APPENDIX B

Sampling, survey administration, data weighting, data analysis procedures
Sampling, Survey Administration, Data Weighting, and Data Analysis Procedures

SAMPLING PROCEDURES

MYRBS schools and classrooms were randomly selected using a multi-stage clustering sampling design.

**Stage 1: School-level Sampling** - All regular public high schools in Massachusetts containing grades 9, 10, 11, or 12 were included in the sampling frame. Public charter schools with high school grades were included in the sampling frame; alternative schools were not. Using a random start, schools were selected systematically with probability of being selected proportional to enrollment in grades 9 through 12. Each student in the eligible schools had an equal probability of being selected for the survey, although students were selected by classroom within school, not individually (see Classroom-level Sampling below).

Of the schools included in the sampling frame, 59 schools were selected to participate in the survey. School selection was conducted by CDC using PCSample, a software program designed for this purpose. Superintendents and principals of selected school districts and schools were notified by mail of their school’s selection and were contacted by phone for their permission to move forward in administering the survey. Fifty-one (51) schools agreed to participate; eight refused or were unable to participate, yielding a school response rate of 86.4% (51/59).

**Stage 2: Classroom-Level Sampling** - Within each school, an average of three to five classrooms (approximately 69 students per school), were randomly selected to participate in the MYRBS. Depending on the school, all classes within a required subject (for example, all English classes) or all classes meeting during a particular period (for example, second period) were included in the sampling frame. Systematic equal probability sampling with a random start was used to select classes from each school to participate in the survey.

Across the state, a total of 4,494 students were enrolled in classes selected to participate in the survey, and 3,522 students actually completed the survey, yielding a student response rate of 78.4% (3,522/4,494). Student attendance on the day of the survey was the primary factor determining the response rate.

The overall response rate of the survey was 67.7%, calculated by multiplying the 86.4% school response rate by the 78.4% student response rate. Because of this high overall response rate, data from the survey can be considered representative of all public high school students in Massachusetts.

SURVEY ADMINISTRATION PROCEDURES

All survey administrators were members of the Department of Education’s School, Nutrition, Safety, and Climate Unit, and all were trained in standardized survey administration procedures.

For each participating school, the survey administrator and contact person designated by the school’s principal scheduled a convenient date on which to administer the survey. Teachers of selected classrooms were notified
in advance in order to avoid scheduling conflicts on the day of the survey. Local district procedures were followed with regard to parent notification about the survey. Because the MYRBS is both anonymous and voluntary, schools were not required by state or federal law to notify parents or to secure parental consent for student participation.

Survey administrators conducted the survey in a single class period in the selected classrooms of participating schools. In some schools, selected classes were pooled into a larger room and surveyed simultaneously. Classroom teachers were permitted to stay in the room if they wished, but were asked not to circulate through the room in order to ensure students' sense of privacy.

The survey administrators gave all students a verbal introduction to the survey. These remarks described (1) the purpose of the survey, (2) the anonymous and voluntary nature of the survey, and (3) instructions for completing the survey. Students were given a cover sheet to conceal their answers as they worked. Students then recorded their answers on a separate, scannable answer sheet. Students who chose not to take the survey were asked to remain in the room and read or sit quietly until all students finished the survey. No talking was permitted during the survey, although students were allowed to ask questions of their survey administrator. On average, students took between 30 and 45 minutes to complete the survey. Completed answer sheets were collected, facedown, by the survey administrator and were placed in an envelope, which was sealed by the survey administrator before leaving the room. Completed answer sheets were assembled at the Department of Education and were sent off-site for data scanning, cleaning, and preliminary frequency analyses.

**DATA WEIGHTING PROCEDURES**

Because of the high overall response rate for this survey, the data were weighted to reduce any possible bias in the sample. A weight was associated with each questionnaire to reflect the likelihood of sampling each student and to reduce bias by compensating for differing patterns of non-response. The weight used for estimation is given by:

\[ W = W_1 \times W_2 \times f_1 \times f_2 \times f_3 \]

Where:

- \( W_1 \) = the inverse of the probability of selecting the school
- \( W_2 \) = the inverse of the probability of selecting the classroom within the school
- \( f_1 \) = a school-level non-response adjustment factor calculated by school size category (small, medium, large). The factor was calculated in terms of school enrollment instead of number of schools.
- \( f_2 \) = a student-level non-response adjustment factor calculated by class.
- \( f_3 \) = a post-stratification adjustment factor calculated by gender within grade and by race/ethnicity.

The weighted results can be used to make important inferences concerning the priority health-risk behaviors of all regular public school students in grades 9 through 12.
DATA ANALYSIS PROCEDURES

Data scanning, cleaning, and preliminary analyses were performed by Westat, Inc., of Rockville, Maryland and by the Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia. SUDAAN, a statistical software program which accounts for complex sampling designs was used to generate point estimates of proportions, sampling errors, and 95% confidence intervals for aggregate data and data broken down into demographic categories by age, gender, and grade.

Comparisons of major groups within the 2005 data (for example, comparisons by gender or grade) and comparisons of prevalence rates over time (for example, comparisons of 2005 rates to 2003 rates) were based on the SUDAAN-generated 95% confidence intervals supplied by the CDC. Differences between prevalence estimates were considered statistically significant if the confidence intervals did not overlap. This approach is statistically conservative; it may in some instances result in a finding of no difference when alternative procedures would indicate a statistically significant difference.

In cases where the CDC had not supplied confidence intervals (as in the case of subgroups based on race/ethnicity, immigrant status, sexual orientation, kind of community, or particular risk status), comparisons were based on analyses performed in SPSS 12.0, the statistical program used by the Department of Education. Because SPSS 12.0 assumes a simple random sample rather than the multi-stage sample actually employed for the MYRBS, analyses may result in a significant finding when indeed there is none. Therefore, a more stringent level of significance (p<.01) was used for group analyses performed in SPSS.

LIMITATIONS

All analyses and findings in this report are based on cross-sectional self-reported data. Interpretations of the results should be made with careful consideration of possible biases that may have resulted from the self-reported nature of the data. Despite assurances of confidentiality and requests for honesty, a small number of students may have been inclined to give misleading answers, either overestimating or underestimating their actual behaviors. Also, confounding variables were not controlled for in analyses of groups. For example, when a difference was reported between smokers and non-smokers, the analyses did not control for the confounding effects of gender, grade, race/ethnicity, or other variables that may have been associated with smoking.