

## GENERAL INFORMATION:

Smoking is a significant healthcare burden, being linked to:

- > 480,000 premature deaths annually<sup>1</sup>
- > \$300 billion each year with direct and indirect costs.<sup>1</sup>
- Correlation of smoking and "other health events" 19.8% adults and ~74%.<sup>2</sup>

## POPULATION HEALTH:

Abuse and Addiction to Nicotine = poor outlook on personal health.<sup>3</sup>

2x's more prevalent in heavy smokers (> 25 cigarettes per day): mood, anxiety, psychosis.<sup>9</sup>

## PHYSIOLOGIC EFFECTS: BOTH ACUTE RESPONSES AND CHRONIC DISEASE

Smokers > density of nicotinic receptors than nonsmokers.

When these receptors are filled, dopamine is released in the nucleus accumbens as depicted below.<sup>4</sup>

These nicotinic receptors are the physiologic association to the addictive effects of smoking by signaling the craving sensation when the receptors are unoccupied. Decreased cerebral blood flow with increased response to environmental cues in the prefrontal & parietal cortex  $\Rightarrow$  inhibited ability to ignore urges caused by everyday activities.<sup>4</sup>

- Ex. coworkers taking smoke breaks and regularly purchasing cigarettes at the gas

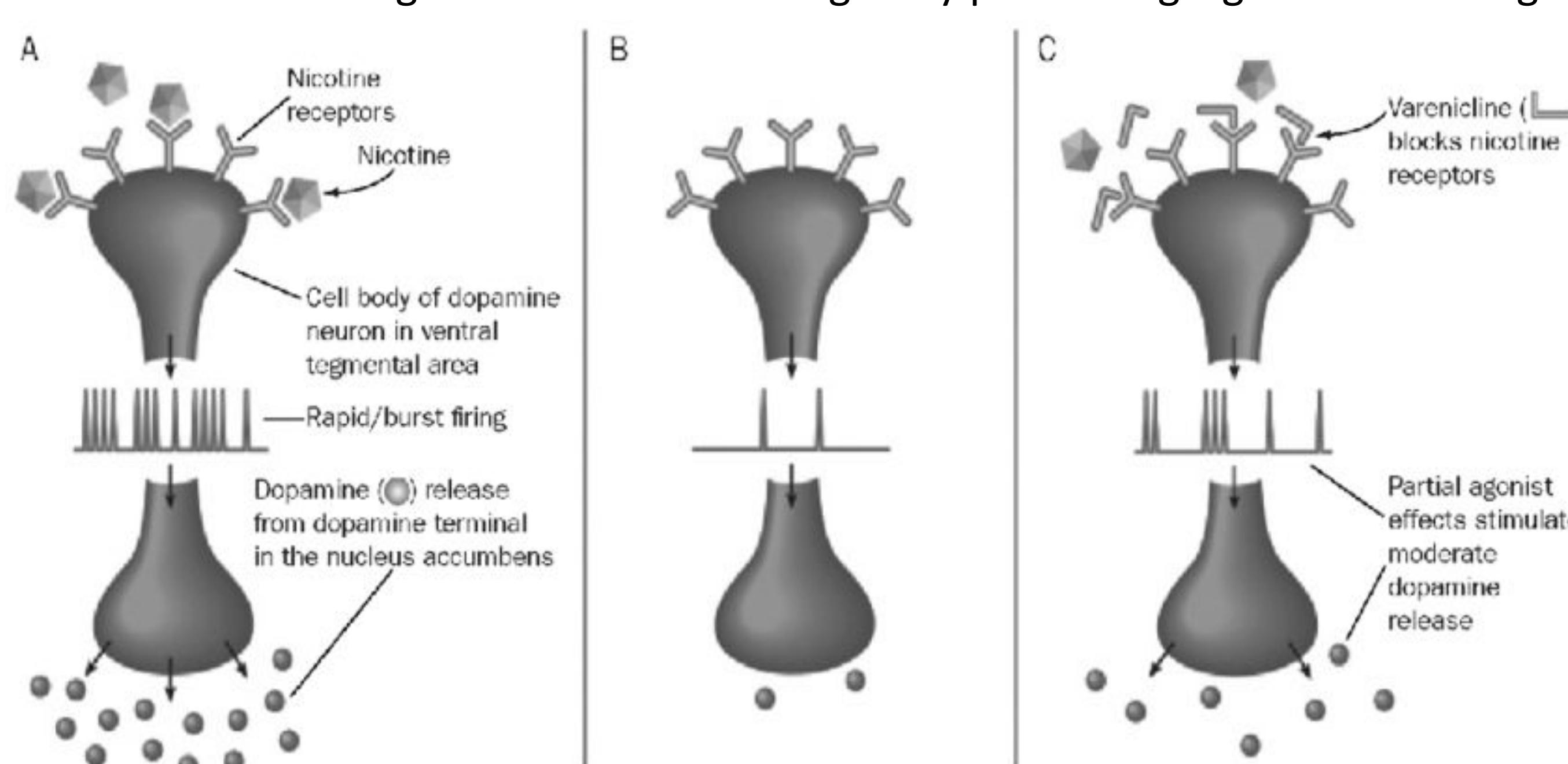


Figure 1: Visual demonstration of the relationship between nicotine receptors and neurotransmitters involved in withdrawal cravings. Kaur K, Kaushal S, Chopra SC. Varenicline for smoking cessation: A review of the literature. *Current Therapeutic Research*. 2009;70(1):35-54. doi:10.1016/j.curtheres.2009.02.004

### Acute:

Vasoconstriction, direct inflammation, oxidative stress  $\Rightarrow$  protein injury (DNA), deranged lipid metabolism, antioxidant depletion, impaired immunity (innate and adaptive), respiratory insults.<sup>4</sup>

### Chronic:

- Atherosclerosis and chronic inflammation  $\Rightarrow$  CVA and AAA risk
- 90% lung cancer and 80% of COPD deaths linked to hx cigarette smoking

### RURAL SETTING DETAILS:

Rural: < 2,500 residents per square mile. Rural residents are 2.5% more likely to be a current smoker. Rural residents less likely to: receive yearly health screenings, implement smoking cessation, miscarriage.<sup>4</sup>

The prevalence of the uninsured in rural settings also poses a barrier to incentives for better coverage in non-smokers.

Context: Urban = 500-1000 persons per square mile in 1 block, > 50,000 in total group of blocks.<sup>2</sup>

## RURAL VS URBAN DIFFERENCES:

Smoking rates in adults: 18.1% rural versus 10.5% urban.<sup>5</sup>

### The differences in up-bringing & daily life.

#### Environmental & Societal Norms:

Increased second-hand smoke exposure: 8.5% less prohibition policies in rural family homes, 3.6% less in rural workplace areas,<sup>6</sup> leading to a culture of habit and creating barriers to cessation.

#### Education:

College education rates in rural populations have  $\uparrow$  from 15% to 21%. However, they are still 18% lower than those of urban residents with a college degree.<sup>6</sup> Higher cigarette smoking rates among individuals with only a high school diploma (22%) compared to those with a bachelor's degree (5.8%).<sup>5</sup>

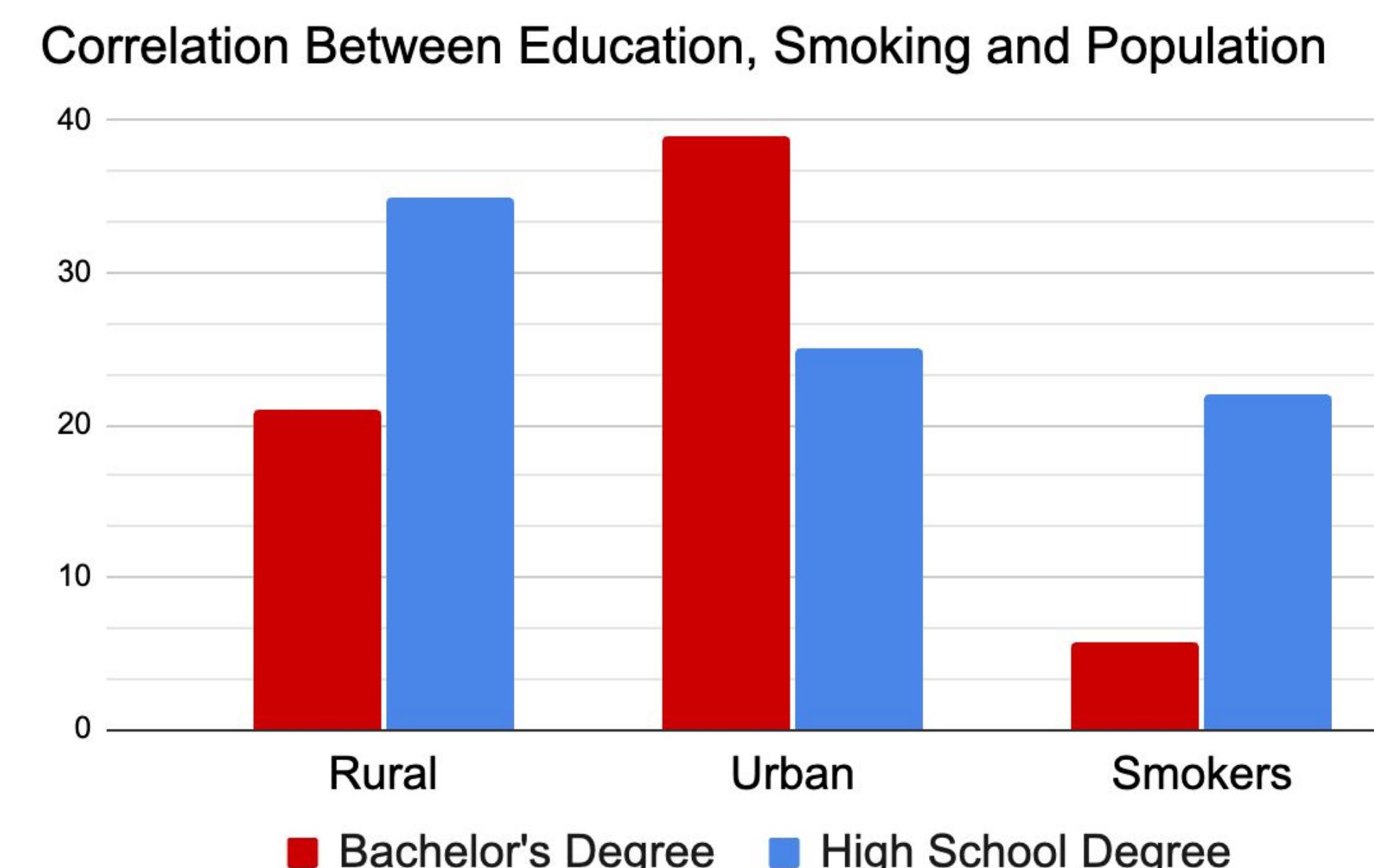


Figure 2: The relationship between smokers, levels of education and their differences in rural versus urban populations.

### The differences in population trends.

Smoking rates among adolescents are declining more slowly in rural areas: 11% of rural adolescents smoke compared to 6.7% of their urban peers.

The decrease in smoking is less pronounced in rural areas: 56%  $\downarrow$  in smoking among urban rural adolescents.<sup>8</sup>

Rural Vs. Urban Youth Smoking Trends (12-17 years old)

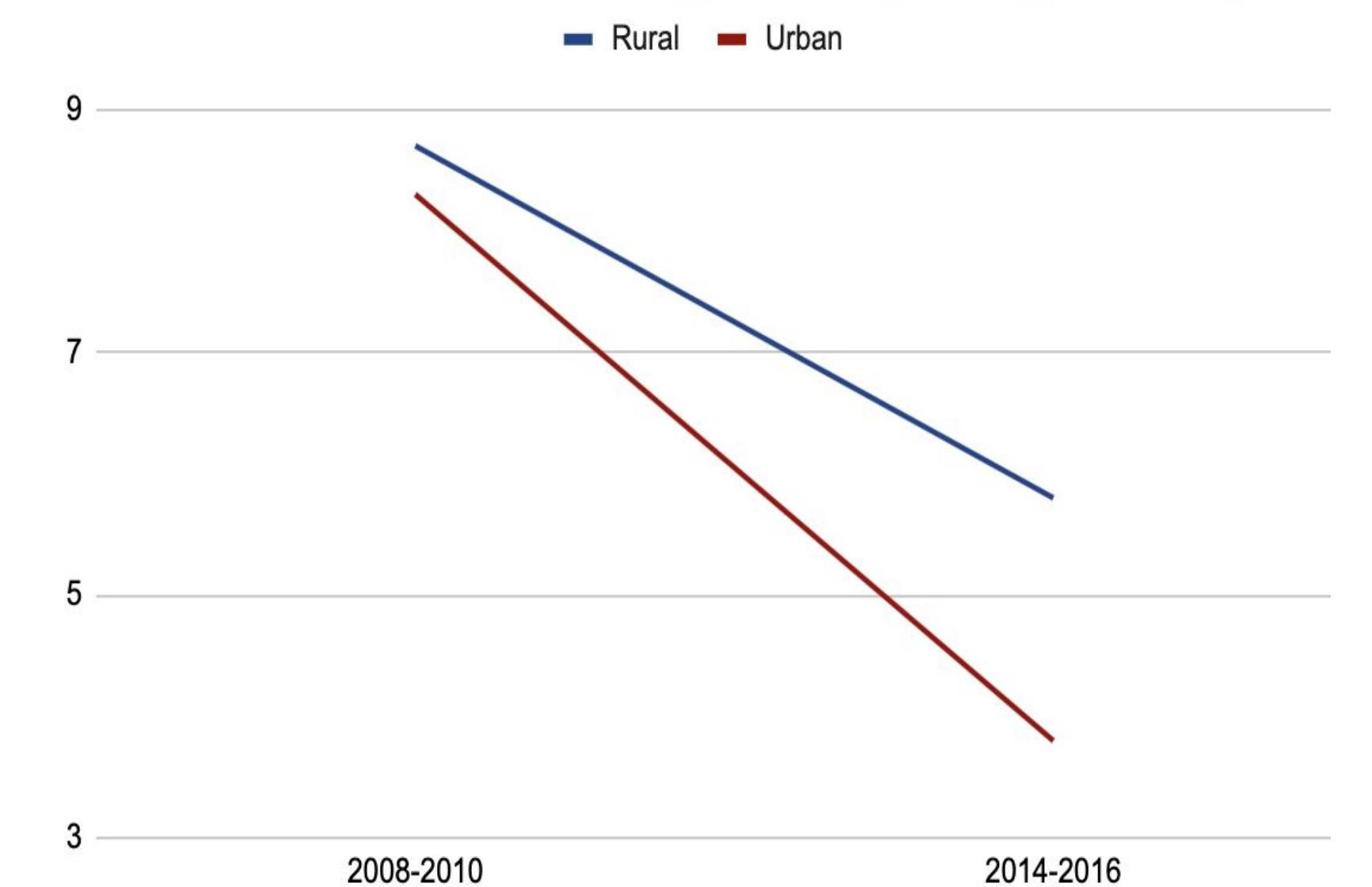


Figure 3: The disparity in declining rates of cigarette smoking in rural adolescents when compared to urban.

### Beyond Health (Socioeconomic Factors):

Smoking prevalence is inversely related to education and socioeconomic status—higher education levels associated with a lower likelihood of smoking. However, environmental factors, such as the influence of friends, family, and coworkers, may still play a role. Interestingly, 29% of individuals

## ADDRESSING THE PROBLEM: (GENERAL HEALTHCARE CONCERNs)

Early preventive education: pediatric age school physicals.

Campaign to encourage screening psychiatric illness.<sup>7</sup>

Evidence with short term (< 6 mo.) effective contingency, incentive and online cessation interventions with psychological and pharmacological therapies.<sup>10</sup>

Developed partnerships: Healthcare systems and employers, incentivize patients to conduct health physicals, allow screening, discuss treatments and ensure compliance.

- Health systems offer expansive availability (scheduled days vs. onsite with employer)
- Biometric screening results available to health programs with employer

## ADDRESSING THE PROBLEM: (TARGETING THE COMMUNITY)

Smoke-free workplace policies and cessation programs = higher motivation to quit

- Employee incentives to take less smoke breaks  $\Rightarrow$  reduced expenses for the company and long-term cessation success<sup>12</sup>

**15 minute smoke break x 3 breaks (\$20 wage)**

**1 worker = \$3,750/year x 20 workers = \$75,000/year**

Adolescent community: peer social media and prevention campaign ambassadors.<sup>11</sup>

**1-(800)-QUI-TNOW** allows people to receive assistance during smoking cessation.

Includes: quit coaches offering free long-term plans, medications and tips for avoiding withdrawal cravings.<sup>11</sup>

## ADDRESSING THE PROBLEM: (DIRECT TO THE PATIENT)

Redirecting behaviors and breaking habits by replacing the physical and emotional consequence of smoking. Ex. Rethinking tactile delivery.<sup>10</sup>

Health team efforts to encourage patient health screenings, allowing the opportunity for patient education and implementing interventions.<sup>7</sup>

### Effective options for rural-setting based interventions:

6 week home-based cessation program with weekly MH visits utilizing smoking-cessation focused cognitive behavioral therapy. Use of telemedicine =  $\Rightarrow$  success/compliance.<sup>10</sup>

Pharmacologic Interventions: nicotine patches (most effective), Varenicline, Bupropion, Nicotine, gum, lozenge, inhaler, nasal spray and combinations.<sup>7</sup>

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