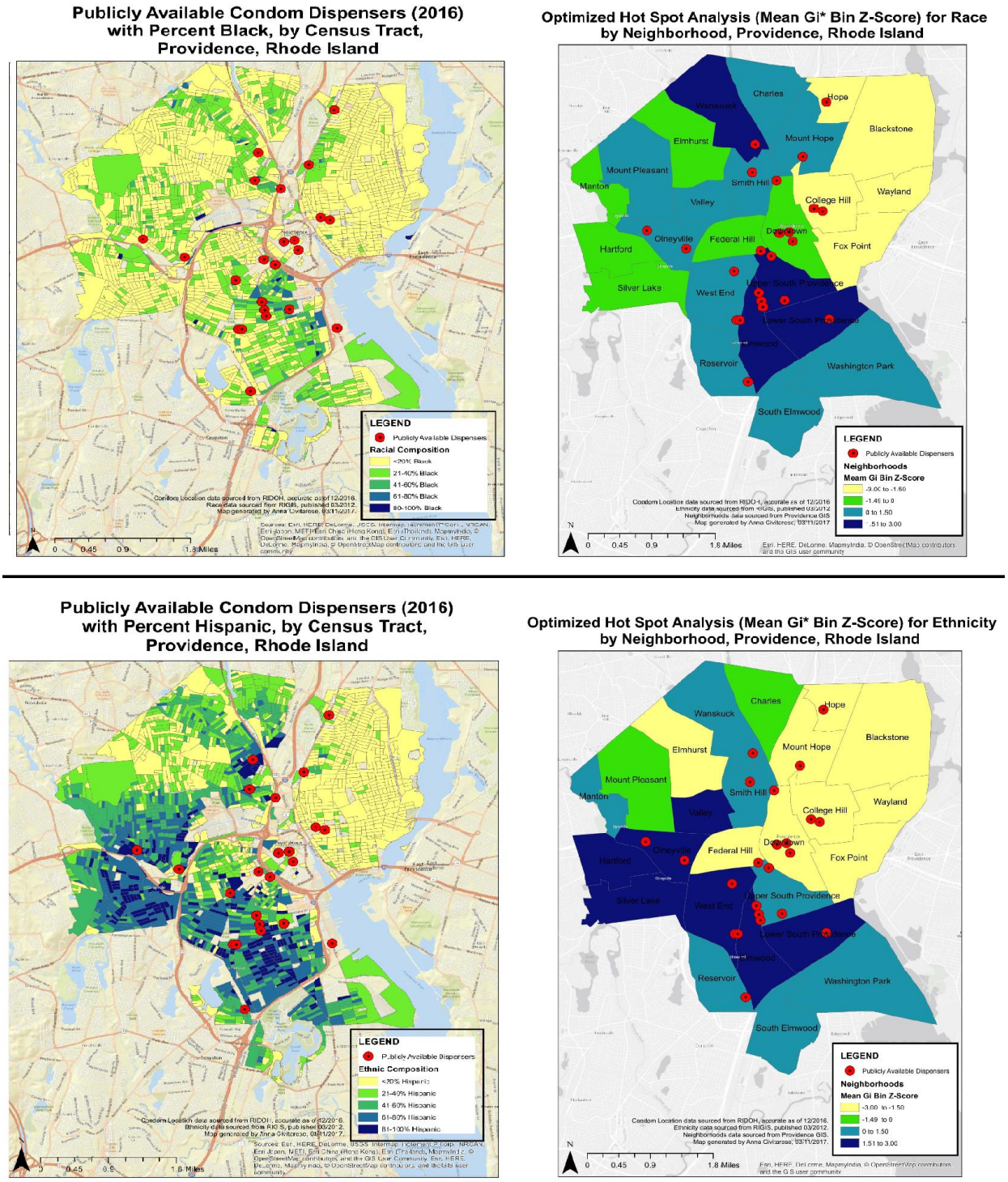

***Figure 3**: [Top Left] Race by Census Tract with Publicly Available Condom Dispensers, Providence, Rhode Island; [Top Right] Optimized Hot Spot Analysis for Race by Neighborhood with Publicly Available Condom Dispensers, Providence, Rhode Island; [Bottom Left] Ethnicity by Census Tract with Publicly Available Condom Dispensers, Providence, Rhode Island; [Bottom Right] Optimized Hot Spot Analysis for Ethnicity by Neighborhood with Publicly Available Condom Dispensers, Providence, Rhode Island*

APPENDIX

Layer Descriptions

Municipal Boundaries – Originally entitled "Municipal Boundaries (1997)" and outlines the boundaries to Rhode Island's 39 different municipalities. Original data from Environmental Data Center at the University of Rhode Island. Downloaded from http://www.rigis.org/data/state97, published 05/2016.

Race – Data gleaned from 2010 Census Data maintained in "Census 2010: Summary File 1 Indicators" file. Calculated by dividing POP3_N variable (Black or African American Population) by POP1 variable (Total Population). Original data from the U.S. Census Bureau and the Providence Plan. Downloaded from http://www.rigis.org/data/censusSF1_2010, published 03/2012.

Ethnicity – Data gleaned from 2010 Census Data maintained in "Census 2010: Summary File 1 Indicators" file. Calculated by dividing POP10_N variable (Hispanic Population) by POP1 variable (Total Population). Original data from the U.S. Census Bureau and the Providence Plan. Downloaded from http://www.rigis.org/data/censusSF1_2010, published 03/2012.

Neighborhoods - Outlines neighborhood boundaries for the city of Providence. Original data from the Providence Geographic Information System from the City of Providence. Published 12/2011.

High Schools - Locations of all public, private, charter, and trade schools serving grades 9-12; only schools serving students 9-12 were selected. Original data from the RI Department of Administration Statewide Planning Program and RIGIS. Downloaded from http://www.rigis.org/data/schools; published 04/2008.

Adolescent Chlamydia – Geocoded manually using Brown Geocoding Server. Data was extracted from the 2012-2015 annual chlamydia reports for all Rhode Islanders, and from the raw 2015 data for Providence. To be included, patient had to be 15-19 years of age as of the end of the calendar year in which the data was calculated. No data reported for Foster, Scituate, New Shoreham, Jamestown, and Little Compton (less than 5 cases).

Condom Dispenser Locations – Geocoded manually using the Brown Geocoding Server. Address data was gleaned from a spreadsheet maintained by RIDOH staff members which contains information on locations which receive and distribute free condoms from RIDOH's free condom distribution program.

Optimizing an Existing Condom Distribution Program for Rhode Island's Adolescents: Key Informant Perspectives

ABSTRACT

OBJECTIVES: The goal of this study was to obtain the opinions and insight of social service staff and public health professionals who interact with adolescents regarding the social and structural barriers to condom access and use among 15-19 year-olds in Rhode Island.

BACKGROUND: Social and structural barriers exist that deter or prevent adolescents from accessing or using condoms in their communities. Findings of this study broaden our understanding of the barriers to adolescent condom access and use in Rhode Island.

METHODS: Data collection occurred online between June 2016 and August 2016. Respondents were adults and public health professionals in Rhode Island recruited using initial seeding techniques and subsequent snowball sampling. Both qualitative and quantitative data were collected to assess their opinions and attitudes on the following topics: potential locations where adolescents could access condoms, parental views on adolescent sexual health, potential locations where adolescents would access condoms, adolescent attitudes towards sexual health, and potential barriers to condom use among adolescents. Basic summary statistics were calculated.

RESULTS: Forty-two complete responses were recorded. Commonly identified places where adolescents spend time include malls, community locations, sports-related locations, food-related locations, and afterschool programs. Over one-quarter of respondents (28.6%) said that parents felt negatively about condom accessibility for adolescents. Healthcare provider offices and schools were identified as top locations where adolescents would access condoms. Embarrassment and parental oversight were ranked as the most prominent barriers to condom

access. When describing the attitudes of adolescents towards sexual health, nine overarching themes were identified.

CONCLUSIONS: Geographic access to and cost of condoms are structural factors ranked as potential barriers to condom access by key informants. However, issues such as embarrassment and parental oversight are potentially larger and more socially-motivated barriers to access. It is clear that attention must be paid to both types of barriers in efforts to increase condom access for adolescents.

INTRODUCTION

Trends in Adolescent Sexual Behaviors in Rhode Island

According to the 2015 Rhode Island Youth Risk Behavior Surveillance System (YRBSS) results, between 2005-2015, the percentage of high school students who had ever had sex dropped by 10% (from 46.7% to 36.7%), and the percentage of high school students who were sexually active fell over 10% (from 36.5% to 25.7%). However, the number of students who did not use any form of protection increased from 10.0% to 11.6%. (22)

It has been shown that youth are more likely to have unprotected sex, multiple partners, and shorter relationships compared to adults. (21) In 2015, one-quarter of surveyed Rhode Island students were sexually active, and over one-third (36.6%) did not use a condom during their last sexual intercourse. (22)

Epidemiological Burden & Barriers

Various barriers at multiple levels – individual, interpersonal, social, clinical, and structural – exist that deter or prevent adolescents from using or accessing condoms in their communities. DiClemente et al. describes the concept of "proximal" influences such as peers, community, family, and relationships, and "distal" influences like the economic, cultural traditions, and policy that are barriers to access and use. (41)

While individual and relationship-level barriers to condom use, including lack of knowledge, power dynamics, and social supports, have been explored in multiple settings and described in great detail (5, 23-29), higher-level factors such as social, structural, and clinical can be more difficult to quantify.

Complex social barriers are seen in this age group, and can be exceptionally difficult to address. Both stigma and shame have been noted as barriers to both access and screening for

STIs and have also been shown to affect condom use among young populations. (5, 10, 30-34) Additionally, multiple studies have reported that increased levels of communication between parents and adolescents reduced sexually risky behaviors and increase condom use. (35-37)

The importance of structural barriers to adolescent condom use, such as cost and physical access to condoms in the community, was noted as far back as 1971 by Arnold et. al., who suggested that placing condoms in non-clinical settings may help to alleviate the issue of access. (5, 38) Moreover, poverty and limited access to community resources present additional barriers to condom access for adolescents, for example, a lack of funds to buy condoms or access transportation to obtain free condoms. (5)

Clinic-related factors present additional barriers to sexual health for adolescents. Most notably, if adolescents are seeking free condoms and contraception at clinics, various barriers may include limited clinic hours and inability to get an appointment (due to school schedule), as well as confidentiality issues, especially for adolescents who may be seeking care without their parents' knowledge. (5, 10)

Interventions

Adolescent condom use has been extensively studied and many interventions have been evaluated and published in peer-reviewed journals. Of the multitude of interventions performed, many focus on high-risk adolescents. The overarching goal of most of these individual-level condom use interventions has been to increase knowledge of the benefits of condom use and the risks of unprotected sex, as well as decrease risky sexual behavior through improving skills, self-efficacy, and attitudes. (39-56) However, when designing interventions to target the issue of condom access and use, there is concern that while individual-level interventions are very effective, the effects are only observed short-term, and are reduced over time, even back to

baseline levels. (5) Interventions that address the social, structural, and interpersonal barriers are also needed. (2, 5)

In order to further understand barriers to condom use and access, input from adults (other than parents, as their views may be biased) who interact with adolescents in the community may be valuable and provide a perspective that often goes unheard. The goal of this study was to obtain the perspectives of social service staff and public health professionals who interact with adolescents and can offer additional insights to the social, behavioral, and structural barriers to condom use and access among 15-19 year-olds.

METHODS

Study Setting

Online data collection began in late May 2016 and persisted through August 2016.

Participants

Respondents were recruited through various sampling methods. The first wave of recruitment utilized a convenience sample and the survey link was distributed to individuals who attended the Conference on Youth Sexual Health Education in Bristol, Rhode Island on May 20, 2016. Cards with the survey web address were provided to any attendee who was interested in completing the survey regardless of occupation or role, although it was assumed that all attendees were stakeholders in the area of adolescent sexual health.

Additional respondents were recruited using a snowball sampling method. First, school nurses in the four major urban areas with high chlamydia burden (Central Falls, Woonsocket, Pawtucket, and Providence) were selected as the best possible seeds for survey distribution due to their roles and connectedness to other adolescent health professionals. At the end of the

survey, there was an option for the respondents to identify and provide the contact information for additional individuals who could be contacted for participation in the survey. Using the information provided, an email message was sent to each of the identified potential respondents explaining how their information was obtained and the purpose of the survey. (A total of 27 names were obtained from this snowball sampling method.) Respondents were permitted to pass along the survey to people they deemed relevant to serve as respondents. Due to resource constraints and a priori sample size predictions, the survey was closed from accepting new responses after 50 individuals had initiated the survey.

Study Design

This survey was designed to be short in order to encourage participation. Respondents answered both quantitative (ranking and multiple choice) questions and qualitative, open-ended questions. The survey began with a statement regarding the purpose of the survey, use of the data, and anonymity procedures. Respondents were required to check a consent box before they were able to proceed with the survey. If a respondent did not consent to the survey, they were automatically directed to the end of the survey, and no response was recorded. The survey was approved by the Rhode Island Department of Health (RIDOH) Institutional Review Board.

Measures

Questions were developed with input from members of the Office for HV, Hepatitis, STDs, and TB Epidemiology at the RIDOH, including Epidemiologists and Program Managers. First, respondents were asked to choose the capacity in which they interact with youth. If a respondent chose the option "I do not interact with adolescents," they were re-directed to the end of the survey and no further response was recorded.

Next, respondents were asked to manually enter community locations where adolescents spend time in response to the question, “Based on your experiences with this age group, please list any locations that you are aware that high school students will spend their time after school,” in order to obtain insight regarding possible new dispenser locations. Next, respondents were asked provide their opinion on parental views on adolescent sexual health by completing the statement, “Parents in my community view freely accessible condoms/ contraception for adolescents...” with the choice of “negatively,” “somewhat negatively,” “neutral,” “somewhat positively,” or “positively.” Respondents were then asked, “Do you think students would access free condoms in the following locations?” and asked to endorse a list of 12 possible location categories as “Yes”, “Potentially,” or “No,” as places where students may access condoms. Potential barriers to adolescents accessing condoms were assessed by asking respondents for potential factors, including geographic location, cost, embarrassment, transportation, parental oversight, lack of education, lack of knowledge, and cultural stigma/influence. Response options were: “Not a Barrier,” “Somewhat of a Barrier,” or “A Major Barrier.” Respondents were asked to write an open-ended response to the question, “How would you describe the attitudes of the adolescents that you interact with towards safe sex and sexual health?” Finally, respondents were provided with another open-ended question where they could include any other final thoughts or commentary that they felt were not captured by the previous questions.

All questions were optional except for one regarding the relationship of the respondent with adolescents, as this was deemed necessary to provide context to the responses. Additionally, this served as a way for respondents to remove themselves from the survey if they did not feel that they were an appropriate person to complete the survey.

Data Analysis

Frequencies were tabulated for the roles of respondents, as well as for ranking and rating questions. For open-ended, qualitative questions, responses were read and grouped the author based on common themes/answers that were identified. For questions where the option "Other (Please Specify)" was available, all written-in answers were read and summarized appropriately in the text.

RESULTS

Fifty respondents began the survey. Six respondents did not consent to completing the survey after reading the disclosure statement, and two respondents were not able to complete the survey due to their choice of "I do not interact with this age group" in the first question. In total, forty-two respondents completed the survey.

Roles of Respondents

Respondents indicated the following roles: school nurse (n=7), pediatrician or other clinician (n=17), teacher or other educator (n=6), resource officer or counselor (n=1), social worker (n=6), coach (n=1), mentor (n=1), another public health professional or staff member (n=7), and "other" (n=8). Those respondents choosing "other" elaborated on their roles a variety of social service agency staff and clinical positions that were not captured in the options provided.

Locations Frequented by Adolescents

A variety of locations were identified by respondents as places where high school students spend their time. (Table 1) The most common locations identified included: malls (n=23), school and afterschool programs (n=17), community locations (n=16), sports-related locations (n=15), food-related locations (n=15), and parks (n=12). Other responses included at home/friend's home (n=6), entertainment locations (n=5), downtown areas (n=5), specific transportation-based locations (n=5), work (n=5), beaches (n=3), and libraries (n=2). Community-based social services agencies specific to Providence were also mentioned (n=7).

Parental Views

Over one-third (38%) of respondents said that they believed that parents were "neutral" and 33% said they believed parents felt "positively" or "somewhat positively" about accessible

condoms and contraception for adolescents, while the remaining 29% believed the parents felt "negatively" or "somewhat negatively."

Possible Locations of Access

"Health Care Provider Office" and "Schools" were identified as the top locations where adolescents might access condoms. Eighty-three percent responded "Yes" and 17% "Potentially" when asked if adolescents would access condoms at healthcare provider offices. Similarly, 71% and 26% responded "Yes" and "Potentially", respectively, that adolescents would access condoms at school. Other highly ranked answers included convenience stores (69% and 29%, respectively), Boys & Girls Clubs or YMCAs (64% and 33%, respectively), and barber shops and hair salons (52% and 41%, respectively). Conversely, a substantial portion of respondents said that adolescents would not access condoms in restaurants (37%), libraries (33%), body shops (27%), or grocery stores (24%). Other suggested locations written-in by respondents included gyms, pharmacies, public restrooms, parks, other clinical settings, and community/youth centers.

Barriers to Access

When asked about barriers to access for adolescents, embarrassment (98%), parental oversight (95%), and lack of knowledge (95%) were most highly ranked. Cost and transportation were endorsed as major barriers by nearly 50% of respondents. Lack of education on the benefits of condom use were ranked as a barrier by 87% of respondents. Cultural stigma/influence was ranked as a barrier by 90% of respondents. Other barriers written-in by the respondents included privacy concerns, adolescent feelings of invincibility, effects of sexual trauma, and remembering to carry condoms. One respondent cited reduction in sexual pleasure with a condom as a barrier to use.

Attitudes of Adolescents towards Sexual Health

When describing the attitudes of adolescents towards sexual health, the following themes were identified: “positivity/ receptiveness,” “awareness,” “unpreparedness/spontaneity,” “barriers to access,” “knowledge,” “deliberate choice,” “parental role,” “stigma,” and “invincibility.” (Table 2)

The theme of positivity/receptiveness is captured well by one respondent: “Many seem to be receptive to discussing sexual practices, and even entertaining the idea of using condoms; most even will take condoms and return to obtain more and tell friends.” Many respondents noted the increased awareness of adolescents, saying things like “most teens…are aware of the risks of unprotected sex,” and “they know that condoms decrease STIs/pregnancy….” Multiple respondents noted adolescents being unprepared or engaging in spontaneous sex, citing observations like, “[they] do not use condoms because they don’t have one in the moment,” or that adolescents are “unprepared for when an encounter may happen.” With regards to barriers to access, respondents noted “no access” and “cost,” with multiple respondents noting that adolescents “would take more condoms if they were readily available” in places such as “condoms at school.” Regarding knowledge, respondents noted adolescents “state that they were not told about the side effects” and “come to our program…not knowing their own body parts.” Misinformation was also mentioned in this category, including, “they say they know about STIs, however, after talking to them, it is clear how little they know and how surprised they are to hear about the consequences of STIs,” “most adolescents think they know how to use them correctly but many do not,” and “a large amount of adolescents still don't feel they need to use condoms if their partner is ‘clean’.” One respondent noted, “They are craving information that may not be provided with in health classes and seem to care about their own health and protecting

themselves from STIs." The concept of deliberate choice of adolescents was mentioned many times, with respondents citing that adolescents "choose not to use [condoms] consistently" or "prefer not wearing condoms due to it feeling better without." One respondent noted, "Many have shared stories of their friends contracting an STI, even HIV and yet it has not persuaded them to change their ways." On a related note, invincibility was a reoccurring theme, with respondents saying that adolescents "[are in] denial," or that they have the mindset "that they know it already." Regarding parental role, one respondent noted a jarring response which captured the general opinion of informants on parental oversight: "I have experienced parents that bring adolescents to our health center actually bringing condoms back into the center because they did not want their child to have them..." In this category, respondents mentioned parents that "were not interested in learning until it was too late" and "don't want to acknowledge that it is happening." Cost was mentioned as a barrier to access, with respondents saying that, "If they were accessible, I think they will use them, but they are expensive…" and "[they] have complaints about cost, barriers to access…." Finally, while the theme of stigma was subtly noted within other categories, respondents described adolescents as "embarrassed," "shy," and "suspicious."

One respondent noted the differing views of adolescents: "I find two groups of kids- one is very open about sexuality and needing contraceptives, the other is very embarrassed and requires patience to get to the heart of their needs…. I think the open kids would pick up condoms wherever it was convenient…. But the other kids would only access condoms if they were able to do it in a private location." Other survey respondents reinforced this concept of two markedly different groups: students who were interested in their sexual health and receptive to education and discussion around the matter, and students who lacked knowledge, or were

influenced by parental involvement, stigma, and social norms, and as a result were not using condoms or protecting their sexual health. One respondent supported this by saying, "The attitudes are mixed.... Some teens understand the need for safe sex and sexual health…. These students are open to conversations both with their parents and providers and make sure they utilize the resources available to them…. Other teenagers remain naive and non-compliant to using safe sex techniques for a variety of reasons." Amongst the latter group, lack of risk perception was commonly identified as a problem.

DISCUSSION

Suggestions of locations where adolescents spend time and where condoms could be provided were not particularly surprising. However, important insight can be gleaned from key informant perspectives on where condoms should or would not be accessed, and provide further insight for a public health program looking to improve and expand the existing condom distribution program for 15-19 year-olds.

"Malls" were indicated as a very common place where adolescents spend time and would access condoms. While RIDOH would likely have concerns over dispenser maintenance in these locations—including how they would be monitored—from a public health perspective, placing condoms in public bathrooms in malls may reach a large number of people in a more anonymous environment, thus removing additional barriers related to stigma and privacy. Perhaps placing targeted educational materials and resources in the malls, and advertising where publicly available condom dispensers are located, would be an alternative approach if RIDOH is unable to place dispensers in these locations. Many respondents pointed to a lack of information and knowledge amongst this group, so regardless of condom provision, educational materials in frequented public places are recommended. Further, not only is the provision of educational

materials important to instill new knowledge but also to provide reliable sources of information, as many respondents noted misinformation perpetuated amongst adolescents.

Community-based locations, such as Boys & Girls Clubs and YMCAs, may also be locations where dispensers could be added. However, buy-in from the administration of these locations would be essential, which would likely require support of staff and parents. Additionally, as anticipated, the feedback from this survey provided further support for the ongoing need for condom distribution in schools. Multiple studies have been conducted which support the effectiveness of in-school condom distribution programs in reducing STIs and increasing positive perceptions without increasing sexual activity, especially in urban settings. (14-16, 57-60) Distribution in schools must take into account a unique set of challenges and stakeholders including parents, publicly-elected school boards, school administrators, teachers, and students.

The option "Health Care Provider Office" was selected as a place where adolescents would access condoms by all respondents. Several locations that provide clinical services to adolescents in areas of high STI prevalence such as Planned Parenthood of Southern New England and urban federally qualified community health centers already participate in the RIDOH condom distribution program. It would not be cost-effective, nor an appropriate allocation of resources, to provide condoms to private practices all over the state. Additionally, it would require a member of the office staff from each location to be responsible for ordering condoms from RIDOH, filling the dispenser, and monitoring the use and maintenance of the dispenser. However, one focused strategy could be the provision of educational materials to pediatricians and family practice offices so that they can speak with patients about condom use and provide referrals to publicly available condom dispenser locations. Additionally, the RIDOH

is encouraged to continue their practice of providing free condoms to private providers who report high numbers of STDs.

While not endorsed by the key informants in this study, previous studies have found that adolescents mainly access condoms in retail stores, including grocery stores and pharmacies, (61) although one study found that when examining these locations, many did not have condoms actually accessible without asking an employee, and that this would deter adolescents from obtaining condoms (62). This further emphasizes the roles of stigma and embarrassment as barriers to condom access; in fact, embarrassment is well-documented in the literature as a significant deterrent of condom access for adolescents (62-64), and this study reinforces this notion.

Intriguingly, less than one-third of respondents felt that parents viewed access to condoms and contraception "negatively" or "somewhat negatively," yet over 95% of respondents ranked parental oversight as "somewhat of a barrier" or "a major barrier" to access. This apparent contradiction presents a case for further research (from adolescents and from parents directly) to investigate if parental concerns, stigma, and social norms are major barriers to condom use. The finding that "embarrassment" was endorsed as often as "parental oversight" as a barrier to access further supports this notion.

Cost was endorsed as a major barrier to use by less than half of respondents and specifically mentioned by two respondents regarding adolescent attitudes. As per the American Pregnancy Association, male condoms cost between $0.20 and $2.50 each. (65) One study in 1999 demonstrated that increasing the price of a condom from free to $0.25 resulted in large decreases in the amount of people accessing and using condoms. (66) Additionally, a structured review of barriers to access in 2009 cited cost as a reoccurring barrier, although this accounted

for other countries, some with significant poverty. (67) Rhode Island is a fortunate beneficiary of a portion of the CDC's $339 million allocated to 67 different groups for provision of HIV prevention programs (9), which has funded the distribution of over 1,208,00 free condoms in Rhode Island since 2012. Because of this grant, the barrier of cost is somewhat alleviated, and therefore RIDOH is able to – for now – move its attention to targeting the other barriers to access identified here.

Special attention should be paid to the reoccurring themes noted regarding attitudes of adolescents. The themes identified serve to reaffirm the existence and substantial impact of social barriers. The overall description by respondents of two drastically different groups of adolescents (with respect to attitudes towards sexual health) is extremely insightful. With knowledge that two types of attitudes exist in the community, it is recommended that the RIDOH investigate potential partnerships with the Rhode Island Department of Education to initiate positive, peer-led interventions, particularly in schools.

Limitations

Although this study is unique in that it incorporated the perspectives of public health professional and other professionals who work with adolescents in Rhode Island in over 25 different capacities, it should be understood in the context of its limitations. The targeted recruitment and convenience sampling frame may have led to selection bias. Additionally, applicability of the survey was subject to interpretation by respondents. Finally, in order to increase response rate and survey completion, the survey was very brief, limiting the amount of information that could be collected.

CONCLUSIONS

The attitudes of adolescents as described by respondents highlight the wide variety of factors at play in adolescents' ability to access and use condoms. Based on the identified themes, social barriers such as lack of knowledge and awareness about STI prevention, embarrassment and stigma, and parental oversight may be even more substantial barriers than access and cost.

Overall, multiple studies have reinforced the idea that interventions to increase adolescent condom use need to occur across all levels and address multiple barriers in order to be effective over time. The results of this study confirm that the perceived barriers to access and use vary widely. Future research may include a formal assessment of adolescent attitudes through quantitative surveys and qualitative focus groups to obtain input directly from the target population. While the process of formally surveying students (especially in schools) is lengthy and labor-intensive, if the RIDOH is invested in targeting root causes of barriers to adolescent condom use, this venture is likely worthwhile. Input directly from the source population as well as from key informants can be combined to form a more informative, multi-dimensional picture of existing barriers and possible solutions. It is, without a doubt, imperative that more resources be dedicated to this target population, and RIDOH should continue to invest in this issue.

TABLES & FIGURES

***Table 1**: Identified Location Types (with Examples) where Adolescents May Spend Time*

Response Category *(with Example Responses)*	# of Responses
Mall *(e.g. Downtown Mall, Providence Place Mall, Emerald Square Mall, Lincoln Mall)*	23
Sports *(e.g. Basketball Courts, Sporting Events, Gym, Practice, Skate Park, Tennis Courts, Recreation Center)*	17
Youth-Oriented Locations *(e.g. YMCA, Boys & Girls Club, Youth Center)*	16
School / Afterschool Programs	15
Food *(e.g. Pizza/Sandwich Shops, Coffee Shops, Restaurants, Ice Cream Place, Convenience Store)*	15
Parks	12
Community Locations Specific to Rhode Island	7
Home *(e.g. At Home, At A Friend's Home)*	6
Entertainment locations *(e.g. Movies, Shopping, Night Clubs)*	5
Downtown	5
Transportation-Related Locations *(e.g. Kennedy Plaza, Thayer Street, Bus Stops, Streets)*	5
Work	5
Beach	3
Library	2
Unsure/ Do Not Know	1

***Table 2**: Qualitative Results of Identified Themes in Key Informants Survey Question: "How would you describe the attitudes of adolescents towards sexual health?"*

Theme	Key Words/ Phrases
Positivity / Receptiveness	• "[They] ask for them all the time!" • "[They are] very open to discussing it… pregnancy prevention a big 'door in' to the conversation" • "[They are] willing to learn and adopt new behaviors if shown respect" • "[They are] very open to conversations regarding safe sex" • "Most teens we interact with are interested in protecting themselves and partners from HIV and other STDs." • "[They] are very receptive to a discussion." • "Many seem to be receptive to discussing sexual practices, and even entertaining the idea of using condoms, most even will take condoms and return to obtain more and tell friends." • "[They are] open to advice and have no problem asking questions"
Awareness	• "Most teens…are aware of the risks of unprotected sex…" • "They know that condoms decrease STIs/pregnancy… [but choose not to use them." • "Female patients know about condom use." • "Some of them think that it's very important…" • "The attitudes are mixed. Some teenagers understand the need for safe sex and sexual health. These students are open to conversations both with their parents and providers and make sure they utilize the resources available to them. Other teenagers remain naive and non-compliant to using safe sex techniques for a variety of reasons."
Unpreparedness/ Spontaneity	• "Many are unprepared when an encounter may happen" • "It seems that sometimes the acts are random or spontaneous" • "Do not use condoms because they don't have one 'in the moment'" • "Sex is spontaneous"
Barriers to access	• "[They are aware but] they have no access to them" • "If they were accessible, I think they will use them. They are expensive…" • "[They] have complaints about …cost, barriers to access." • "I think more would take condoms if they were readily available) • "They would love to access condoms at school"
Knowledge	• "They don't always …have all the knowledge they need" • "Teens… state that they were not told about side effects." • "Many come to our program… not knowing their own body parts." • "They say they know about STIs, however, after talking to them, it is clear how little they know and how surprised they are to hear about the consequences of STIs." • "Most teens think they know how to use them correctly but many do not." • "Ranges from very insightful and willing to use, to very uneducated and unaware."

	• "They are craving information that may not be provided with in health classes and seem to care about their own health and protecting themselves from STIs."
Deliberate Choice	• "[They know]…but choose not to use them consistently." • "They brush it off" • "[They] know it's very important but don't use it most times." • "Many have shared stories of their friends contracting an STI, even HIV and yet it has not persuaded them to change their ways." • "Large amount of teens still don't feel they need to use condoms if their partner is 'clean'." • "Teens know the benefits of safe sex, but say they prefer not wearing condoms due to it feeling better without it."
Invincibility	• "They feel they are invulnerable" • "[They brush it off] because they don't think it will ever be them with an STD." • "[They are in] denial." • "Their attitude…is that they know it all already." • "Teens still think they are invincible, that nothing will happen to them."
Parental Role	• "I have very informed parents… and some that are not at all interested in learning anything until it is too late." • "State that they would like to have access to birth control/condoms, however when pressed by their parent or if parent becomes aware/is made aware student then prefers not to have access." • "Some seem to be worried about their parents finding condoms, and I have experienced parents that bring teens to our health center actual bringing condoms back into the center because they did not want their child to have them..." • "Due to religious beliefs; parents don't want to acknowledge that it is happening; there is a lack of social and emotional support for their kids. We need more parental education where parents can understand that their kids are sexually active, the consequences, and how they can help support their kids."
Stigma	• "Some teens are shy to ask questions." • "[They are] embarrassed to talk about it." • "[They are] suspicious of birth control." • "They would only access condoms if they were able to do it in a private location."

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