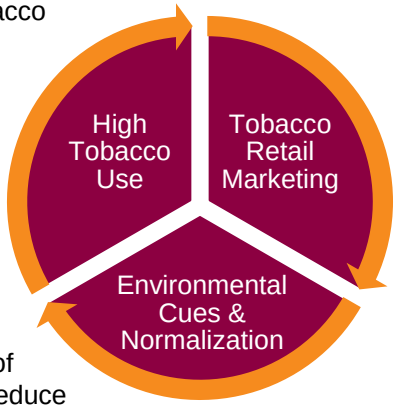
Public Health and Tobacco Policy Center

Tobacco Disparities: Evidence Supports Policy Change

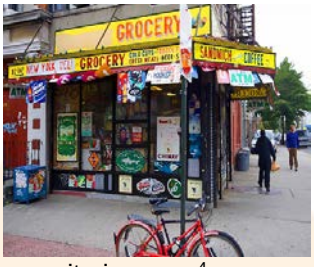
Tobacco industry practices are a key factor in **shaping the retail environment**. Tobacco companies heavily market their products to socioeconomically disadvantaged communities, primarily through local stores; these communities are exposed to more tobacco retailers, more prolific and prominent tobacco advertising in these stores, and more frequent and steeper tobacco price discounts. The result? Despite decades of declining smoking rates, groups with low income and less education use tobacco products at significantly higher rates compared to their more affluent and educated peers, and they disproportionately suffer from tobacco-related disease. Industry-driven marketing contributes to normalization of tobacco use and environmental smoking cues that increase tobacco initiation and decrease cessation success. Further, higher tobacco use contributes to increased involuntary exposure to secondhand smoke, especially among children, at the community level. Evidence of industry-driven tobacco disparities supports policies that restrict tobacco marketing, reduce secondhand smoke exposure, and otherwise combat differential tobacco use within disadvantaged communities.



Density

FACT: There are more tobacco retailers in disadvantaged communities as compared to more communities with more resources; higher tobacco retailer density is associated with higher likelihood of smoking.

More than one hundred studies have been published highlighting **socioeconomic and racial inequities** in tobacco retailer density.[1]



- Tobacco retailers are more concentrated in areas with at-risk groups; in fact, of demographics measured by a national sample, poverty and lack of high school education were both strongly associated with tobacco retailer density.[2]
- Even controlling for population size, there are 32 percent more tobacco retailers in urban areas than non-urban areas, and poverty confers a higher risk for high retailer density regardless of whether the setting is urban or rural.[3]
- The proportion of businesses selling tobacco products is negatively associated with per capita income.[4]
- Low-SES youth are more likely to live within walking distance of a tobacco outlet,[5] and higher density of tobacco retailers is associated with higher likelihood of youth smoking or ever smoking.[6]
- In Erie County, NY, census tracts with lower median household income and a greater percentage of African Americans were found to have greater tobacco retailer densities.[7]
- Among smokers with serious mental illness in the San Francisco area, tobacco retailer densities were two-fold greater than for the general population and higher retailer density was associated with poorer mental health, greater nicotine dependence, and lower self-efficacy for quitting.[8]
- Higher tobacco retailer density is associated with increased perceived prevalence of smoking, decreased cost to obtain tobacco, and increased visibility of environmental tobacco use cues, which are all factors associated with increased tobacco use.[9] At least two studies have directly linked higher neighborhood tobacco retailer density with higher odds of ever smoking.[10]

Marketing

FACT: Disadvantaged communities are exposed to more tobacco marketing and advertising than are communities with more resources; exposure to tobacco marketing increases likelihood of tobacco initiation and reduces cessation success.

> **"Neighborhoods with lower income have more tobacco marketing**… There are more inducements to start and continue smoking in lower-income neighborhoods and in neighborhoods with more Black residents. **[Retail] marketing may contribute to disparities in tobacco use.** [11]

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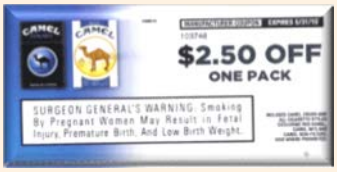
- In a review of 43 studies, authors noted an established pattern of targeted marketing in socioeconomically disadvantaged neighborhoods. Menthol marketing is also disproportionately higher within socioeconomically disadvantaged communities.[12]
- Targeted marketing was indicated by another systematic review of 28 studies. Tobacco companies have marketed specific brands to low-education groups, for example, and have formed alliances with blue-collar workers' unions to market their products.[13]
- Tobacco outlets in minority and lower-income neighborhoods tend to have more exterior ads per store than those in non-minority and higher-income neighborhoods.[14]
- A Metro Boston study found brand name advertising to be significantly higher in low-SES neighborhoods than high-SES neighborhoods. For every 10 percent increase in percent of residents without a high school diploma, there were 19 more brand name ads.[15]
- The 2011 California Tobacco Advertising Survey reports that there were significantly more menthol advertisements at stores in neighborhoods with a higher proportion of African-American residents and in low-income neighborhoods.[16]
- There are more ads in "focus community" stores (characterized as low-income, predominantly Black neighborhoods) for menthol products, and more cigarette displays that feature menthol products.[17] (Menthol products are more addictive,[18] and both youth and racial/ethnic minorities find it harder to quit smoking menthol cigarettes.[19])
- Exposure to retail marketing distorts youth perceptions of availability, use, and popularity of cigarettes, and increases the likelihood of smoking initiation.[20] Cigarette displays trigger impulse purchases both among smokers and those trying to avoid smoking.[21]

Price Promotions

FACT: Disadvantaged communities are exposed to more industry price promotions; availability of cheaper tobacco products interferes with cessation.



- Low-income groups, youth and young adults, African Americans and women are **more price-sensitive**, and tobacco companies have historically targeted these groups with price discounts to counteract the effect of rising prices.[22]
- Stores located in low-income, predominantly Black neighborhoods receive more discount incentives from tobacco manufacturers than those in other communities.[23] Incentives include premium contracts, discount coupons, and value-added promotions that translate to lower prices for consumers.[24]
- Lower-priced tobacco products, such as little cigars and cigarillos (which are sold in in smaller quantities and taxed at a lower rate than cigarettes) are more appealing to price-sensitive customers and are heavily marketed and discounted in lower-income and predominantly Black neighborhoods.[25] For example, Ohio stores located in economically disadvantaged communities (characterized by unemployment and low income) were 1.68 times more likely to advertise cigarillos.[26]

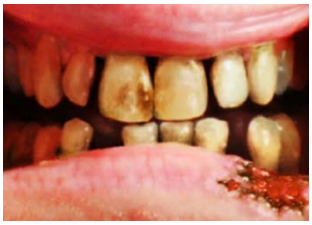
Tobacco Use

FACT: Despite declines in overall tobacco use, disadvantaged communities continue to use tobacco at higher-than-average rates, revealing persistent disparities in the beneficial effects of public health policy.

> "Although cigarette smoking has declined significantly since 1964, **very large disparities in tobacco use remain** across groups defined by race, ethnicity, educational level, and socioeconomic status and across regions of the country."[27]

- The smoking rates among uninsured adults and adults covered by Medicaid (27.9 percent and 29.1 percent respectively) are nearly double those of adults with private insurance and those with Medicare (12.9 percent and 12.5 percent respectively).[28]
- In New York in 2014, prevalence of smoking was 22.4 percent among people with less than a high school education, compared to only 6.8 percent among college graduates.[29]
- Among adults who were ever cigarette smokers, 34.5 percent of those living below the poverty level have quit versus 57.5 percent of those living at or above the poverty level.[30]
- New York adult smokers with less than a high school education are far less successful in achieving long-term cessation than those with more education, despite being 34 percent more likely to have made a quit attempt within the last year.[31]

Burden of Disease



FACT: Vulnerable groups tend to use tobacco more frequently and for more years, and disproportionately suffer from tobacco-related disease.

Tobacco use causes **health disparities among minority and low-SES groups**.[32]

- People living in poverty smoke for twice as many years as those with family income three times the poverty rate; smokers with only a high school education smoke for twice as many years as those with at least a Bachelor's degree.[33]
- Individuals in the most socioeconomically deprived groups have higher lung cancer risk than those in the most affluent groups.[34] Lung cancer incidence is higher among those with family incomes of less than $12,500 compared to those with family incomes of $50,000 or more and people with less than a high school education have higher lung cancer incidence than those with a college education.[35]
- Low-SES groups are more likely to suffer the harmful health consequences of exposure to secondhand smoke.[36]

Smoke-Free Rules

FACT: Vulnerable groups are less likely to be covered by tobacco-free rules both at work and at home, which correlates with an increased likelihood of tobacco use.

- Absence of workplace rules limiting smoking is strongly associated with workers' current smoking status.[37] Blue-collar workers (who are less likely to have a college degree, less likely to earn more than $50,000 annually, and less frequently covered by comprehensive workplace restrictions) are more likely to start smoking cigarettes at a younger age and smoke more heavily than white-collar workers.[38] Construction workers and service workers are particularly heavy smokers.[39]
- In localities with lower-educated residents, workers have lower odds of being completely covered by smoke-free workplace laws.[40]
- Low-income adults in New York were significantly less likely (about 12 percentage points) than high-income adults to have no-smoking rules in the home in 2014. Low-education adults in New York were also significantly less likely (about 10 percentage points) to have in-home smoking restrictions than adults with higher education.[41]
- Even among adults with no-smoking rules in the home, nearly half of those living in multi-unit housing still experience infiltration of secondhand smoke from other residences.[42] Residents of affordable housing are more likely to experience detrimental health effects from this exposure, and are less likely to be able to move.[43]
- Tobacco use is 30 percent higher among adults living in multi-unit housing than those in single-family housing. Disparities in smoke-free rules in the home have been observed by race/ethnicity, income, education, and tobacco use.[44]

[1] CENTER FOR PUBLIC HEALTH SYSTEMS SCIENCE. Point-of- Sale Report to the Nation: Realizing the Power of States and Communities to Change the Tobacco Retail and Policy Landscape. St. Louis, MO: Center for Public Health Systems Science at the Brown School at Washington University in St. Louis and the National Cancer Institute, State and Community Tobacco Control Research Initiative, 2016.
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[3] *Id.*
[4] Michael Barton Laws et al., *Tobacco availability and point of sale marketing in demographically contrasting districts of Massachusetts*, 11 Suppl 2 TOBACCO CONTROL ii71–73 (2002).
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("Adjusting for teen race and ethnicity, each $10K increase in household income was associated with a 7% decrease in the odds of living near a tobacco retailer.").
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[10] Henriksen, et. al. *supra* note 5; Henriksen et al., *supra* note 6.
[11] Joseph G. L. Lee et al., *A Systematic Review of Neighborhood Disparities in Point-of-Sale Tobacco Marketing*, 105 American Journal of Public Health e8-18 (2015) at e8.
[12] *Id.*
[13] Rosemary Hiscock et al., *Socioeconomic status and smoking: a review*, 1248 Annals of the New York Academy of Sciences 107–123 (2012).
[14] Laws et al., *supra* note 4.
[15] Elizabeth M. Barbeau et al., *Tobacco advertising in communities: associations with race and class*, 40 Preventive Medicine 16–22 (2005).
[16] Nina Schleicher et al., "Tobacco Marketing in California's Retail Environment (2008-2011): Final report for the California Tobacco Advertising Survey," Stanford, CA: Stanford Prevention Research Center, July 2013.
[17] Tess Boley-Cruz et al., *The menthol marketing mix: targeted promotions for focus communities in the United States*, 12 Suppl 2 Nicotine & Tobacco Research: Official Journal of the Society for Research on Nicotine and Tobacco S147-153 (2010).
[18] FOOD AND DRUG ADMINISTRATION, Preliminary scientific evaluation of the possible public health effects of menthol versus non-menthol cigarettes. (2013), http://www.fda.gov/downloads/UCM361598.pdf (last visited Jun 28, 2016).
[19] Jonathan Foulds et al., *Do smokers of menthol cigarettes find it harder to quit smoking?*, 12 Suppl 2 Nicotine & Tobacco Research: Official Journal of the Society for Research on Nicotine and Tobacco S102-109 (2010).
[20] *See* U.S. DEP'T. OF HEALTH & HUMAN SERVS., Preventing Tobacco Use Among Youth and Young Adults, a Report of the Surgeon General 165 (2012) at 851-852; Lisa Henriksen et al., *Reaching youth at the point of sale: cigarette marketing is more prevalent in stores where adolescents shop frequently*, 13 Tobacco Control 315–318 (2004); Lisa Henriksen et al*., Effects on Youth of Exposure to Retail Tobacco Advertising*, 32 Journal of Applied Social Psychology 1771–1789 (2002).
[21] Melanie Wakefield et al., *The effect of retail cigarette pack displays on impulse purchase*, 103 Addiction (Abingdon, England) 322–328 (2008).
[22] Victoria M. White et al., *Cigarette promotional offers: who takes advantage?*, 30 AMERICAN JOURNAL OF PREVENTIVE MEDICINE 225–231 (2006).
[23] Boley-Cruz et al., *supra* note 17.
[24] *Id.*

[25] Jennifer Cantrell et al., *Marketing little cigars and cigarillos: advertising, price, and associations with neighborhood demographics*, 103 American Journal of Public Health 1902–1909 (2013) *citing* Elaine A. Borawski et al., *Adult use of cigars, little cigars, and cigarillos in Cuyahoga County, Ohio: a cross-sectional study*, 12 Nicotine & Tobacco Research: Official Journal of the Society for Research on Nicotine and Tobacco 669–673 (2010) and Brian A. King et al., *Current tobacco use among adults in the United States: findings from the National Adult Tobacco Survey*, 102 American Journal of Public Health e93–e100 (2012). *See also* Joseph G. L. Lee et al., *supra* note 11 at e13.
[26] Megan E. Roberts et al., *Point-of-sale tobacco marketing in rural and urban Ohio: Could the new landscape of Tobacco products widen inequalities?*, 81 Preventive Medicine 232–235 (2015).
[27] U.S. DEP'T OF HEALTH AND HUMAN SERVICES, The Health Consequences of Smoking: 50 Years of Progress (2014) at 7; *see also* Brandi N. Martell et al., *Disparities in Adult Cigarette Smoking — United States, 2002–2005 and 2010–2013*, 65 MMWR. Morbidity and Mortality Weekly Report 753–758 (2016), evidencing racial/ethnic disparities in use.
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[30] U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES *supra* note 27 at 718.
[31] Jane A. Allen et al., *Dismantling Disparities in Smoking Cessation: The New York Example* (manuscript), 7 (June 2015) (on file with author).
[32] Health Disparities in Tobacco Smoking and Smoke Exposure, in *Health Disparities in Respiratory Medicine* 9–39, http://link.springer.com/10.1007/978-3-319-23675-9_2 (last visited Jun 15, 2016) at 13.
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[36] DAVID M. HOMA ET AL., *Vital signs: disparities in nonsmokers' exposure to secondhand smoke--United States, 1999-2012*, 64 MMWR. MORBIDITY AND MORTALITY WEEKLY REPORT 103–108 (2015).
[37] David C. Ham et al., *Occupation and workplace policies predict smoking behaviors: analysis of national data from the current population survey*, 53 JOURNAL OF OCCUPATIONAL AND ENVIRONMENTAL MEDICINE / AMERICAN COLLEGE OF OCCUPATIONAL AND ENVIRONMENTAL MEDICINE 1337–1345 (2011).
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[39] *Id.*
[40] Jidong Huang et al., *Sociodemographic Disparities in Local Smoke-Free Law Coverage in 10 States*, 105 American Journal of Public Health 1806–1813 (2015).
[41] PUBLIC HEALTH AND TOBACCO POLICY CENTER, Examining Policy Successes in Reducing Low-Socioeconomic Adult Smoking Rates, 2016: *available at* http://www.tobaccopolicycenter.org/documents/2016%20Knopf-Juster%20SRNT%20Poster%20FINAL%203.pdf (last visited Jun 22, 2016).
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[43] Stein et al., *supra* note 42.
[44] Nguyen et al., supra note 42.

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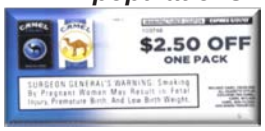
Tobacco industry practices are a key factor in **shaping the retail environment** and therefore the community. Tobacco companies heavily market their products to socioeconomically disadvantaged communities, primarily through local stores; these communities are exposed to more tobacco retailers, more prolific and prominent tobacco advertising in these stores, and more frequent and steeper tobacco price discounts. The result? Despite decades of declining smoking rates, groups with low income and less education use tobacco products at significantly higher rates compared to their more affluent and educated peers, and they disproportionately suffer from tobacco-related disease. Industry-driven marketing contributes to normalization of tobacco use and environmental smoking cues that increase tobacco initiation and decrease cessation success. The resulting higher tobacco use rates contributes to increases in community level involuntary exposure to secondhand smoke, especially among children and further exacerbates health disparities. Evidence of industry-driven tobacco disparities supports policies that restrict tobacco marketing, reduce secondhand smoke exposure, and reduce smoking within disadvantaged communities.

Here's How Targeted Tobacco Marketing Affects My Community:

	Disadvantaged community:	Community with more resources:
Density ***There are more tobacco retailers in disadvantaged communities as compared to communities with more resources.[1]*** 	It seems like my neighborhood has a store selling tobacco on every block—I see tobacco products wherever I buy food or other necessities.	I don't notice tobacco for sale in the stores I frequent. Some stores in my community seem to be getting rid of tobacco and using space for other products.
	My community is pretty rural and has only a few stores, but they all sell tobacco products. There's no way to avoid tobacco when shopping in my town. Some days I cave and buy a pack at checkout on impulse—even though I don't intend to when I first walk in.	While there're plenty of tobacco stores in my part of the city, there're also lots of other stores where I can shop. That's critical to me when I'm feeling close to smoking relapse—I try to avoid the stores where I used to buy cigarettes to avoid the temptation altogether.
Marketing ***Disadvantaged communities are exposed to more tobacco marketing and advertising than are more privileged populations.[2]***	Not only do tobacco stores seem to be everywhere you turn, but they're all plastered with tobacco ads. Lots of people must smoke around here.	I see tobacco ads in my community, but they run together with other ads—even stores that sell tobacco seem to have just as many ads for other products. Regardless, I tend to tune out tobacco advertising.
	As I'm walking to school I see a lot of ads for the big brands (especially menthol) on the windows of convenience stores. I also notice a lot of ads for those cheap cigarillos.	Seems like there are lots of cigarette brands advertised in my community. I can't think of specific brands or other types of tobacco pictured in store windows I pass.
Price Promotions ***Disadvantaged communities are exposed to more industry price promotions.[3]***	I often see stores offering "2 for 1" or other tobacco deals. And every time I think I'm about to quit, I'm mailed a coupon and end up back for my "last pack." It's hard to avoid these deals—they're everywhere.	I quit smoking about ten years ago in part because cigarettes became so expensive. It's a good thing I rarely see them discounted – it would make quitting that much more challenging.

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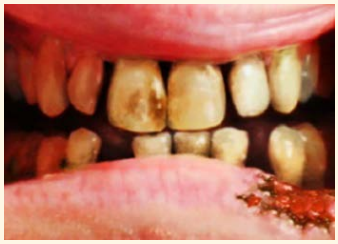
	Disadvantaged community:	Community with more resources:
Tobacco Use ***Despite declines in overall tobacco use, disadvantaged communities continue to use tobacco at higher-than-average rates.[iv]***	My whole life it's always seemed like everyone is a tobacco user. It's even the norm at work, where smokers get more breaks. I don't want to feel left out.	Only a few people I know smoke and I rarely even see anyone light up or chew. I think tobacco is a problem of the past –I think of it as a problem for older generations.
	I've tried to quit three times this year, but I guess I'll have to keep trying. Just seeing my brand's logo triggers my cravings, especially when I'm stressed. It's all over local stores and on the packs carried by neighbors and littering my street.	My college friends and I all quit smoking together. Having that support made a difference. Now it's pretty easy to avoid temptation (and downright embarrassing to be spotted using!) Once I made the decision to quit, I was able to avoid tobacco altogether.
Burden of Disease ***Vulnerable groups tend to use tobacco more frequently and for more years, and disproportionately suffer from tobacco-related disease.[v]***	My asthma is probably from secondhand smoke. It filled my apartment as a kid, my social life as a teen, and now fills my family car. So far I've been spared the cancers affecting so many I know.	I'm so rarely exposed to cigarette smoke that I'm surprised when I am—especially if the smoker is young. I think smoking-related diseases like lung cancer must be on the decline.
Smoke-Free Rules ***Vulnerable groups are less likely to be covered by smoke-free rules both at work and at home.[vi]***	I started smoking at 15–and I've been smoking over half my life. I work in outdoor construction, so I can smoke whenever I want, I've thought of cutting back, but most of my friends still smoke, so I don't get very far.	I work in an office building where tobacco use is prohibited both indoors and outdoors on the entire office campus. It would be challenging for me to smoke and get my work done. I think I'd also feel ostracized by my colleagues.
	I feel like I can't control my family's exposure to smoke. My building prohibits smoking in common areas, but I can smell smoke drifting from my neighbors' apartments into mine. In my opinion, it's played a role in my son's asthma and chronic bronchitis.	My family doesn't allow smoking in our home or car (or anywhere near us, if we can control it), and this is the norm for families we know. In fact, I believe my kids would be shocked to enter a home with smoking. I think I've successfully limited my kids' exposure to indoor secondhand smoke.

Tobacco disparities are persistent, but they are not inevitable. Tobacco control policies can combat targeted industry marketing in the retail environment and reduce the health disparities associated with differential tobacco use. Smoke-free housing policies, point of sale policies limiting the number, type and location of tobacco retailers, and tobacco price promotions are examples of public health policies with the potential to reduce tobacco disparities. To learn more about what tobacco control policies can do for your community, contact the Public Health and Tobacco Policy Center.

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[1] "More than 100 studies about tobacco retailer density have been published. Most highlight socioeconomic and racial inequities in the concentration of tobacco retailers." CTR FOR PUBLIC HEALTH SYSTEMS SCIENCE, Point-of-Sale Report to the Nation: Realizing the Power of States and Communities to Change the Tobacco Retail and Policy Landscape. St. Louis, MO: Center for Public Health Systems Science at the Brown School at Washington University in St. Louis and the National Cancer Institute, State and Community Tobacco Control Research Initiative, 2016. Even controlling for population size, there are 32 percent more tobacco retailers in urban areas than non-urban areas, and poverty confers a higher risk for high retailer density regardless of whether the setting is urban or rural. Daniel Rodriguez et al., *Predictors of tobacco outlet density nationwide: a geographic analysis*, 22 TOBACCO CONTROL 349–355 (2013). Higher tobacco retailer density is associated with factors associated with increased tobacco use. Jamie Pearce et al., *Sociospatial inequalities in health-related behaviours: Pathways linking place and smoking*, 36 Progress in Human Geography 3–24 (2012).

[2] A systematic review found that communities "with lower income have more tobacco marketing….There are more inducements to start and continue smoking in lower-income neighborhoods and in neighborhoods with more Black residents. [Retail] marketing may contribute to disparities in tobacco use." Joseph G. L. Lee et al., *A Systematic Review of Neighborhood Disparities in Point-of-Sale Tobacco Marketing*, 105 American Journal of Public Health e8-18 (2015). Exposure to retail marketing distorts youth perceptions of availability, use, and popularity of cigarettes, and increases the likelihood of smoking initiation. *See* U.S. DEP'T. OF HEALTH & HUMAN SERVS, Preventing Tobacco Use Among Youth and Young Adults, a Report of the Surgeon General 165 (2012) at 851-852; Lisa Henriksen et al., *Reaching youth at the point of sale: cigarette marketing is more prevalent in stores where adolescents shop frequently*, 13 Tobacco Control 315–318 (2004); Lisa Henriksen et al., *Effects on Youth of Exposure to Retail Tobacco Advertising*, 32 Journal of Applied Social Psychology 1771–1789 (2002). Cigarette displays trigger impulse purchases both among smokers and those trying to avoid smoking. Melanie Wakefield et al., *The effect of retail cigarette pack displays on impulse purchase*, 103 Addiction (Abingdon, England) 322–328 (2008).

[3] Low-income groups, youth and young adults, and women are more price-sensitive, and tobacco industry has historically targeted these groups with price promotions to counteract the effect of rising prices. Victoria M. White et al., *Cigarette promotional offers: who takes advantage*? 30 American Journal of Preventive Medicine 225–231 (2006). Stores located in low-income, predominantly black neighborhoods receive more discount incentives from tobacco manufacturers than those in other communities. Incentives include premium contracts, discount coupons, and value-added promotions that translate to lower prices for consumers. Tess Boley-Cruz et al., *The menthol marketing mix: targeted promotions for focus communities in the United States*, 12 Suppl 2 Nicotine & Tobacco Research: Official Journal of the Society for Research on Nicotine and Tobacco S147-153 (2010).

[iv] "Although cigarette smoking has declined significantly since 1964, very large disparities in tobacco use remain across groups defined by race, ethnicity, educational level, and socioeconomic status and across regions of the country." U.S. DEP'T. OF HEALTH & HUMAN SERVS, The Health Consequences of Smoking: 50 Years of Progress (2014) at 7.

[v] Tobacco use causes health disparities among minority and low-SES groups. Health Disparities in Tobacco Smoking and Smoke Exposure, in *Health Disparities in Respiratory Medicine* 9–39, http://link.springer.com/10.1007/978-3-319-23675-9_2 (last visited Jun 15, 2016) at 13.

[vi] Absence of workplace rules limiting smoking is strongly associated with workers' current smoking status. David C. Ham et al., *Occupation and workplace policies predict smoking behaviors: analysis of national data from the current population survey*, 53 J. Occup. Environ. Med. 1337–1345 (2011); U.S. DEP'T. OF HEALTH & HUMAN SERVS, The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General, CTRS FOR DISEASE CONTROL AND PREVENTION, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2006 at 4. Multi-unit housing residents use tobacco at higher rates, and disparities in smoke-free rules in the home are observed by race, education, and income. Kimberly H. Nguyen et al., *Tobacco Use, Secondhand Smoke, and Smoke-Free Home Rules in Multiunit Housing*, American Journal of Preventive Medicine (2016).