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UNEQUAL ACCESS:

TOBACCO RETAIL IN THE INDIANAPOLIS METRO AREA

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Unequal Access

Tobacco is a notable health threat in Indiana with over 11,000 Hoosier lives taken annually, [1] and vulnerable populations have far more retail access[1] to tobacco than do other segments of the population. The local density and accessibility of tobacco retail outlets not only provide vulnerable populations with greater access to tobacco products, [2-6] but they also provide the tobacco industry with greater access to vulnerable populations in terms of point-of-sale (POS) marketing. [7-13] While unequal access typically refers to less access to a desirable resource by marginalized populations, in the case of tobacco products and tobacco marketing, *greater* access by and to marginalized populations is the troublesome inequity.

Differences in life expectancy do not occur randomly.[2] [14] Some populations have greater access to health-promoting and health-protecting resources; others have greater access, or exposure, to potential health threats. In the Indianapolis metropolitan area, tobacco is more readily availability in areas that already struggle with quality-of-life issues. Why should we care? What can we do about it?

Higher poverty, lower education… and targeted by tobacco. Why should we care? What can we do about it?

In this report, we explore these questions and share results of our analysis of tobacco access across the Indianapolis metro area.

Where Tobacco Prevails

Since 1964, smoking rates among U.S. adults have decreased from 42% to 15% because of ongoing public health efforts. [15-18] Despite this positive trend, smoking continues to exact a heavy toll on the nation's health, with one in every five deaths in the U.S. due to diseases known to be caused by chemicals in tobacco smoke. [6] Although the harmful effects of tobacco are now widely known, the tobacco industry has retained its presence in the U.S., with over 375,000 tobacco retailers. [19] The tobacco industry also spends almost $8.5 billion annually on promotion. [20]

Based on smoking statistics, tobacco use is an even greater problem in Indiana and in Indianapolis than in the country as a whole. In 2016, the adult smoking rates of the five healthiest states ranged from 9.1 to 13.8%. Indiana ranks

[1]While the term *exposure* is typically used when discussing environment toxicants, we are instead using the term access because we are measuring accessibility of retail tobacco sites.

[2]In July 2015, at our last health-focused SAVI Talks! event, we unveiled the *Worlds Apart: Gaps in Life Expectancy in the Indianapolis Metro Area* report (www.savi.org/savi/documents/Worlds_Apart_Gaps_in_Life_Expectancy.pdf.)

39th, with an adult smoking rate of 20.6%, [21] while Marion County has a rate of 21.8%. [22] Tobacco use has significant economic and tax consequences for Indiana. The annual direct cost of Indiana health care attributable to smoking is estimated to be $2.93 billion dollars. The state and federal tax burden from smoking is $903 per household, as measured by government expenditures. [23] The additional annual cost for lost productivity due to tobacco use is estimated at $3.17 billion. [23] Most Hoosiers who smoke want to quit. [1, 24] Ready access to tobacco outlets and repeated exposure to tobacco advertising can make quitting harder to accomplish. Easy retail access to tobacco also makes it more likely that people will begin to smoke. [25-36] In Indiana, we have 8,593 licensed tobacco retailers and in the Indianapolis metro area we have 1,952. [37] As this report demonstrates, these outlets are not evenly distributed.

Density Matters

Tobacco retail density has become a measure of environmental health risk. [9, 38, 39] In addition to providing more opportunities to purchase tobacco, higher density of retail tobacco outlets increases exposure to POS marketing, such as signs that display information on available brands, and sales prices, and prominent in-store product placement. [10, 31, 40-44] POS marketing is one of the few remaining means that tobacco retailers can use to target potential users. [10, 45, 46] Retail density and POS marketing increase the usage of tobacco and raise the health risks of residents.

Measuring Access

In order to understand tobacco access in the Indianapolis metro area, first we collected several datasets related to tobacco, population, and transportation. We obtained a list of tobacco retailer certificates from the Indiana Alcohol and Tobacco Commission. These data include the location of all valid certificates in Indiana as of January 3, 2017. We used street centerline information provided by the Indiana Department of Transportation to map the location of tobacco retailers. We retrieved socioeconomic and demographic indicators from the American Community Survey (2010-2014 five year estimates) using the SAVI Community Information System (SAVI; http://www.savi.org). We also retrieved the maternal smoking indicator, based on birth certificate data from the Marion County Public Health Department, again from SAVI. We used risks scores for selected health conditions from Center for Disease Control and Prevention's (CDC) 500 Cities small area estimate based upon the 2014 Behavioral Risk Factor Surveillance System (BRFSS) in January 2017. [47]

Next, we calculated tobacco access based upon both the density and accessibility of tobacco retailers in a given census tract in 2017. As Figure 1 below shows, we combined three factors (two measures of density and one of accessibility) to develop an access score for each census tract.

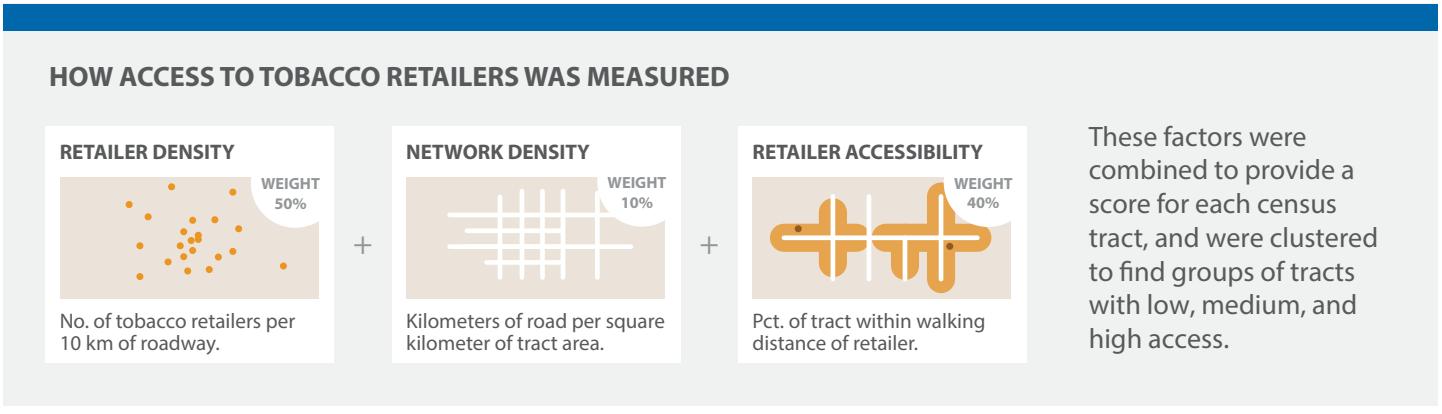

Figure 1. Methodology

To measure density, we included both retailer density and network density, which accounts for an individual's ability to walk or drive to a nearby retailer. Retailer accessibility differs from network density in that it examines the proportion of the tract area within 500 meters (approximately 1/3 mile) – considered a walk-able distance. [25, 48-50] The objective of calculating this metric was to identify the tracts where an individual may be exposed more often to the presence of tobacco retailers (and, potentially, tobacco marketing).

We calculated the access score and then clustered census tracts into groupings for further analysis. We grouped tracts based on Jenks calculations, which maximize variation between groups while minimizing variation within groups, using the following score ranges:

Low access tracts (scores ranged from 0.10 – 8.53, n=229);
Medium access tracts (8.80– 22.42, n=112);
High access tracts (22.66 – 43.27, n=56).

All charts and maps were produced by The Polis Center at Indiana University Purdue University Indianapolis, March 2017.

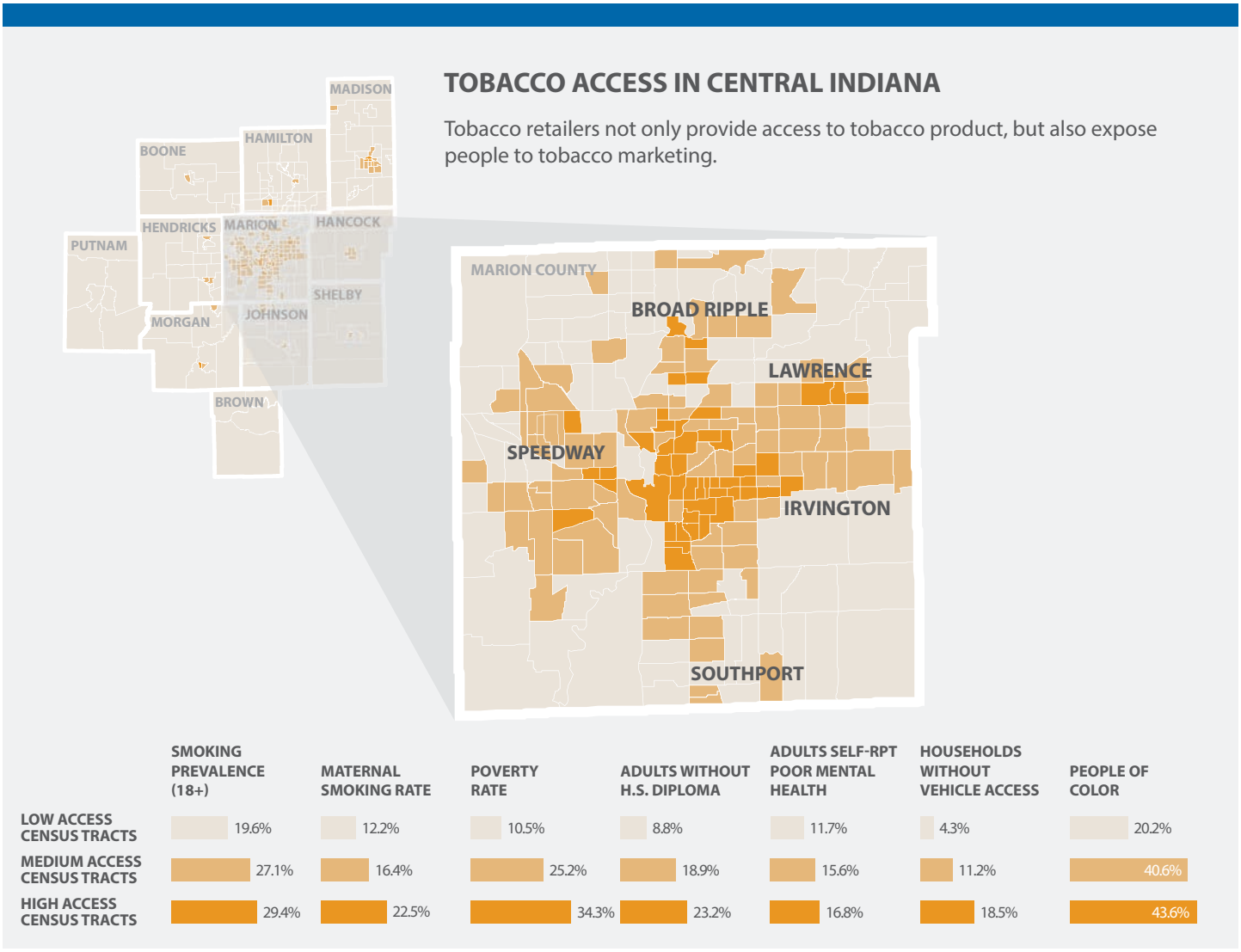

Figure 2. Results

Finally, we compared sociodemographic characteristics[3] and health behaviors across these three different access levels. To do this, we tested the results for significance to ensure the differences between the means for each indicator in each access group were not the result of random occurrence.

We tested all three combinations of groups (low vs. high, medium vs. high, and medium vs. low) for significance using a two-tailed t-test. For low vs. high and low vs. medium, differences in every indicator were significant with 95% confidence. For high vs. medium, differences were significant with 95% confidence for four of the seven indicators. See Appendix B for the p-values resulting from the significance testing.

The results demonstrate that in Indianapolis, as in other U.S. cities, tobacco retail outlets are concentrated where smoking rates are predicted to be the highest. In medium and high access groups, the 2014 **adult smoking rates**, predicted by the 500 Cities Project using the Behavioral Risk Factor Surveillance System (BRFSS) and sociodemographic characteristics, exceed the rate for Indiana. Tobacco access is only part of the issue in Indianapolis, as even in the low access groups, the estimated smoking rate exceeds the rate for the United States (16.8%). [51]

More significant, the measured rate of **maternal smoking** is nearly twice as high in high access areas than in low access areas and is also significantly higher in high access areas than in medium access areas. The maternal smoking rate in high access areas is 1.5 times higher than the 2015 maternal smoking rate in Indiana (14.3%). [52] Maternal smoking rates for all three access groups are higher than the U.S. rate (7.8%). [53] This illustrates that maternal smoking is a significant health issue in Indianapolis regardless of level of tobacco access, but also that some geographic communities in Indianapolis are at greater risk than others.

In the Indy metropolitan area, tobacco retail outlets are concentrated where maternal smoking rates are the highest.

Tobacco Access and Vulnerable Populations

In the Indianapolis metro area tobacco retail outlets are concentrated where vulnerable populations live.

Poverty is more than three times greater in high tobacco access areas in the Indianapolis metro area than in low access areas. High access areas also have almost three times more **adults without high school diplomas** than low access areas. Or, nearly one in four adults in high access areas do not have a high school diploma. In low access areas, that rate is fewer than one in ten.

In Indianapolis, poverty is more than three times greater in high access areas than in low access areas.

Individuals with poor mental health are also more vulnerable to tobacco. Nationally, people with psychiatric or addictive disorders consume about 40% of cigarettes purchased and are more likely to be regular and heavy smokers. [9, 54] In Indianapolis, residents with the highest access to tobacco also have the highest rate of **self-reported poor mental health**. This suggests that this vulnerable population could benefit from actions that decrease tobacco access.

The percentage of **households without access to a vehicle** is more than four times higher in the high access group than the low access group, which may indicate that residents in

[3]The reported population characteristics of high, medium, and low access areas are based upon census tract level variables for 2010-2014, the latest available at the time of initial analysis.

Photo courtesy of WhyQuit.com

these areas have limited mobility – that is, residents in high access areas may more often find themselves in close proximity to higher concentrations of tobacco retailers than residents in low access areas.

Demographic disparities in tobacco access in Indianapolis also reflect those found elsewhere. The high tobacco access group had the highest percentage of **people of color**.

Tobacco access in the Indianapolis metro area is similar to what has been found in other parts of the country, with poor and minority areas having a higher density of tobacco outlets. **In disadvantaged communities**, higher tobacco retail density has been shown to have an even greater negative association with cessation efforts and an even greater positive association with smoking initiation. [3, 25] Because of the previously noted economic burden to Indiana, these disparities impact us all. As such, we have additional incentive to explore how local tobacco control policy and practice can respond to disparities in tobacco access.

Action Toward Tobacco Control

Tobacco control interventions are among the most thoroughly researched strategies to improve public health, and we know a lot about which are most effective, in large measure because of funding provided through the 1998 Master Tobacco Settlement.[4] One result of this research are the recommendations from the Institute of Medicine's (IOM) *Ending the Tobacco Problem: A Blueprint for the Nation.* [55, 56]. Listed in the table on page 9 are the recommended actions that are appropriate at state and local levels. They can serve as a framework for discussing current and potential action.

Increasing the price of tobacco products (IOM Recommendation 2) is the single most powerful tool available for curtailing tobacco consumption. [15] Several peer-reviewed economic evaluations have reached the same conclusion—the demand for cigarettes, like other consumer products, is responsive to price. As the price of cigarettes increases, the sale of cigarettes decreases. [57] For every 10% rise in the price of cigarettes, overall cigarette consumption goes down 3 to 5% and smoking among pregnant women goes down 7%. [15, 58] [59] [60-63] Responsiveness to price is most pronounced among males, Blacks, Hispanics, and lower-income smokers. [58, 62, 64, 65] Raising the price of cigarettes is also the most cost-effective tobacco control intervention, because tax increases have consistently increased state revenues after they were enacted. [66]

Indiana currently levies a $0.995 tax on a pack of cigarettes, placing the State of Indiana 37th among states. [58] The average state tax nationally is $1.69 per pack. A broad coalition of business, health care, not-for-profit and academic groups have joined forces to advocate for legislation to raise the tax by $1.50. This increase will not elevate Indiana's cigarette tax into the top quintile of states as

[4]The Master Settlement resulted from a class action suit filed by several states, including Indiana, against the tobacco companies for excess health care costs due to smoking.

RECOMMENDATION 1	State	Fund state tobacco control activities at the level recommended by the CDC.
RECOMMENDATION 2	State	Substantially increase excise tax rates to be more in line with level imposed by the top quintile of states.
RECOMMENDATION 4	State and local	Enact complete bans on smoking in all nonresidential indoor locations, including workplaces, malls, restaurants, and bars.
RECOMMENDATION 16	State, heath care partners	Increase demand for effective cessation programs and activities through mass media and other general and targeted public education programs.
RECOMMENDATION 21	State and local	Support the efforts of community coalitions to promote, disseminate, and advocate for tobacco use prevention and cessation
RECOMMENDATION 22	State and local	• Consider populations disproportionately affected by tobacco addiction and tobacco when designing and implementing prevention and treatment programs. • Ensure health communications are culturally-appropriate and that special outreach efforts target all high-risk populations.
RECOMMENDATION 30	State	Regulate retail POS of tobacco products for purpose of discouraging consumption and encouraging cessation.
RECOMMENDATION 32	State	Restrict the number of tobacco outlets.
RECOMMENDATION 35	State	Limit visually displayed tobacco advertising in all venues, including mass media and at the point of sale

Table 1. State and Local Recommendations for Ending the Tobacco Problem, Institute of Medicine

recommended by the IOM, but would increase our rank to 14th among states, [67] while saving countless Hoosier lives and avoiding millions in healthcare and lost productivity costs. This coalition is also advocating for Indiana legislation to raise the age of legal tobacco purchase from 18 to 21 years.

When the price of tobacco rises, there is a corresponding increase in the number of tobacco users interested in quitting and in the demand for cessation services. Indiana's state tobacco control program (IOM Recommendations 1, 16, 21, 22) has been underfunded in recent years. According to the Centers for Disease Control and Prevention (CDC), a minimum of $51.2 million should be invested in state tobacco control functions in Indiana, including $20.6 million for cessation interventions. [68] The CDC's recommended funding level for Indiana is $73.5 million, which would provide $33.1 for cessation services. [68] Indiana's tobacco control program actually receives approximately $7 million per year in state and federal funding, slightly under 10% of the recommended amount. [69] Meanwhile, tobacco companies spend approximately $284.5 million annually marketing tobacco products in Indiana. [70]

Passing stricter smoke-free air laws (IOM Recommendation 4) is another way Indiana could reduce exposure to the adverse effects of tobacco. The state legislature passed smoke-free air legislation in 2012, but several types of work environments were exempted from the law, thus weakening its capacity to protect citizens from tobacco smoke. [71] The Indiana State Department of Health estimates that only 31% of Indiana residents, living in the twenty-one cities and counties that have passed comprehensive laws, are nearly fully protected from second-hand smoke. [72]

Action Toward Equity

The current study unveils new information about where and toward whom interventions

and resources need to be targeted. Our results demonstrate that access to tobacco products in Indianapolis occurs in greater proximity to disadvantaged populations than it does to the population-at-large. Understanding tobacco access informs discussion of potential policy change and interventions for reduced tobacco use, and several IOM recommendations (30, 32 and 35) address geographically-based methods for limiting tobacco access. As the tobacco industry continues its efforts to introduce and "place" new products, the public health sector must consider these strategies and others to reduce population access to harmful tobacco products and population exposure to associated marketing.

Coordinated data collection efforts on POS marketing are occurring across the State of Indiana in an effort to understand how POS marketing is being handled in Indiana and the potential impact on our population. This knowledge will be used to educate our citizens and inform future policy initiatives.

Indiana policymakers should debate whether the state should regulate retail POS tobacco products, similar to what is occurring elsewhere in the country. For example, other states and communities have successfully capped the number of tobacco retail outlets, required a minimum distance between outlets, regulated price discounting, and prohibited the sale of tobacco products at certain types of establishments, such as in pharmacies and restaurants. [27] [73-76]

In Indiana, such action at the local level is not feasible because our state's preemptive tobacco control laws, long supported by the tobacco industry, [77] prohibit localities from enacting tobacco control ordinances that are more stringent than state laws.

Despite the legal barriers in Indiana, tobacco control is not totally dependent on government action. Options for action still exist. Because the socioeconomic disparities in tobacco access in Indianapolis occur in concentrated geographic areas, it makes sense to consider geographically-focused action.

Some examples are given below.

- The Marion County Public Health Department (MCPHD) has been surveying apartment complexes over time to determine the smoke-free status of their properties. They are working with some of the communities that have indicated interest in putting in smoke-free air policies. Because of these efforts, MCPHD has data on where there are smoking-free apartments available and where there are gaps. As such, we can look for geographic patterns in terms of which apartment complexes are not self-designating as smoke-free and target outreach about the benefits of smoke-free residential environments to those communities.
- The Indianapolis Public Housing Authority put a smoke-free policy in place for all of their apartment communities almost two years before the late 2016 final ruling of the U.S. Department of Housing and Urban Development (HUD) that mandates all multi-family public housing to be smoke-free.
- Hospitals have the opportunity to invest in smoking cessation and counter-marketing programs that are designed for the most vulnerable populations in their service areas. Nonprofit hospitals can invest in such programs as part of their required community benefit investments.
- The Nurse Family Partnership (NFP), which connects first-time, low-income moms with registered nurses for home visits, trains its nurses on evidence-based smoking cessation interventions. Because NFP is a home visiting program that targets vulnerable mothers, its cessation programming is a valuable complement to the Baby & Me Tobacco Free program offered via healthcare providers and to the Indiana Tobacco Quitline, Indiana's telephone-based tobacco cessation service.

Mapping tobacco access in the Indianapolis metropolitan area has revealed that vulnerable populations have far more retail access to tobacco than do other segments of the population. Because tobacco use is such a big problem in our city, we must continue to identify cross-sector opportunities for addressing disparities in tobacco use and access and to work together toward change in the policy environment.

Limitations

Available state data tell us the locations that have legal certificates to sell tobacco, but the data do not reveal if any of these outlets do not sell tobacco even though they have certificates. There is currently no publically available source of data on actual tobacco sales. Tobacco retailers are not required to report this information. Tobacco tax certificates cannot be used to track tobacco sales, as these are sold to the distributors versus the retailers. Private marketing firms generate and sell *estimates* based on surveys and audits. We did not purchase those for the purpose of this analysis. Our measures of tobacco retail access do not account for growing Internet e-cigarette sales or access via other vehicles besides commercial retail location.

In our access measurements, we did not control for population density. It is possible that in more sparsely populated areas, distances considered accessible (i.e., considered reasonable to travel for a tobacco purchase) are much greater than those in higher density areas (e.g., the urban core).

About the analysis

In our analysis, we derived tobacco access for census tracts in the Indianapolis Metropolitan Statistical Area (MSA) through the calculation of density and accessibility of licensed tobacco retail outlets. We obtained the location of 2017 licensed outlets from the Indiana State Department of Health. We used five-year population estimates by census tracts for 2010-2014, from the American Community Survey. For additional caution, we tested the results for significance to ensure the differences between the means for each indicator in each access group were not the result of random occurrence. (See Appendix B.)

About the authors

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APPENDIX A

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Appendix B: Two-Tailed T-Test Results

Low vs. High Tobacco Accessibility Areas

Indicator	Degrees of Freedom	P-Values
Percent Hispanic[1]	283	0.0000
Percent Non-Hispanic Black[1]	283	0.0000
Percent Without High School Diploma[1]	283	0.0000
Poverty Rate[1]	283	0.0000
Percent Without Car[1]	283	0.0000
Adult Smoking[2]	153	0.0000
Percent Maternal Smoking[2]	113	0.0000
Poor Mental Health[2]	153	0.0000

Low vs. Medium Tobacco Accessibility Areas

Indicator	Degrees of Freedom	P-Values
Percent Hispanic	339	0.0000
Percent Non-Hispanic Black	339	0.0000
Percent Without High School Diploma	339	0.0000
Poverty Rate	339	0.0000
Percent Without Car	339	0.0000
Adult Smoking	188	0.0000
Percent Maternal Smoking	150	0.0028
Poor Mental Health	188	0.0000

Medium vs. High Tobacco Accessibility Areas

Indicator	Degrees of Freedom	P-Values
Percent Hispanic	166	0.9316
Percent Non-Hispanic Black	166	0.4895
Percent Without High School Diploma	166	0.0188
Poverty Rate	166	0.0000
Percent Without Car	166	0.0000
Adult Smoking	129	0.0742
Percent Maternal Smoking	123	0.0017
Poor Mental Health	129	0.0996

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In Indianapolis, tobacco retail outlets are concentrated where smoking rates are highest. The rate of maternal smoking is nearly twice as high in high access areas than in low access areas.

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