Correlates and Characteristics of Susceptibility
to Initiation of Cigarette Smoking,
Colorado Youth, 2001-2008

Summary Report

June 2010
Background

Susceptibility to smoking indicates a cognitive predisposition to smoking involving an individual’s intentions and expectations about smoking.\(^1\) For this report, susceptibility was assessed by asking, “At any time in the next year, do you think you will smoke a cigarette?” and “If one of your best friends offers you a cigarette, will you smoke it?” Students were deemed susceptible to smoking if they fail to answer "definitely not" to both questions. Susceptibility to smoking has been shown to predict subsequent smoking initiation.\(^1,2\) Factors previously associated with susceptibility include:

- gender (females more susceptible than males, except the reverse among Hispanic youth);\(^3,4\)
- exposure to either pro- or anti-tobacco messaging;\(^3\)
- grade in school (higher grades were less susceptible,\(^3\) similar to findings with age and experimentation\(^1\));
- having a parent, sibling or best friend who smokes, believing peer norms support smoking, ethnicity, or having a detention or suspension in school.\(^3,4\)

Smoking initiation has been associated with many of these same factors as well as others, including socioeconomic stress, living in a deprived area, depression, lower grade point average, ease of access to tobacco, lower parental expectations against smoking, and watching smoking in movies.\(^2,5,6,7,8,9\)

The Amendment 35 Program Evaluation Group (APEG) administers the Healthy Kids Colorado Survey on Tobacco and Health (HKCS-TH, formerly the Colorado youth Tobacco Attitudes and Behaviors Survey [TABS]). The survey is administered statewide to a large random sample of Colorado public school students in grades 6-12. Survey administrations occurred in 2001, 2006, and 2008. Results were weighted to represent the public school student population in that grade range. Responses from selected questions were analyzed for this report to identify characteristics of the youth population that may increase susceptibility to cigarette smoking in the next year.

The purpose of this report is to identify correlates and characteristics of susceptibility to smoking in the next year among Colorado youth. Potential factors were grouped by topic areas: de-

mographics, socioeconomic status (SES), educational achievement and expectation, smoking environment, depression, engagement, normative attitudes, exposure to messaging, and health. Multivariate logistic regression modeling was performed to identify the characteristics that were most predictive of susceptibility. The report uses a "95% confidence" (p<0.05) criterion for statistical significance. A rate in **bold** typeface is significantly different from the comparable rate (an * indicates the reference group in charts).
Summary of Findings

Demographics:
- No differences in susceptibility were found between males and females in all years.
- In all years, Hispanics were more susceptible than whites, and susceptibility was highest among students where at least some Spanish was spoken in the home.
- Susceptibility peaked in 9th grade in all years.

Educational Achievement and Expectation:
- Students with below average grades were substantially more susceptible than those with above average grades.
- Students who did not expect to complete high school were two to three times as likely to be susceptible as those who expected to attend college.

Smoking in the Environment:
- Exposure to secondhand smoke or having friends that smoke was significantly associated with increased susceptibility.

Depression:
- Students reporting feeling sad or hopeless daily for 2 or more weeks were substantially more susceptible than those who did not report these feelings (26.4% vs. 13.9%).

Normative Attitudes:
- Susceptibility was higher among students who felt that their parents/guardians would not be upset or would not care if they smoked in front of them compared to those who felt their parents or guardians would be upset (29.6% vs. 14.3%).
- Susceptibility was also higher among those who felt that their friends would approve or would not care if they smoked compared to those who felt their friends would disapprove (34.7% vs. 12.1%).
- Students who felt that secondhand smoke was not harmful were much more susceptible than those who felt that it was harmful (40.8% vs. 13.7%).

Pro-Tobacco Influences:
- Seeing tobacco use in movies or on TV was associated with increased susceptibility.
- Willingness to wear/use products with a tobacco brand logo was also associated with increased susceptibility.

Multivariate Comparisons:
- In 2008, the strongest predictor of susceptibility was the belief that secondhand smoke was not very harmful (OR 4.35), followed by not expecting to complete high school, having friends that smoke, being in grades 7-9, being depressed, and having friends that would approve of other tobacco use.
- In 2006, the strongest predictor of susceptibility was the willingness to wear/use a product with a tobacco brand logo on it (OR 2.61), followed by seeing smoking in movies or TV, having parents that would not be upset if the student smoked in front of them, believing that cigarettes are easy to obtain, having friends that approve or don’t care about smoking, having below average grades in school, having friends that smoke, Spanish being spoken in the home, and being ≤ 14 years of age.
Demographics

Susceptibility was similarly prevalent between females and males for all three survey waves (graph, right). Between 2001 and 2008, susceptibility to smoking in the next year significantly decreased among female never smokers (16.6% from 20.0%). Compared to 2001, there was no change in susceptibility for male never smokers in 2008 (18.3% vs. 19.9%). Susceptibility was not significantly different for either gender between 2006 and 2008.

Hispanics were significantly more susceptible than whites across all survey years. In 2006, blacks and were also significantly more susceptible than whites. In 2001 and 2008, there were no significant differences between whites and blacks. Susceptibility among whites has declined since 2001 (15.5% vs. 19.0%). Among the other race/ethnicities, however, susceptibility has not significantly changed over time. Among each of the different ethnicities, there were no statistically significant differences in susceptibility between males and females.
For all years, susceptibility prevalence among never-smokers peaked in 9th grade (23.9%, 19.4%, and 23.1%, respectively), although in 2001 it was not significantly different among 7th, 8th and 9th grades. In 2008, susceptibility was significantly lower than in 2001 for 7th grade (16.2% vs. 23.5%) and was significantly higher than in 2006 for 9th (23.1% vs. 19.4%) and 12th grade (18.9% vs. 14.7%). Susceptibility was not significantly changed between years for the other grades.

Across all survey years, susceptibility was similar among ages 13-15, and, similar to the pattern with grade, peaked in this age range. Susceptibility was significantly lower for age 11 than 14 in all years and was similar across years for each age except age 12, where it was significantly lower in 2008 than in 2001 (14.4% vs. 21.7%).
In all years, susceptibility was significantly higher among students whose primary language at home was Spanish compared to English. Susceptibility also appeared to be higher in homes where English and Spanish were spoken equally, although the difference was significant only in 2006 (22.7% vs. 15.2%).

**Socioeconomic Factors**

Susceptibility was significantly higher among students whose mother (or female guardian) or father (or male guardian) had completed no more than high school education / GED (19.8% and 19.1%, respectively) compared to those with more than a high school education (16.0%; 15.9%, respectively). In 2006 and 2008, students whose parents both completed more than a high school education were significantly less susceptible to smoking than those where both parents or a single parent had a high school education or less (13.7% vs. 17.2% in 2006, 15.6% vs. 19.9% in 2008). Susceptibility was also significantly lower in 2008 for those where at least one parent had completed more than a high school education compared to 2001 (17.9% vs. 24.1% and 15.6% vs. 22.9%, respectively). Susceptibility where both parents had completed high school or less was similar between 2008 and 2001. There were no significant differences between 2008 and 2006 for susceptibility by parental education status.

The percent of students in a school who are eligible for free or reduced school lunch is an indicator of living in an economically deprived area. In 2008, susceptibility was significantly higher among students attending a school where more than 25% of enrolled students were eligible for free or reduced school lunch (19.2% vs. 16.3%). Apparent changes in susceptibility between 2006 and 2008 were not significant.
In 2008, students who had more than $25 of weekly spending money were significantly more likely to be susceptible than those with less than that amount (19.9% vs. 16.0%); a similar difference was almost significant in 2006 (17.9% vs. 15.5%, \( p=0.0501 \)). Among students with $25 or less of weekly spending money, susceptibility was significantly lower in 2008 than in 2001 (16.0% vs. 19.0%), possibly due to the increasing price of cigarettes.

**Educational Achievement and Expectation**

Across all years, susceptibility was significantly higher among those with below average grades compared to those with above average grades. Susceptibility was also significantly higher among those with average grades compared to above average grades for all years, although the difference was not as great as for those with below average grades. These results suggest a strong relationship between susceptibility to smoking and educational achievement where even those with average grades are more susceptible than those with above average. The differences in susceptibility between years for the various levels of educational achievement were not significantly different.

Students who did not expect to complete high school were much more likely to be susceptible than students who expected to attend college (43.3% vs. 16.1% in 2008, 48.1% vs. 14.2% in 2006). A similar pattern appeared for students who expected to complete high school or a vocational/technical program compared to those who expected to attend college (or post-graduate). Among students expecting to attend college (or post-graduate), susceptibility was significantly more common in 2008 than in 2006, by a factor of 13% (16.1% vs. 14.2%).
Smoking in the Environment

Those exposed to SHS in the past 7 days were significantly more susceptible to smoking than those not exposed. The difference was even greater when the exposure was done by a peer than a parent (33.4% compared to 23.9%). Questions on previous surveys did not differentiate whether the exposure came from a peer or a parent and therefore were not included in this analysis.

Similarly to what was seen above for SHS exposure, the more friends that smoke, the higher the susceptibility to smoking. Susceptibility is significantly higher when even just a few friends smoke compared to none for all years. Having half or more of their friends smoking increases susceptibility dramatically (39.8% vs. 12.0%) compared to those that have no friends that smoke. Susceptibility among those that have no friends that smoke has significantly decreased since 2001 (12.0% vs. 15.2%). However, susceptibility among those where half or more of their friends smoke has increased since 2006 (39.8% vs. 30.5%).

Susceptibility to smoking is significantly higher in those that have seen a teacher or other school employee smoking on school grounds during the school year. This susceptibility increased significantly from 21.3% in 2006 to 27.0% in 2008. Taken together, these results suggest that susceptibility to smoking is much higher in an environment where smoking is prevalent, especially when friends and peers are smoking.
Depression

Students reporting feeling sad or hopeless daily for 2 or more weeks were significantly more susceptible to smoking than those who were not depressed (26.4% vs. 13.9%). This question was not asked in previous years and therefore only 2008 results are available. Depression has previously been associated with smoking in both adults and adolescents\(^1\). With 22.3% of never smokers in this survey reporting this symptom of depression, a significant opportunity for intervention exists.

Engagement

In both 2006 and 2008, susceptibility was highest among those with no physical activity during the previous 7 days, although the difference was only significant in 2008 compared to those with 3-7 days of physical activity. Susceptibility was also higher for those with 1-2 days of physical activity compared to those with 3-7 days of physical activity, although the differences were not statistically significant. Although susceptibility was higher in 2008 for those with 0 days of physical activity compared to 2006 (24.7% vs. 20.4%), this difference was not statistically significant.

Students that did not participate in after-school activities had higher susceptibility to smoking than students that did participate in after-school activities in both 2006 and 2008. Estimates between years were similar.

In 2006, students were asked about the type of activity that they participated in after school. The highest susceptibility was for those who did not participate in any after school activities. Those who participated in no after school activities had significantly higher susceptibility than those who participated in sports (15.9%), clubs (16.1%), or in multipe.

people after school activities (11.0%). Those who participated in a class or in religious activities after school did not have significantly lower susceptibility compared to those who did not participate in any activities. For those who participated in religious activities, the lack of statistical significance is likely due to small numbers since the estimate is lower by a factor of 24%.

**Normative Attitudes**

**Adult Attitudes**

In 2001, students were more susceptible if they reported not having an adult in their lives (teacher, coach, other school employee) who wanted them not to smoke. The differences were not significant for 2006 or 2008. Susceptibility among those that did not feel they had an adult who hoped that they didn’t smoke decreased significantly between 2001 and 2008 (23.7% vs. 18.7%).

**Parental Attitudes**

Susceptibility was highest among students whose parents or guardians rarely or never expressed a desire for them not to smoke and was significantly higher in all years. Between 2001 and 2008, susceptibility among this group declined significantly from 25.4% to 20.3%. Results were similar between 2006 and 2008.

In 2006, students were asked how their parent or guardian would react if they lit up a cigarette in front of them. Students who felt that their parent/guardian would not ask them to stop and would not be upset or would not care had higher susceptibility than those who thought their parent/guardian would ask them to stop and would be upset (29.6% vs. 14.3%). Students who felt that their parent/guardian would not ask them to stop but would be disappointed had higher susceptibility than those who felt that their parent/guardian would ask them to stop and would be upset (21.7% vs. 14.3%). These results and those above indicate that a students perception about how their parents or guardians and other adults feel about smoking influences their susceptibility to smoking.
**Peer Attitudes**

Peer attitudes towards smoking have a bigger influence on susceptibility than parental or other adult attitudes. In 2006, students were asked how their friends would feel about them smoking. Susceptibility was significantly higher among those with friends that would approve or not care about them smoking (34.7% vs. 12.1%). Although this same question was not asked in 2008, a similar question about how their friends would feel about them using other forms of tobacco, such as chewing tobacco, snuff, or spitless tobacco was asked. Similar results were found with a significant increase in susceptibility for those who felt that their friends would approve of their use of other forms of tobacco (33.7% vs. 13.4%).

**Perceived Harm**

Students who believed that they would not get in trouble if they were caught smoking on school grounds had higher susceptibility than those who thought they would get in trouble for all years. The estimates were similar between 2001, 2006, and 2008.

Susceptibility was highest in students that did not believe that secondhand smoke (SHS) exposure was very harmful (40.8%). Compared to those who believed that it was very harmful, those who did not think it was very harmful had significantly higher susceptibility (40.8% vs. 13.7%). Those who believed that SHS was somewhat harmful had higher susceptibility compared to those that thought it was very harmful as well (24.5% vs. 13.7%). This question was only available for the 2008 survey administration.
**Ease of Access**

Students who said cigarettes are easy to obtain were significantly more susceptible to smoking than those who believe they are hard to obtain for all years. Susceptibility among those who believe that cigarettes are hard to obtain has significantly declined since 2001 (12.2% vs. 16.2%). Otherwise, estimates were similar across the three years.

**Exposure to Messaging**

**Anti-Tobacco Messages**

In 2006, students were asked how often they had been exposed to anti-tobacco messages through various types of media in the previous 30 days. Although susceptibility was highest for those that had been exposed to messages every 2 or 3 days, the differences were not significant compared to those who had been exposed to anti-tobacco messages more than once a day (18.1% vs. 15.5%). Those that reported not being exposed to anti-tobacco messages at all in the previous 30 days had the same susceptibility as those that reported being exposed more than once a day (15.5% vs. 15.5%). These results suggest that susceptibility to smoking in the next year is not influenced by the frequency of exposure to anti-tobacco messaging. Never smokers may also be less aware or less receptive to anti-tobacco messaging.

**Pro-Tobacco Influences**

Students were asked in 2006 how often they had seen characters on TV or in the movies smoking cigarettes or using tobacco. Compared to those who reported that they never saw tobacco use, those that reported seeing tobacco use on TV or in the movies had higher susceptibility. Those that reported that they did not watch TV or go to the movies had the highest susceptibility.
ity at 25.4%.

Also in 2006, students were asked about how likely they would be to wear or use products with a tobacco brand logo on it. Those who were not completely opposed to wearing or using a product with a tobacco brand logo on it were significantly more susceptible to smoking than those who reported that it would be very unlikely. The biggest difference was found between those who reported that it would be very likely (43.2%) compared to those who reported that it would be very unlikely (12.1%).

**Health**

Susceptibility was similar between the different categories of BMI and there were no significant differences between 2006 and 2008. There were no significant differences in susceptibility for those who had ever had asthma and those that did not (18.3% vs. 17.1%), as well as those who currently have asthma and those that do not (16.2% vs. 17.1%). Questions about ever or currently having asthma were only asked in 2008 and therefore can not be compared across years.
Multivariate Models

Variables that were significant in univariate comparisons were tested in logistic regression models to determine a model of significant factors associated with susceptibility to smoking. Since the 2006 and 2008 survey administrations had some different questions that were significant in the univariate comparisons, these years were modeled separately. For categorical variables, categories with similar risk estimates were collapsed.

2008

Modeling of the survey questions available for 2008 demonstrated that pro-tobacco attitudes and beliefs are associated with susceptibility. Students who believed SHS is not very harmful were more than four times as likely to be susceptible to smoking as those who believe it is very harmful (adjusted odds ratio (OR) 4.35, 95% confidence interval 2.59 to 7.30). Those who believe that SHS is somewhat harmful also had a significantly increased odds of susceptibility of 2.25. An expectation of not completing high school was associated with three times the likelihood of susceptibility compared to expecting to complete high school. Having friends who smoke was associated with an increased odds of 2.60 compared to those with no friends that smoke. Grades 7-9 had the highest susceptibility. Other risk factors included being depressed or having friends that approve of other tobacco use.

<table>
<thead>
<tr>
<th>Predictors of Susceptibility, 2008</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not very harmful</td>
<td>4.35</td>
<td>2.59, 7.30</td>
</tr>
<tr>
<td>Somewhat harmful</td>
<td>2.25</td>
<td>1.39, 3.64</td>
</tr>
<tr>
<td>Very harmful†</td>
<td>1.00</td>
<td>–</td>
</tr>
<tr>
<td>Not expecting to complete high school</td>
<td>3.05</td>
<td>1.00, 9.34</td>
</tr>
<tr>
<td>A few or more friends that smoke</td>
<td>2.60</td>
<td>1.78, 3.79</td>
</tr>
<tr>
<td>Grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6th</td>
<td>1.68</td>
<td>0.87, 3.23</td>
</tr>
<tr>
<td>7th-9th</td>
<td>2.52</td>
<td>1.59, 3.98</td>
</tr>
<tr>
<td>10th-11th</td>
<td>1.10</td>
<td>0.71, 1.70</td>
</tr>
<tr>
<td>12th</td>
<td>1.00</td>
<td>–</td>
</tr>
<tr>
<td>Depressed</td>
<td>2.23</td>
<td>1.55, 3.19</td>
</tr>
<tr>
<td>Friends approve of other tobacco use</td>
<td>1.77</td>
<td>1.29, 2.43</td>
</tr>
</tbody>
</table>

* Odds Ratio adjusted for the other variables in the table.
† Reference category.
The strongest predictor of susceptibility in 2006 was willingness to wear or use a product with a tobacco brand logo on it (OR 2.61). Seeing smoking a few or more TV shows or movies was also associated with a significantly increased risk of susceptibility (OR 2.20). Similar to 2008, pro-smoking attitudes were associated with an increased risk in susceptibility, including having parents that would not be upset or would not care if the student smokes, believing cigarettes are easy to obtain, and having friends that would approve or would not care if the student smoked.

Additional risk factors for susceptibility include having below average grades, having at least a few friends that smoke, having Spanish spoken in the home (either as the primary language or as a mixture of English and Spanish), and age ≤14. Compared to students with a normal BMI, those that are obese have a significantly reduced odds of susceptibility with an OR of 0.46.

### Predictors of Susceptibility, 2006

<table>
<thead>
<tr>
<th>Predictor</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would wear/use a product with a tobacco brand logo</td>
<td>2.61</td>
<td>1.98, 3.44</td>
</tr>
<tr>
<td>Seeing smoking on screen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t watch TV or movies</td>
<td>2.19</td>
<td>0.89, 5.42</td>
</tr>
<tr>
<td>A few or more</td>
<td>2.20</td>
<td>1.42, 3.41</td>
</tr>
<tr>
<td>Never†</td>
<td>1.00</td>
<td>–</td>
</tr>
<tr>
<td>Parents would not be upset or would not care if smokes</td>
<td>2.19</td>
<td>1.48, 3.24</td>
</tr>
<tr>
<td>Cigarettes are easy to obtain</td>
<td>2.18</td>
<td>1.74, 2.73</td>
</tr>
<tr>
<td>Friends approve or don’t care about smoking</td>
<td>1.82</td>
<td>1.37, 2.42</td>
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<tr>
<td>Below average grades in school</td>
<td>1.72</td>
<td>1.17, 2.54</td>
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<tr>
<td>A few or more friends that smoke</td>
<td>1.65</td>
<td>1.24, 2.21</td>
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<tr>
<td>Spanish spoken at home</td>
<td>1.54</td>
<td>1.03, 2.31</td>
</tr>
<tr>
<td>Age ≤14</td>
<td>1.48</td>
<td>1.13, 1.94</td>
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<tr>
<td>BMI category</td>
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<td></td>
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<tr>
<td>Underweight</td>
<td>0.81</td>
<td>0.52, 1.27</td>
</tr>
<tr>
<td>Normal†</td>
<td>1.00</td>
<td>–</td>
</tr>
<tr>
<td>Overweight</td>
<td>0.76</td>
<td>0.54, 1.07</td>
</tr>
<tr>
<td>Obese</td>
<td>0.46</td>
<td>0.29, 0.72</td>
</tr>
</tbody>
</table>

* Odds Ratio adjusted for the other variables in the table.
† Reference category.