Evaluation of Vermont School Wellness Policies

by

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Abstract

Obesity among youth is a complicated public health and education challenge in Vermont and across the United States. In addition to detrimental health consequences, youth obesity negatively impacts quality of life and learning potential. School-based child wellness practices, including healthful eating and physical activity, have great potential to maximize academic success. To support positive change and to address the problem of child obesity, federal and Vermont state legislation require that schools adopt and implement a School Wellness Policy (SWP) that dictates a healthy learning environment for students. This study was designed to evaluate the quality of SWPs from a geographically stratified sample of 25 Vermont high schools. The Wellness School Assessment Tool (WellSAT) was used to measure and compare the comprehensiveness and strength of SWPs.

The mean score for overall comprehensiveness of SWPs is 30.8 and the mean score for overall strength is 15.7 for the 25 Vermont high schools in this sample. These scores fall much below the highest possible score of 100 points. Among the schools in this sample, policies scored more points for items related to Standards for USDA Child Nutrition Programs and School Meals, and for items related to policy evaluation. Schools serving a larger proportion of students living in poverty have higher quality SWPs than schools with fewer students living in poverty. Schools serving only students in grades nine-12 have lower quality policies than schools serving a broader grade-level distribution of students. The findings suggest that Vermont SWPs may be weaker than those from a national sample, although differences in sampling and other study design characteristics may contribute to this disparity.

Based on these findings, it is suggested that Vermont schools may benefit from state agency, and community-based organization supports to address child obesity and improve
learning. In the long term, a continuous improvement framework for school wellness, with periodic policy assessment at multiple points is recommended. Finally, future research studies are proposed, including replication of this type of study for the full range of grades in Vermont, as well as further research on the use of the WellSAT.
Introduction

Child obesity is one of the most troubling public health issues of the 21st Century. This condition is associated with cardiovascular disease, type 2 diabetes, asthma, sleep disorders, and musculoskeletal disorders.\(^1\) In terms of psychosocial complications, overweight or obese youth are also more likely to be at the risk of facing social stigma which can lead to poor self-esteem, depression, anxiety, and destructive behaviors.\(^2\)\(^3\) Most important for schools, poor nutrition and physical inactivity among youth are negatively associated with academic performance.\(^4\)\(^5\)

Although obesity is caused by caloric imbalance\(^6\), this public health issue has been deemed a "wicked problem" due to the contribution of many complex biological, environmental, and societal risk factors.\(^7\) Such societal risk factors include lack of education, poverty, limited access to healthy food, parental obesity, and race.\(^8\)\(^9\)\(^10\)\(^11\) Additionally, as they age, youth with increased body-mass index levels (an indicator of body fatness) are at greater risk of becoming obese adults.\(^12\)

Considering these many risk factors, this complex problem requires a comprehensive solution approach that addresses all levels of behavior influence: intrapersonal, interpersonal, organizational/community, and public policy; as described by the socio-ecological model.\(^13\) As public institutions, schools are in a position to implement both practices and policies to support life-long health. Some may argue that due to the negative effects of obesity on quality of life\(^14\) and learning,\(^15\)\(^16\) schools are bound by a moral obligation to help solve child obesity.

Recognizing this important locus of influence, when the United States (U.S.) Congress reauthorized the Federal Child Nutrition Act in 2004, a new provision required all schools with a federally-funded meals program to create and implement a School Wellness Policy (SWP). In
2010, the *Healthy, Hunger-Free Kids Act* expanded the SWP requirements to include a minimum of the following additional provisions:17

- "Include goals for nutrition promotion and education, physical activity, and other school-based activities that promote student wellness;
- Include nutrition guidelines to promote student health and reduce childhood obesity for all foods available in each school district;
- Permit parents, students, representatives of the school food authority, teachers of physical education, school health professionals, the school board, school administrators, and the general public to participate in the development, implementation, and review and update of the local wellness policy;
- Inform and update the public (including parents, students, and others in the community) about the content and implementation of local wellness policies; and
- Be measured periodically on the extent to which schools are in compliance with the local wellness policy, the extent to which the local education agency’s local wellness policy compares to model local school wellness policies, and the progress made in attaining the goals of the local wellness policy, and make this assessment available to the public".18

During this same period of action at the federal level, advocates in Vermont also recognized that schools have an obligation to address child obesity because of the considerable amount of time youth spend in this setting. Data from the Vermont Youth Risk Behavior Survey reveals that between 2003-2011 youth overweight and obesity rates have ranged between 23% and 27%.19 In order to address this threat to the current and future health of Vermonters, it is critically important to acknowledge and capitalize on the reality that schools are a place of significant influence for shaping youth knowledge, attitudes, and behaviors around both nutrition and physical activity. Indeed, student wellness is a foundation for successful academic performance.20

In Vermont, schools must provide students at least 175 teaching days per year. Furthermore, the required educational program must include both nutrition education and physical education for students in grades K-12.21 Data also indicate that 95% of Vermont students have access to breakfast and/or lunch programs during the school day, thanks to the federally-funded school food service programs.22 Equipped with this information, law makers passed *H.272: An Act Relating to Nutrition Policy in Vermont Schools*, which requires schools to enhance the wellness environment for youth.23
This law reinforces federal legislation by requiring all Vermont schools to write and implement a SWP. In order to support this work, the law called upon the Vermont Department of Education to collaborate with the Departments of Agriculture and Health to develop a model policy. This document, called *The Vermont Nutrition and Fitness Policy Guidelines*, became a list of best practices for creating a health-enhancing educational environment. At the request of their members, the Vermont School Boards’ Association (VTSBA), representing more than 300 independent school boards state-wide, also developed a sample wellness policy. However, in an effort to minimize the burden on schools, the VTSBA wrote a sample policy that simply meets the lowest standards of the law. In the accompanying letter, the organization specifically notes that they "purposefully limited the scope of this model" and clarified that schools may choose, but are not legally required, to expand upon this policy framework. Despite being very different from one another, the influence of these model and sample policies is best understood within the context of the Vermont school governance system.

In Vermont, the requirement of schools to create a local SWP becomes a varied and complex process due to the unique public education governance structure. In stark contrast with most states or urban areas across the country, Vermont's entire public education system serves only 90,289 students in grades prekindergarten through 12. At the same time, a diverse geographic and often rural landscape necessitates the operation of more than 300 public schools which range in size from 14 students at East Haven River School to 1,345 students at Champlain Valley Union High School. Furthermore, collectively Vermont schools have an extremely diverse set of grade level configurations (e.g. PreK-12, K-6, 5-8, 7-8, 7-12, 9-12, etc…). Despite such low student enrollment and small school size, deep tradition and state law allow each school to elect and operate an independent school board. Hence, state-wide, there is one
school board member in power per approximately every 64 students. These school boards are ultimately responsible for creating, implementing, and evaluating a local SWP. In addition, some schools also operate a coordinated school health team or school health committee which may be charged with development, implementation and oversight of the SWP. With such a large number and variety of administrators in control of schools, it is possible that the quality of policies may vary greatly across the state.

Although federal law requires the Vermont Department of Education to monitor all school food service programs; which includes assessment of SWPs, this process may not assure quality or consistency across schools. For example, due to limited staffing, Vermont schools are typically only subject to review once every five years; and the process merely ensures that the school has a policy in place. Consequently, the intent of limiting and preventing child obesity through SWPs may or may not be realized.

In 2009, several Vermont agencies and non-profit partners pooled funds and staff resources to develop an incentive for SWP monitoring and technical assistance - the School Wellness Award. The award is designed to recognize and promote best school wellness practices. To apply, schools conduct an electronic, self-assessment of their SWP and practices and include narrative success stories. All applicants are provided an honorary banner to hang in their building. In addition, top scoring schools in three categories - elementary, middle, and high school - are rewarded with funds to support school wellness initiatives. Moreover, award ceremonies are held across the state, at various conferences, to promote these examples of school efforts to reduce child obesity. However, limited monitoring from the Vermont Department of Education and the School Wellness Award are not enough; schools need additional resources to
ensure that wellness policies and practices are implemented within a continuous improvement system.

**WellSAT Tool**

In response to the nationwide need of schools to address child obesity; Yale University's Rudd Center for Food Policy and Obesity developed a SWP evaluation tool called the Wellness School Assessment Tool (WellSAT). Released in February 2010, this tool was born out of a research-based, comprehensive, 96-item coding system that was designed to measure the quality of school wellness policies. The tool is intended for use by school staff and/or public health personnel who are interested in assessing the quality of local school wellness policies. In addition, the WellSAT is available online at no cost.

WellSAT users create a personal login and then score one or more SWPs by rating individual policy statements as zero, one, or two. Scores are then compiled into subsection summaries as well as an overall rating that provides a numeric measure of policy comprehensiveness and strength. Comprehensiveness is a measure of the degree to which recommended content is addressed in the policy. The strength score indicates how strongly the statement is phrased. (Specific scoring criteria are described below, see pp 11-12.) Once policy analysis is completed, an auto-generated final report identifies useful resources that the school can employ to ameliorate weak policy areas. Schwartz et al. found that the tool is a valid and reliable measure of school wellness policy quality. Since this tool is relatively new, as of December 2011 no research studies that employed the tool have yet been published.

As of December 2011, the WellSAT website has been viewed by over 12,000 visitors from every state in the nation, plus the District of Columbia. Over 2,000 visitors were from California - the greatest number from any state. Completed scoring profiles were submitted for
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1333 policies from all states. These policies were not systematically collected. Rather, it is possible that this sample represents early initiators who were motivated to make SWP improvements. Among this sample, the mean total comprehensiveness score was 56.1 points (standard deviation = 21.4 points) while the mean total strength score was 33.0 points (standard deviation = 21.3 points). Hence, these scores indicate that nationally SWP quality falls far below the WellSAT standard of excellence that is set at 100 points for comprehensiveness and 100 points for strength.

Quality of School Wellness Policies

Considering the powerful role of schools in addressing child obesity, the purpose of this study is to understand the quality of existing wellness policies from a sample of Vermont schools. This study aims to assess and describe SWPs to help identify strengths and deficiencies across the state. The work was carried out from August 2011 to December 2011 - seven years after federal and state governments required schools to adopt SWPs. What follows is a description of the process, findings, and implications from a systematic analysis of policies collected from a sample of Vermont public schools that provide education to students in grades nine through twelve. Findings from this study have the potential to guide development of training and technical assistance to enhance the work of developing, implementing, and evaluating the effectiveness of SWPs. The methodology in this study may also be useful to provide a framework for policy assessment and improvement over time.

Methods

Sampling and Data Collection

As discussed, since 2004 Vermont schools have been required by both federal and state government to write and implement a SWP. Therefore, this collection of SWPs first indicates
whether schools are operating in compliance with these laws. The study also provides a measure of policy quality. To conduct the investigation, Vermont schools serving students in grades nine-12 (n=60) were divided into strata based on county location. High schools were chosen because these schools are often larger and fewer than elementary schools. Although there are 14 counties in Vermont, Grand Isle County does not have a high school, therefore data were available from schools in 13 counties. Next, two high schools were randomly identified from each of the remaining 13 counties to create a target sample of 26 geographically dispersed high schools. This sample design represents approximately 40% of Vermont public schools serving high school-aged youth. (See the results sections for a detailed description of sample demographics.)

Each of the 26 targeted high schools was contacted by a research assistant from Dartmouth Medical School (see Appendix A) who was assigned the task of collecting primary data - the SWP. To ensure consistent messaging about the purpose of data collection, both a telephone script and e-mail script were used (see Appendix B). Three of the 26 targeted schools did not respond to the request for their policy. Fortunately, each non-responsive school was located in a different county. From two of these counties, a third high school was randomly selected and a SWP was successfully collected. The third county is home to only two high schools; therefore a second SWP could not be collected. Altogether, the final sample included primary data from 25 schools that represent 13 Vermont counties.

In addition to these primary data, other available secondary data were collected from the Vermont Department of Education's Education Data Warehouse (EDW) with help from a Department of Education data analyst (see Appendix A). For each of the 25 sample schools the following information was retrieved: grade level distribution, number of students, student race, and family income. Secondary data were also collected from Yale University's Rudd Center for
Food Policy and Obesity. The organization provided SWP scores from a national sample of data that was stored in the WellSAT database (see Appendix A and Figure 6).

**School Wellness Policy Evaluation**

Each SWP was evaluated for comprehensiveness and strength using the WellSAT. To develop a study protocol, the WellSAT supporting background documents and instructions were reviewed. Next, SWPs were collected from two high schools outside of the study sample. The policies for these two schools were scored by the primary researcher in order to practice the evaluation methods. This process informed creation of a project-specific coding protocol (see Appendix B). Next, the primary researcher scored each of the 25 policies included in the study sample.

To ensure inter-rater reliability 20% (n = 2) of the sample SWPs were randomly selected. Then, a research assistant from Dartmouth Medical School used the same scoring protocol to produce a second score for each of these policies. In advance, a 20% margin of difference was determined as an acceptable threshold of agreement for the total comprehensiveness and total strength scores. Both scores for these two policies fell within this margin of difference.

The WellSAT tool is divided into five distinct sections: Nutrition Education and Wellness Promotion (NEWP), Standards for USDA Child Nutrition Programs and School Meals (US), Nutrition Standards for Competitive and Other Foods and Beverages (NS), Physical Education and Physical Activity (PEPA), and Evaluation (E). Each section includes between four and 16 questions designed to evaluate the comprehensiveness and strength of policy items in that category. In the NEWP section, nine items are scored on a scale from zero to two. In the US section, seven items are scored on a scale from zero to two. The NS section "relates to sale or service of foods outside USDA school meals". USDA meal guidelines are strictly defined,
therefore the NS section rates 16 items on a scale from zero up to four. The highest score of four is given for statements that ban the sale of food items which compete with the sale of USDA meals served at a school. The PEPA section addresses fourteen policy items; all of which are scored from zero to two. Finally, the E section assesses four items on a scale of zero to two. For each item, a score of zero = Not mentioned; one = Weak Statement; two, three, or four = Meets/Exceeds Expectations.36

After all items in each section are evaluated, the WellSAT automatically generates a score of comprehensiveness and a score of strength for each of the five sections described above and for the overall policy. As previously described, comprehensiveness is a measure of the degree to which recommended content is addressed in the policy, whereas the strength score indicates how strongly the statement is phrased. The highest possible score for overall comprehensiveness is 100 points. The highest possible score for overall strength is also 100 points.37 Likewise, for each subsection, the maximum score is 100.

The WellSAT also generates results for each individual policy in a data file which allows for compilation and analysis of all quality measures. Note also that the WellSAT produces a school-specific score card which includes feedback and web-links to resources that can be used to help enhance the policy that was scored. This information can be shared with each of the schools in the study sample.

Results

Vermont Study Sample Characteristics

The final sample of Vermont high schools includes 25 schools selected from 13 Vermont counties. This sample represents 42% of public schools serving students in grades nine-12. Grade level distribution in Vermont schools varies greatly across the state. In this sample, 12 out
of 25 schools (48%) serve only students in grades nine-12, six schools (24%) serve students in grades 7-12, two schools (8%) serve students in grades six-12, one school (4%) serves students in grades five-12, one school (4%) serves students in grades K-12, and three schools (12%) serve students in grades Pk-12 (see Figure 1).

As stated above, the total public school population of 90,289 PreK-12 students in Vermont is small compared with other states. Furthermore, Vermont is a relatively rural state with a low population density. Therefore, school size is considered small compared with those of others states. Among this sample of 25 schools, four schools (16%) serve 250 or fewer students, 11 schools (44%) serve 251-500 students, seven schools (28%) serve 501-1000 students, and three schools (12%) serve 1001 or more students (see Figure 2).
In order for students to enroll in the federally-funded school food service program, parents/guardians with low incomes must complete an application form on behalf of their student(s). Hence, the proportion of students in the Free- or Reduced-Priced Meal Program (FRL) serve as an indicator of the income of families served by the school. Specifically, a higher proportion of students in FRL indicate that the school is serving more families with low income. Among the schools in this sample, one school (4%) reports less than 10% of students in FRL, five schools (20%) are serving a population with 21-30% of students in FRL, seven schools (28%) are serving a population with 31-40% of students in FRL, six schools (24%) are serving a population with 41-50% of students in FRL, five schools (20%) are serving a population with 51-60% of students in FRL, and one school (4%) reported that over 60% of their students participate in FRL (see Figure 3).

In terms of race, Vermont schools generally do not serve a diverse student body, which is reflected in this study sample. Among the schools in this sample, one school reports serving a population with 72.9% white students. The other 24 schools report that their population of students is comprised of between 89.4% to 98.1% white students.

**Vermont Study Sample School Wellness Policy Scores**
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Among the high schools in this sample, the mean score for overall comprehensiveness of SWPs is 30.8 (standard deviation 11.3 points) and the mean score for overall strength is 15.7 (standard deviation 7.3 points). These scores fall much below the highest possible score of 100 points. It is also noteworthy that scores range between five and 59 points for total comprehensiveness and between zero and 37 points for total strength (see Table 1). Only one school was scored 0 for overall strength because it did not include any statements that aligned with legal requirements. This same policy earned the lowest score of five points for comprehensiveness because it had only one weak statement that named the superintendent as responsible for policy implementation.

Table 1: Summary of Overall WellSAT Scores for Comprehensiveness and Strength

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>High</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Comprehensiveness</td>
<td>5</td>
<td>59</td>
<td>30.8</td>
<td>11.3</td>
</tr>
<tr>
<td>Total Strength</td>
<td>0</td>
<td>37</td>
<td>15.7</td>
<td>7.3</td>
</tr>
</tbody>
</table>

Mean subsection scores for comprehensiveness and strength are as follows: NEWP - 16.3 and 3.6 points; US - 47.3 and 23.6 points; NS - 22.2 and 6.2 points; PEPA- 23.0 and 5.7 points; E - 45.0 and 39.0 points (see Table 2).

Table 2: Summary of Comprehensiveness and Strength Scores by Section of WellSAT

<table>
<thead>
<tr>
<th></th>
<th>Low</th>
<th>High</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEWP</td>
<td>Comp. 0</td>
<td>67</td>
<td>16.3</td>
<td>12.9</td>
</tr>
<tr>
<td></td>
<td>Strength 0</td>
<td>56</td>
<td>3.6</td>
<td>11.5</td>
</tr>
<tr>
<td>US</td>
<td>Comp. 0</td>
<td>71</td>
<td>47.3</td>
<td>19.6</td>
</tr>
<tr>
<td></td>
<td>Strength 0</td>
<td>43</td>
<td>23.6</td>
<td>11.0</td>
</tr>
<tr>
<td>NS</td>
<td>Comp. 0</td>
<td>56</td>
<td>22.2</td>
<td>13.7</td>
</tr>
<tr>
<td></td>
<td>Strength 0</td>
<td>50</td>
<td>6.2</td>
<td>10.5</td>
</tr>
<tr>
<td>PEPA</td>
<td>Comp. 0</td>
<td>73</td>
<td>23.0</td>
<td>16.6</td>
</tr>
<tr>
<td></td>
<td>Strength 0</td>
<td>45</td>
<td>5.7</td>
<td>13.2</td>
</tr>
<tr>
<td>E</td>
<td>Comp. 25</td>
<td>50</td>
<td>45.0</td>
<td>10.2</td>
</tr>
<tr>
<td></td>
<td>Strength 0</td>
<td>50</td>
<td>39.0</td>
<td>19.2</td>
</tr>
</tbody>
</table>

NEWP - Nutrition Education and Wellness Promotion
US - Standards for USDA Child Nutrition Programs and School Meals
NS - Nutrition Standards for Competitive and Other Foods and Beverages
PEPA - Physical Education and Physical Activity
E - Evaluation
A separate analysis was conducted to assess whether SWP quality is related to student family poverty level. Recall that a higher proportion of students in FRL indicates that the school is serving more families with low income. To carry out this analysis, a dichotomous "poverty status indicator" was developed. Sample schools were divided into two groups defined by whether they were above or below the midpoint of the proportion of students in FRL: low poverty schools [<40% of students in FRL (N = 13)]; and high poverty schools [≥41% of students in FRL (N = 12)]. Low poverty schools have slightly lower SWP quality scores than high poverty schools. Mean total comprehensiveness score is 28.5 points and mean total strength score is 13.6 points for the schools with a smaller proportion of low income students. Mean total comprehensiveness score is 33.3 points and mean total strength score is 17.8 points for the schools with a larger proportion of low income students (see Table 3 and Figure 4).

Table 3: Overall WellSAT Scores by School Poverty Status*

<table>
<thead>
<tr>
<th>School Poverty Status*</th>
<th>Mean Comprehensiveness</th>
<th>Mean Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low poverty schools (&lt;40% FRL, n=13)</td>
<td>28.5</td>
<td>13.6</td>
</tr>
<tr>
<td>High poverty schools (≥41%, n=12)</td>
<td>33.3</td>
<td>17.8</td>
</tr>
</tbody>
</table>

* Proportion of students who participate in the Free and Reduced Priced Meal Program (FRL)
A final investigation of the Vermont SWP data was conducted to assess whether quality of policy is related to the type of school. In this case, type is defined by the grade level distribution within the school. As previously discussed, Vermont schools vary greatly by the grade levels served. In this sample of high schools, 12 serve only grades nine-12, whereas 13 schools serve grades nine-12 along with students in elementary and/or middle school (herein referred to as "multiple-grade schools") (see Figure 1). The SWP scores from nine-12 only schools are lower than the policy scores from the multiple-grade schools. Specifically, mean total comprehensiveness is 27.5 points and mean total strength score is 14.2 points for the schools with grades nine-12 only. Mean total comprehensiveness is 34.4 points and mean total strength score is 17.2 points for the schools with students in elementary, middle, and/or high school (see Table 4 and Figure 5).

Table 4: Overall WellSAT Scores by Type of School

<table>
<thead>
<tr>
<th></th>
<th>Mean Comprehensiveness</th>
<th>Mean Strength</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grades nine-12</td>
<td>27.5</td>
<td>14.2</td>
</tr>
<tr>
<td>schools (N = 12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple-grade</td>
<td>34.4</td>
<td>17.2</td>
</tr>
<tr>
<td>schools (n = 13)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 5: Vermont Wellness Policy Scores by Type of School

[Diagram showing mean scores for comprehensiveness and strength for grades nine-12 (n=12) and multiple grades (n=13)]
Vermont School Wellness Policy Scores Compared with National Data

The Vermont sample SWP scores are lower than scores for the policies from the national sample (n=1333) retrieved from the WellSAT database as of December 2011. Among the national sample, the mean total comprehensiveness score is 56.1 points (standard deviation = 21.4 points) and the mean total strength score is 33.0 points (standard deviation = 21.3 points). As indicated above, among the schools in this Vermont sample, the mean score for overall comprehensiveness of SWPs is 30.8 (standard deviation 11.3 points) and the mean score for overall strength is 15.7 (standard deviation 7.3 points) (see Table 1). This represents a difference of 25.2 points for comprehensiveness and a difference of 17.3 points for strength. In other words, the scores from the national sample are nearly double those scores for Vermont SWPs (see Figure 6). On the other hand, as identified in Table 2, the Vermont policies did score well in a few subsections.

Discussion

Based on this sample of 25 Vermont high schools, the mean score for overall comprehensiveness (30.6 points) is about one-third of the highest possible score, 100. The mean
score for overall strength (15.7 points) is only about one-sixth of the highest possible score, 100. These measures indicate a need for improved SWPs among the high schools in Vermont.

Comparisons to national averages also provide useful information for analyzing the meaning of the findings in this study. Mean overall scores for comprehensiveness and strength among this sample of Vermont high schools are about one-half the value of nationally reported scores; once again providing an indicator of need for improvement. However, it must be noted that this variation may be due to a difference in sample size and/or due to sampling techniques. The national sample (n=1333) is over 53 times larger than the Vermont sample (n=25). Then again, although large, the national sample was not randomly selected. The national data may reflect some favorable selection bias due to the fact that this information was self-reported. Also, it is not know what grade ranges are represented among the national data; whereas, the Vermont sample primarily focused on high schools. Consequently, these comparisons should be made with caution. Nevertheless, differences of this magnitude are unlikely to be attributable to sampling methods alone.

A deeper level of analysis shows that among the Vermont SWPs, scores for the five WellSAT subsections also vary (see Table 2). Relatively high scores were awarded to the US and E sections. The mean US scores are 47.3 points for comprehensiveness and 23.6 points for strength while the mean E section scores are 45.0 points for comprehensiveness and 39.0 points for strength. In terms of other subsection scores for comprehensiveness, these means are approximately double the scores for NEWP, NS, and PEPA subsections. This result is encouraging because it indicates that school policy makers were consistent with the details of the Standards for USDA Child Nutrition Programs and School Meals. It suggests that quality of school meals may be highly valued by policy writing teams from the schools in this sample. In
addition, the high scores for evaluation suggest that policy writing teams made an effort to emphasize the importance of policy management, including reporting on implementation.

One of the most interesting findings of this study is that schools with relatively high poverty levels have stronger SWPs than the group of schools with less poverty. The difference in scores is 4.8 points for comprehensiveness and 4.2 points for strength. Another remarkable trend among this sample of SWPs is that schools serving only grades nine-12 have weaker policies than schools with elementary, middle and/or high school students. The difference in SWP scores by type of school is 6.9 points for comprehensiveness and 3.0 points for strength.

For each of these findings, the consistency of direction for both measures of SWP quality makes this difference notable. They may indicate that schools serving a large proportion of students living in poverty and schools serving a broader age range of children are already tuned into the importance of establishing a healthy environment for academic success. However, due to small size of the differences coupled with the small numbers of schools in each sub-category, only limited conclusions can be drawn from these results. In fact, these sub-category differences may be due to chance alone. To understand this better, these findings are worthy of further investigation in future studies with larger sample sizes.

SWP development may be influenced by relative income of student families. This may be correlated with other important county or town characteristics. Schools located in small, rural, low-income towns are likely to be operating on a smaller budget and have reduced potential for drawing on additional community financial support to enhance the school nutrition and physical activity environment. Large, urban, wealthy school systems not only have larger budgets, but also naturally have access to a broader network of resources from which to draw support for wellness values and initiatives. Yet, the proportion of low-income students is growing statewide.
Vermont Food Education Every Day (FEED) reports that "from 2004 to 2010 the number of students eligible for FRL grew by 21%.\textsuperscript{42} Nevertheless, despite these challenges, this study suggests that perhaps schools serving more students with low-income are able to establish buy-in from policy makers to enhance the wellness environment. Furthermore, perhaps because such schools are identified as economically needy they are better positioned to secure funding and programmatic resources to improve the wellness environment. Certainly, a high-quality wellness policy is an important supporting document to show value for school wellness when applying for support.

It must be reiterated that this sample of SWPs does not represent all of K-12 education in Vermont. Nevertheless, as the data about school type may indicate, some school policy makers may believe younger students need to be educated in an environment with tighter guidelines over nutrition and physical activity than older peers. As students stretch toward graduation, it may be more natural for school officials to support student growth and independence by reducing restrictions and increasing choices. Hence, future investigations might focus on schools serving early grades so that this finding can be better understood. In addition to grade level distribution, it must also be noted that some districts or supervisory unions which oversee multiple schools elect to adopt one policy for all schools. This was the case for approximately 14 of the 25 schools in this sample.

SWPs and practices may also be enhanced by the presence of a strong, active school wellness team. The Centers for Disease Control and Prevention (CDC) recommends Coordinated School Health (CSH) as a strategy to improve student health and learning.\textsuperscript{43} This CSH model, employed by many Vermont schools, involves establishing a team of school staff, administrators, board members, students, parents, and community members to a) define health priorities and
goals based on data, b) determine available resources, c) establish and action plan, and d) implement and evaluate the plan. Anecdotally, schools with high-quality SWPs often attribute this to the activities of an influential school health team - especially one that includes a local health care provider. This is another aspect of SWP development that could be investigated in future studies.

In reviewing and discussing these findings, limitations of the research methods must be considered. These include a critique of sampling and scoring methods, an assessment of the investigation scope, and feedback about the WellSAT tool.

The sampling method of stratifying schools by county location is a trade off between collecting a geographically diverse sample of SWPs and gathering a sample that proportionately represents the entire population distribution of Vermont schools. As noted, this strategy also focuses on schools serving high school youth. Schools that exclusively serve elementary and middle school students were not included in this sample because there tends to be much variation in size and resources of these schools. Hence, the results are not necessarily generalizable to K-8 schools. Likewise, the methods do not result in a true proportionate representation of all high schools in the state. To make this study manageable, the stratification methods ensures county representation but limits the number of schools that can be selected to only two schools in each county. This tends to overrepresent schools in small counties and underrepresent schools in large counties. For example, Washington County has only seven schools that provide high school education. Because the sampling method calls for random selection of two schools per county this small ratio statistically increases the chance of any single school selection. This is both a weakness and strength of the sampling methods - since stratifying equally across counties
introduces a simple and efficient process for ensuring geographic representation, but may sacrifice the proportional representation of schools in every county.

As described in the methods section, the entire sample of SWPs was scored once by the same researcher. Intra-rater reliability was not assessed. Inter-rater reliability was based on the second scoring only 20% of the sample (two policies). It is possible that this scoring method may reduce the accuracy and reliability of findings. Given increased resources of personnel and time, the methods can be strengthened if all SWPs in the sample are scored independently by two researchers. Then, both set of records can be checked and adjusted for agreement. Despite these small challenges, the overall sampling methods and analysis procedure resulted in 25 policies that were collected and scored. It is thought that these methods generated a respectable pilot study of SWPs in Vermont high schools.

Also important to consider is that all findings in this study are based on the WellSAT, which is still a relatively new methodology with only limited use and no peer-reviewed, published studies. Although it is thought to be a valuable and reliable evaluation tool, only through wider testing and application can the WellSAT be fully assessed. Most notably, its use in a wider variety of settings (e.g. urban vs. rural, low poverty vs. high poverty) will contribute further to understanding the usefulness and sources of variability of this methodology. Replication of studies, such as the one reported here, will produce additional data to fully assess the value of the WellSAT. Based on its application in this study, the following observations are offered.

The WellSAT was created for use by schools across the country. Therefore, some aspects of the tool may be better aligned with education systems in certain parts of the U.S. For example, urban schools may have difficult access to local, fresh produce which can enhance the nutritional
quality and taste of meals. Nevertheless, in general, this online SWP scoring system is easy to use. Explanation for scores is clear and well supported with examples for each measure. It is also helpful that the final scoring report is available electronically in multiple formats (i.e. as a text or data file) and is accompanied by resources to support policy improvements. Recognizing that the scoring process inherently requires subjective decision-making, users might benefit from a comprehensive sample SWP that has been scored by Rudd Center for Food Policy and Obesity staff. This sample could be enhanced by including a detailed explanation for scoring decisions.

In terms of question details, a few inconsistencies between the WellSAT sections for nutrition education and physical education are noted. First, in the PEPA section, question seven allots points for schools that hire licensed physical education instructors. A similar question is not included for hiring licensed health/nutrition education instructors. Second, the PEPA section includes a question (number five) about the student-teacher ratio. An analogous question does not appear for the NEWP section. Third, neither section addresses whether the SWP sets limits to interruptions for either nutrition education or physical education. Such a question would address the reality that increased pressure on academic performance measures, via standardized test scores, has caused many administrators to pull students out of these classes for other academic interventions. Question ten in the PEPA section addresses physical activity breaks during standard classroom instruction. This question unfortunately refers only to instruction at the elementary school level. Neuroscience research indicates students of all grade-levels experience learning and health benefits from regular, interspersed bouts of physical activity. Therefore, it is recommended that this question be applied not just to elementary education, but also to middle and high school education. Finally, the WellSAT must be adapted to align with the January 2012
update to the USDA Nutrition Standards for national school lunch and school breakfast programs.  

Implications

Collectively, the low quality scores of SWPs in this study sample indicate that schools in Vermont may benefit from additional supports for school wellness. Many of the analyzed policies mimicked the simpler version distributed by the VTSBA, thereby leading to low scores on the WellSAT. Assuming that stronger SWPs can put schools in a more powerful position to help halt and even reduce child obesity, leadership for this work must be bold and specific. For example, state agencies such as the Vermont Departments of Education and Health and other community partners like FEED might consider investing in training, resources, and technical assistance to help local school boards and CSH teams establish strong wellness systems. Training for policy setters must first address the importance of wellness for student learning; then emphasize the most effective, repeatable strategies that will enhance student wellness and reduce obesity. Second, resources such as high quality, model policies from Vermont schools plus the WellSAT tool itself must be promoted. Third, school leaders might benefit from assistance with the process of policy writing and for establishing feasible implementation and monitoring strategies. Finally, after provision of these supports, this study could be repeated at a later point in time to determine if SWPs do indeed strengthen. As a whole, this work will create a continuous improvement system similar to the community health assessment process employed by the field of public health.

Future Research and Recommendations

This investigation can be thought of as an initial assessment of SWPs in Vermont as well as a pilot study of the WellSAT. Building on the success of this project, a few other
investigations are proposed for the future. First, as in all successful research, it is important to replicate this study. A larger Vermont sample size with broader grade-level distribution will help establish a clear picture of SWPs statewide. Furthermore, results of a larger sample of Vermont SWPs could be more accurately compared with those from a national sample of policies when data collection methods are consistent across both samples.

Additional data and study about use of the WellSAT would be beneficial to school systems as a way to measure SWP quality and compliance with federal and state regulations. With that in place, a long term recommendation for Vermont includes the development of a continuous improvement framework that employs the WellSAT to evaluate SWPs over time by tracking changes using traditional methods for continuous quality improvement.47

Next, it is important to investigate further the policy writing and implementation process, which is critical to understanding the efficacy of any policy. Clearly, a written policy tells us nothing about how the document is written, implemented, or evaluated. Hence, additional research is necessary to understand how SWPs are created at the local level. This subsequent work could be accomplished through structured interviews with school administrators or CSH team members. Some questions might include: How were stakeholders engaged in the policy writing process? What resources or sample policies were consulted? What factors limit the quality of documents approved by local school boards? This type of information could be used to drive provision of training and technical assistance for schools.

Of course, regardless of the policy content, these documents are meaningless unless they are implemented, enforced, evaluated, and improved. Therefore, it must also be understood what significance or value a school places on the SWP in light of other federal and state requirements such as No Child Left Behind.48 Although child obesity is a significant challenge facing all
members of our communities - schools must recognize that learning cannot take place if children are not well. Public health officials must also step up to support schools while helping them to maintain focus on education - the primary purpose of schools.
Appendix A

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Last, I want to thank my husband JW for his support throughout my enrollment at UNC. Looking back over the past five years, I am amazed that together we have achieved so many big dreams.
Appendix B

**Script for Collecting Wellness Policies by Phone or e-mail**

Hi, this is name from Dartmouth Medical School in Lebanon, New Hampshire. I was hoping to obtain a copy of the school’s local wellness policy. Do you know if that is available somewhere online?  
If yes – what is the website?  
[try to check it while you are still on the phone]  
If no – is there someone I could speak with at the school to obtain a paper copy of your policy?

By e-mail: ________________  
Please send it to…  
name
HB 7925, Dartmouth Medical School  
Lebanon, NH 03766

My number is 603-653-9115 if you have any questions.  
Many thanks!

[if they need more info from you]

I’m a research assistant for Dr. Adachi-Mejia at Dartmouth Medical School. She is very interested in learning more about school local wellness policies and we have copies from schools across the state but they are several years old. We’re hoping to update what we have to make sure they are the most recent. What might be a best way to get a copy?

Thank you so much.
School Wellness Policy Scoring Protocol

1. Register for an account with the Rudd Center WellSAT: http://www.wellsat.org/


5. Thoroughly review the School Wellness Policy.

6. Create a record in the WellSAT by school name.

7. Score the School Wellness Policy. This process should take about 30-45 minutes per policy.
   a) Keep a hard copy record of the score assigned to each statement on the School Wellness Policy. For example: "Administration will ensure compliance with the Wellness Policy and will provide a report of the school district's compliance with the Policy to the school board as requested through data available to them." Statement gets two scores: E1-2, E3-2
   b) If forced to make a judgment between two scores, assign higher score.
   c) If an attachment is referenced but not included with the School Wellness Policy, do not score this attachment.

8. After the scoring is complete for each School Wellness Policy ensure that a copy is e-mailed to your account. Then forward this e-mail copy to lindsay.simpson@unc.edu and Anna.M.Adachi-Mejia@Dartmouth.EDU

9. Call Lindsay with questions at 802-828-1461 or 802-324-8877.
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