

The West Virginia Health Education Assessment Project

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ABSTRACT: Well-designed school health education should provide students with the knowledge and skills to prevent the health risk behaviors most responsible for the major causes of morbidity and mortality. This paper reports the methodology and findings of a West Virginia statewide health education assessment initiative and describes how the findings are used to design professional development training for school health educators. Selected response items from the State Collaborative on Assessment and Student Standards, Health Education Assessment Project were used to develop a 40-item assessment instrument for 6 health education content areas. In West Virginia, 51 counties and 242 schools were recruited (county response rate = 93%; school response rate = 53%); 17,549 students were tested in grades 6, 8, and high school health education classes. Mean total scores by grade were 30.61 (grade 6), 26.55 (grade 8), and 26.53 (high school), indicating a slight decline in scores as grade level increased. Females in each grade level scored higher on total Health Education Assessment Project (HEAP) scores and subtest scores than males. The results suggest notable differences across grade levels. High school students failed to meet the standard on any health education content areas, indicating the need for enhanced knowledge and skill development. During professional development training, HEAP scores were examined in the context of results from the West Virginia Youth Risk Behavior Survey to underscore the importance of providing quality skills-based health education in West Virginia schools. (J Sch Health. 2005;75(6):193-198)

The Centers for Disease Control and Prevention (CDC) identified 6 behavioral categories most responsible for the major causes of morbidity and mortality: (1) behaviors that lead to intentional and unintentional injuries; (2) tobacco use; (3) alcohol and other drug use; (4) sexual behaviors leading to sexually transmitted diseases, human immunodeficiency virus infection, and unintended pregnancy; (5) poor nutrition; and (6) lack of physical activity.¹ Comprehensive school health education programs should provide students with the knowledge and skills to prevent these health risk behaviors.¹ CDC and its partners devised 4 strategies to help schools reduce these risks:²

1. Monitor critical health risks among students and monitor school policies and programs to reduce those risks.
2. Synthesize and apply research to identify, and to provide information about, effective school policies and programs.
3. Enable state, large city, and national education and health agencies to jointly help local schools implement effective policies and programs.
4. Evaluate implemented policies and programs to iteratively assess and improve their effectiveness.

The Office of Student Services and Health Promotion, West Virginia Department of Education (WVDE), in collaboration with the West Virginia University Prevention

Research Center and local school health educators, is contributing to the implementation of these strategies through various assessment activities, including the Youth Risk Behavior Survey and statewide assessments of school-based tobacco control policies³ and school-based opportunities for physical activity.⁴ This paper describes the methodology and findings of a statewide school health education assessment initiative and how the findings are being used to design professional development training for school health educators in West Virginia schools.

METHODS

WVDE HEAP Team

The WVDE has a long history of recognizing the role of teachers as important stakeholders in school health, and the active involvement of local teachers was deemed essential to this process. In 1996, the World Health Organization's Expert Committee on Comprehensive School Health Education and Promotion recognized the significance of involving teachers in the assessment of school health programs.⁵ Accordingly, a team of West Virginia school health educators was convened to plan this assessment. Health Education Assessment Project (HEAP) team members were selected from a list of health education specialists nominated by their county school superintendents. Three health educators from each school level (elementary, middle, and high school) were selected from the list of nominations.

One of the team's first tasks was to select the grades in which to conduct the assessment. The team decided to conduct the assessment in sixth, eighth, and high school health education classes because health education is required as a separate subject in grades 6 through 8 and high school (1 unit). Health education is required at the elementary level in West Virginia but not as a separate subject. The HEAP team determined that testing in health education classes was their best opportunity to test a large number of students.

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West Virginia HEAP Assessment Instrument

A second and equally important task for the team was to design the assessment instrument using items developed and validated by the State Collaborative on Assessment and Student Standards, Health Education Assessment Project (SCASS-HEAP). The WVDE has been participating in SCASS-HEAP since 1993.⁶ The mission of SCASS-HEAP is to develop effective health education assessment resources through a collaborative process and to increase members' capacity to align curriculum, instruction, and assessment to improve student health literacy through improved instruction. SCASS-HEAP developed an assessment framework comprising 10 content areas (alcohol and other drugs, community health, consumer health, environmental health, mental and emotional health, nutrition and dietary behaviors, physical activity, sexuality and family life, tobacco use, and unintentional and intentional injuries) and 7 health education skill areas aligned with the National Health Education Standards (core concepts, accessing information, analyzing external influences, decision-making/goal setting, interpersonal communication, self-management, and advocacy). The assessment framework covers skills and practices as well as knowledge and concepts and includes multiple formats, which were designed to measure different aspects of health education outcomes.⁷ The formats include selected response, constructed response, performance events, and performance tasks. A detailed description of the development and validation of the SCASS-HEAP health education assessment formats and items is reported elsewhere.⁸

The team was charged with selecting content areas and items from the national HEAP Item Bank that aligned with the newly adopted West Virginia Health Education Content Standards (WV CSOs). The WV CSOs, based on the National School Health Education Standards, were adopted in 2003. The West Virginia Health Education Assessment Project assessment instrument included 8 items each on the content areas of nutrition, physical activity, and tobacco and 4 items on the content area of alcohol and other drugs for all grades. In addition, grade 6 included 8 items on injury prevention and 4 items on growth and development, while grade 8 and high school versions included 4 mental health items and 8 growth and development items.

Although the national SCASS-HEAP project developed a variety of assessment approaches, the WVDE HEAP team decided to conduct the assessment using only the selected responses item format. Selected response items are intended to assess a broad range of knowledge and concepts.⁷ This multiple-choice format requires students to select a correct answer from several options. The goal was to develop an instrument that could be completed in a 45-minute class period. The team chose 4 to 8 selected response items per content area. Each grade level test consisted of 40 items.

Each assessment approach has advantages and disadvantages.^{7,9} The decision to use the selected response format was primarily driven by cost. Selected response tests are easier to administer and score than other response formats and therefore can be administered to a larger numbers of students. Although the team recognized that traditional multiple-choice tests do not provide a complete picture of

student learning, they adopted this approach for the statewide assessment, knowing that professional development training on the other SCASS-HEAP assessment formats (constructed response, performance events, and performance tasks) was being planned for teachers to use in their classrooms.

School Recruitment

All 55 counties in West Virginia were eligible to participate in this assessment. Within the counties, only schools with grades 6 and 8 and high school health education classes ($n = 459$) were approached for participation. The State Superintendent of Schools sent a letter to the principals in all eligible schools, encouraging participation. Interested schools were asked to designate a contact person and provide information regarding the projected numbers of health education classes and students to be tested. Fifty-one counties and 242 schools were recruited (county response rate = 93%; school response rate = 53%).

Data Collection

The WVDE developed a Test Administration Manual to guide schools through the testing process. This guidance was modeled after the testing procedures that West Virginia schools use to administer the statewide achievement test and included such issues as parent notification, involvement of special education students, and providing a proper testing environment. The health education specialist administered the test. The 40 test questions were required to be answered in a 45-minute period. Teachers were asked to keep testing materials secure and to destroy testing booklets after completion of the assessment.

Data Analysis

A total HEAP mean score was computed, as well as mean scores for each subtest (nutrition, physical activity, injury prevention, mental health, growth and development, alcohol, and tobacco). The total HEAP scores and subtests scores were examined according to groups: gender (male, female) and grade (6, 8, and high school). Data analysis consisted of descriptive statistics, and wherever appropriate, differences in groups or group means were statistically assessed using the independent *t* test and one-way analysis of variance (ANOVA). All statistical analyses were performed using SPSS[®], Version 10.1 (SPSS Inc., Chicago, IL). An a priori "alpha" value of equal to or less than 0.05 was adopted as statistically significant for all statistical tests.

A percent correct score was also computed for each subtest. These were computed for the state as well as for the participating counties and individual schools. The criterion of 80% was established by the WVDE as the standard to be achieved. Scores greater than 80% were labeled as "exceed the standard," those in the 70s were labeled as "almost met the standard," and scores less than 70% were labeled as "standard not met."

RESULTS

As reported in Table 1, 17,549 students were tested, including almost equal numbers of males and females per grade level. Most students were white, reflecting the demographics of West Virginia.

Table 1
Demographics of Respondents

Variables	Grade 6	Grade 8	High School
N (total = 17,549)	5547	4292	7710
Age (mean ± SD)	11.88 ± 0.61	13.82 ± 0.62	14.75 ± 0.52
Gender, n (%)	Male, 2753 (49.5) Female, 2812 (50.5)	Male, 2180 (50.5) Female, 2134 (49.5)	Male, 3916 (50.8) Female, 3916 (49.2)
Race, n (%)			
American Indian, Alaska	482 (8.9)	171 (4.0)	224 (2.9)
Asian	44 (0.8)	36 (0.8)	64 (0.8)
Black	217 (4.0)	148 (3.5)	288 (3.8)
Hispanic	61 (1.1)	48 (1.1)	115 (1.5)
Hawaii, Pacific Islander	44 (0.8)	38 (0.9)	48 (0.6)
White	4578 (84.4)	3796 (89.6)	6860 (90.3)

Table 2
Total HEAP and Subtest Scores by Grade*

	All Grades (mean ± SD)	Grade 6 (mean ± SD)	Grade 8 (mean ± SD)	High School (mean ± SD)
Total HEAP scores	27.83 ± 7.48	30.61 ± 6.92 ^{a,b}	26.55 ± 8.22 ^a	26.53 ± 6.86 ^p
Subtest scores				
Nutrition	5.53 ± 1.80	5.78 ± 1.73 ^c	4.77 ± 1.75 ^{c,d}	5.77 ± 1.76 ^d
Physical activity	5.78 ± 1.81	6.11 ± 1.65 ^e	6.11 ± 1.96 ^f	5.37 ± 1.75 ^{e,f}
Injury	—	7.18 ± 1.58	—	—
Mental	—	—	2.60 ± 1.25	1.97 ± 0.86
Growth	4.66 ± 2.23	2.59 ± 1.00	5.64 ± 2.19	5.60 ± 1.86
Alcohol	2.70 ± 1.09	3.04 ± 1.05 ^g	2.27 ± 1.10 ^g	2.70 ± 1.01 ^g
Tobacco	5.38 ± 1.98	5.91 ± 2.03 ^{h,i}	5.17 ± 2.08 ^h	5.12 ± 1.81 ⁱ

* One-way ANOVA was used to compare score means across the 3 grades. Means with same letters are significantly different at $p \leq .05$ (Scheffe's post hoc test for comparison of means).

Table 3
Total HEAP and Subtest Scores by Gender

	Males (n = 8849) mean ± SD	Females (n = 8737) mean ± SD	Significance
Total HEAP scores	26.65 ± 8.16	29.07 ± 6.05	0.000*
Subtest scores			
Nutrition	5.34 ± 1.89	5.72 ± 1.66	0.000*
Physical activity	5.62 ± 1.96	5.96 ± 1.61	0.000*
Injury	2.16 ± 3.37	2.40 ± 3.55	0.000*
Mental	1.40 ± 1.31	1.61 ± 1.37	0.000*
Growth	4.38 ± 2.26	4.94 ± 2.16	0.000*
Alcohol	2.58 ± 1.16	2.82 ± 0.99	0.000*
Tobacco	5.17 ± 2.12	5.61 ± 1.81	0.000*

* Independent *t* tests, significant at $p \leq .05$.

Grade Level

Table 2 contains the HEAP means and standard deviations (total and subtest scores) by grade level. The total HEAP mean score across all grade levels was 27.83 (out of a possible 40). Mean total scores by grade were 30.61 (grade 6), 26.55 (grade 6), and 26.53 (high school), indicating a slight decline in scores as grade level increased. A one-way ANOVA was performed to compare score means across the 3 grades. For nutrition, mean scores for grade 6 (mean = 5.78) and high school (mean = 5.77) were significantly higher than those for grade 8 (mean = 4.77, $p = .000$). For physical activity, grades 6 (mean = 6.11) and 8 (mean = 6.11) had significantly higher mean scores than high school students (mean = 5.37, $p = .000$). Grade 6 students (mean = 5.91) scored significantly higher on tobacco compared with grade 8 (mean = 5.17) and high school students (mean = 5.12, $p = .000$). All 3 grades were significantly different ($p = .000$) on content area alcohol, with grade 6 (mean = 3.04) having the highest mean scores followed by high school (mean = 2.70) and grade 8 (mean = 2.27). Scores on the growth and development questions were not compared because different numbers of questions were used for the sixth and eighth and high school test versions.

Gender

Table 3 contains HEAP total and subtest scores by gender. Independent t tests were performed to compare means of males and females on total scores and subscores. Total HEAP scores for females (mean = 29.07) were significantly higher than scores for males (mean = 26.65, $p = .000$). Females also scored higher than males on all subtests ($p = .000$).

Grade Level and Gender

Table 4 contains HEAP scores (total and subtest scores) by grade level and gender. Independent t tests were performed to determine if a difference existed in the mean scores of males and females when categorized by grades. Females in each grade level scored higher than males on total HEAP scores and scores on subtests ($p < .05$).

Percent Correct

Figure 1 contains the percent correct by subtests and grade. No grade achieved the standard on the total HEAP score, though sixth graders were close at 77%. Sixth graders exceeded the standard on injury prevention (90%) and almost met the physical activity standards (76%), alcohol and other drugs (76%), tobacco (74%), and nutrition (72%). Sixth graders recorded their lowest scores in growth and development (65%). Eighth graders did not achieve the standard on any subtests, though they came close on physical activity (76%). Eighth graders scored the lowest on the alcohol and other drugs questions (57%). High schoolers also did not achieve the standard on any of the subtests; their closest score was on the nutrition questions (72%). High school students scored the lowest on the mental health questions (49%).

Reports to Counties, Schools, and Statewide Partners

Detailed reports, using the percent correct scores, were constructed and sent to each participating county and school. Results were listed by state, county, school, and

Table 4
Total HEAP and Subtest Scores by Gender and Grade

	Grade 6			Grade 8			High School		
	Male (n = 2753) mean \pm SD	Female (n = 2821) mean \pm SD	Significance	Male (n = 2180) mean \pm SD	Female (n = 2134) mean \pm SD	Significance	Male (n = 3916) mean \pm SD	Female (n = 3791) mean \pm SD	Significance
Total HEAP scores	29.83 \pm 7.48	31.45 \pm 5.88	0.000*	25.14 \pm 8.66	28.03 \pm 7.43	0.000*	25.25 \pm 7.55	27.90 \pm 5.74	0.000*
Subtest scores									
Nutrition	5.69 \pm 1.81	5.88 \pm 1.62	0.000*	4.67 \pm 1.82	4.89 \pm 1.66	0.000*	5.48 \pm 1.90	6.08 \pm 1.53	0.000*
Physical activity	6.07 \pm 1.81	6.16 \pm 1.46	0.000*	5.82 \pm 2.13	6.40 \pm 1.70	0.000*	5.18 \pm 1.89	5.57 \pm 1.56	0.000*
Injury	6.93 \pm 1.82	7.45 \pm 1.20	0.000*	—	—	0.000*	—	—	0.000*
Mental	—	—	0.000*	2.37 \pm 1.26	2.83 \pm 1.18	0.000*	1.85 \pm 0.94	2.11 \pm 0.74	0.000*
Growth	2.46 \pm 1.07	2.72 \pm 0.91	0.000*	5.20 \pm 2.30	6.09 \pm 1.97	0.000*	5.28 \pm 2.02	5.94 \pm 1.60	0.000*
Alcohol	2.94 \pm 1.30	3.14 \pm 0.95	0.000*	2.14 \pm 1.70	2.41 \pm 1.01	0.000*	2.57 \pm 1.10	2.83 \pm 0.91	0.000*
Tobacco	5.74 \pm 2.18	6.10 \pm 1.85	0.000*	4.94 \pm 2.19	5.42 \pm 1.93	0.000*	4.89 \pm 1.94	5.37 \pm 1.61	0.000*

* Independent t tests, significant at $p \leq .05$.

grade to allow schools in the same county to compare their results to each other, the county, and state. In addition to HEAP scores, selected county-level Behavioral Risk Factor Survey data were provided to each county. Many West Virginia counties have a high prevalence of risk factors such as obesity and physical inactivity. This information was provided to underscore the importance of prevention education for school-aged youth. An Executive Summary also was prepared and disseminated to the WVDE's statewide partners, including the state health agency and colleges and universities with teacher preparation programs.

DISCUSSION

This study assessed the health education knowledge of students enrolled in grades 6, 8, and high school across 6 health education content areas. The results suggest important differences among students in the different grade levels. High school students failed to meet the standard on any health education content areas, indicating a need for knowledge and skills enhancement.

School health education provides students with the knowledge and skills to prevent health risk behaviors, and it is often assumed that this education has uniform effects on students. The current study included analysis by gender as evaluations of health education have given minimal attention to the importance of this variable.¹⁰ The results show that females scored significantly higher than males on total HEAP scores and subtest scores. These findings suggest that health education should be presented in a way to meet the needs of males and females. In addition, the findings emphasize the importance of taking gender into account in any evaluation.

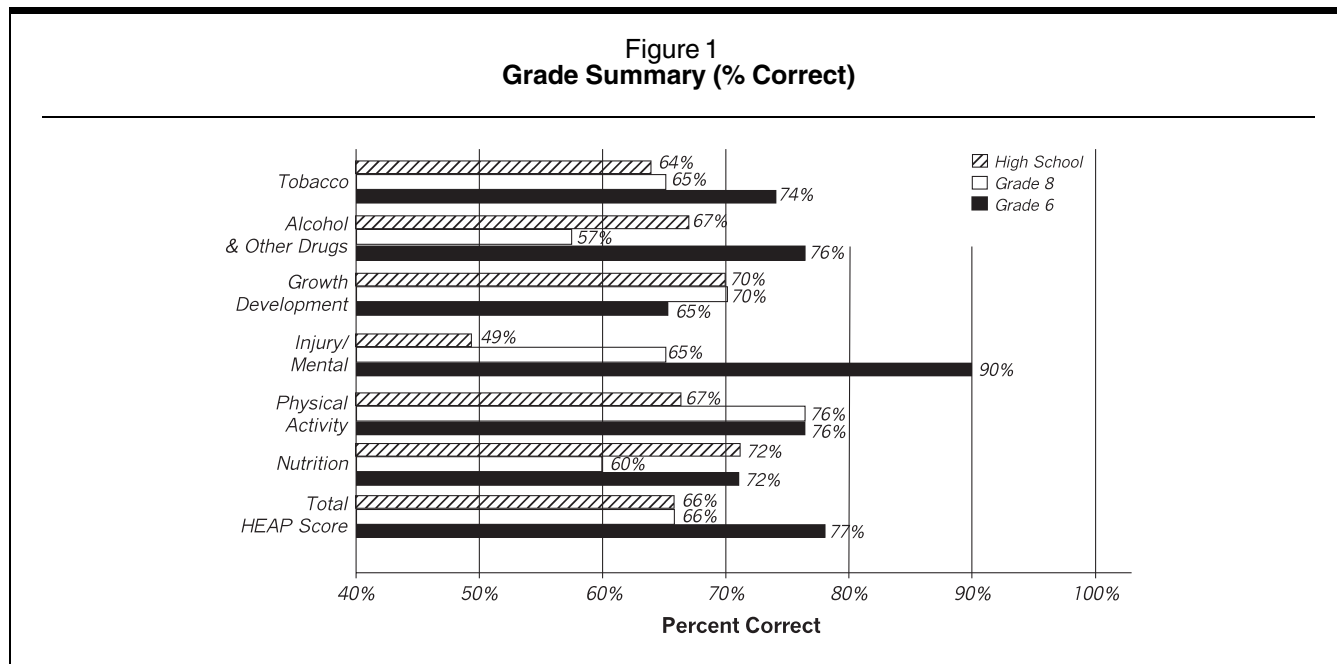
The newly adopted West Virginia health education CSOs represent a shift from a knowledge-based, didactic approach to a skills-based approach to health education. Research has shown that skills-based health education,

when taught appropriately, can positively influence health behavior.¹ The WV CSOs have been designed to provide students the opportunity to acquire health-promoting knowledge and attitudes and to practice the skills they need to avoid risky and unhealthy situations and adopt healthier lifestyles. The results of this assessment point to the need for more teacher training, support, and practice in implementing the WV health education CSOs.

The HEAP results are being used during the statewide Health and Physical Education summer trainings to underscore the need for standards-based health education. Teachers are examining student deficiencies in each content area and discussing ways to strengthen the delivery of health education to improve the deficiencies. Teachers also are examining the HEAP results in the context of 2003 West Virginia Youth Risk Behavior Survey (WV YRBS) data. For example, high school students failed to meet the standard on the Alcohol and Other Drugs HEAP subtest, and results from the 2003 WV YRBS indicate that 25.4% high school students reported that they rode on a car or other vehicle driven by someone who had been drinking alcohol at least once in a 30-day period. Teachers are being encouraged to explore the potential links between knowledge and skill deficiencies and health risk behaviors to increase their commitment to providing quality school health education.

Teachers also are learning how to use the performance-based assessment approaches developed by SCASS-HEAP, eg, constructed responses, performance events, and performance tasks, in conjunction with the statewide HEAP assessment in order to enable West Virginia school health educators to use multiple modes of assessment.

The findings of this study are limited to selected schools in West Virginia and may not be generalizable to other states. Further studies in other states participating in SCASS-HEAP are needed for comparisons. This study illustrates the potential benefits of employing the



SCASS-HEAP assessment and provides useful baseline data for use in future planning of professional development training for health educators in West Virginia schools. It also serves as an illustration of how a state education agency can implement the monitoring and assessment strategies recommended by CDC.² ■

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