Washington DC's Healthy Schools Act:
The Relationship between School Health and Educational Opportunity

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Abstract

This study seeks to describe the relationship between academic achievement and student's health status, particularly as it relates to the implementation of Washington DC's Healthy Schools Act (HSA). In order to meet this objective, the researchers have undertaken an analysis of the relationship between school-level academic achievement, as operationalized by a standardized math score, and the school health environment. The outcomes of this work include the ability to describe school health environments, explore the interrelationships of between school health and student achievement, and to assess the impact of the HSA, with particular attention on how the implementation of this policy might affect children differently based on their socio-economic backgrounds.

Theoretical Framework

Students' health and academic achievement are two areas of ongoing attention and concern in urban schools, for good reason. Disparities in access to healthful foods and exercise are correlated with poor academic outcomes, and occur more regularly in high poverty communities (REF). Healthier students have higher levels of educational achievement (Behrman, 1996; Chomitz et al., 2009) and are more likely to be capable and engaged members of society (Sen, 2000). Healthy students are also more motivated and connected to school (Basch, 2010). Academic achievement and education are critical determinants of health across the life span and disparities in one contribute to disparities in the other (Fiscella and Kitzman, 2009). Opportunities to engage in healthy behaviors, including access to healthful foods and increased time for

physical activities are not equality distributed across economic and racial lines. Children who live in high poverty, minority communities lack access to healthy foods and opportunities for physical activity, so it becomes incumbent on schools to act as an intermediary to offer these opportunities.

Over 30% of the children and teens in the United States are overweight or obese (Ogden et al., 2014). Children of lower socioeconomic status are also more likely to exhibit greater tendency toward higher rates of overweight/obesity status; especially African American and Hispanic children (ADD citation). Academic and health disparities are a complex and significant concern for our nation's youth and evidence has shown significant correlations between health status and academic achievement at the student level (Center on Society and Health, 2014). Studies have demonstrated that health behaviors as a child can affect health outcomes as an adult, and children are showing signs of chronic conditions such as Type II diabetes, hypertension, and bone and joint problems, that were once largely seen in adults only (Daniels, 2006). Further, childhood obesity is projected to nearly double in the next two decades hence the urgency to address this public health issue (Wang, Beydoun, Liang, Caballero, & Kumanyika, 2008). Physical diseases are not the only serious threats to the health and well being of our children; obesity has also been linked to cognitive deficits beginning in childhood and continuing across the lifespan (Li, Dai, Jackson, & Zhang, 2008; Smith, Hay, Campbell, & Troller, 2011). Evidence consistently indicates there is a symbiotic relationship between reducing inequities in health and addressing disparities in child education and academic achievement (Basch, 2011; Fiscella and Kitzman, 2009; Center for Society and Health, 2014). Identifying the mechanisms linking obesity to academic achievement in children is becoming an urgent research concern, one that schools, school systems, and policy makers have an interest and investment in, given the connection between cognition and academic performance.

Student achievement and healthful behaviors are closely tied. Janak, Gabriel, Oluyomi, Perez, Kohl, and Kelder (2014) found that a healthy body mass index and a high fitness status are associated with higher academic achievement. Further, in an

analysis of the National Longitudinal Study on Adolescent Health, Resnick et al (1997) found that students who felt connected to school and supported by families were less likely to participate in health-risk behaviors, such as substance abuse and sexual activity. Researchers have found that attention to students' health and well-being and involvement in school have been shown to have a positive effect on self-esteem and perceptions of the future (Duke et al, 2011; Peterson, Cooper, and Laird, 2009).

Schools are required to adhere to state and federal policies related to both educational outcomes and wellness policies. Missing from this discussion is whether there is any relationship between educational outcomes and wellness policies. The purpose of this study is to understand the association between the time spent in physical education and math proficiency scores at the elementary school level. We hypothesize that as minutes of physical education increase there will be an increase in math proficiency scores.

Setting

During the 2012-2013 academic year, 80,231 students were enrolled in over 200 schools in the DC school system, with 57% of students enrolled in traditional public schools and 43% of students enrolled in public charter schools. Demographically, 73% of students were black, 16% were Hispanic, 8% were white, and 3% identified another race or ethnicity. Of the students enrolled in the District, 76% were eligible for free or reduced price meals. For this cross-sectional study of school health environment data, academic achievement, and demographics, only data from elementary schools were used. School-level analyses were completed in R, the statistical analysis software (Development Core Team, 2011).

Methods

The study team has access to a cross-sectional study of school health environment data and student health, health knowledge, academic achievement, and demographic data. These data and their sources are presented in Table 1. The School

Health Profile (SHP) is a self-report survey measure, completed by the school principal or his/her designee annually. The SHP includes items related to each of the provisions of the HSA, including items related to the nutritional components of the school menu, minutes allocated toward Physical and Health Education, curricular alignment with the city's health standards, and the presence of a school garden. The items from the School Health Profile are then aggregated into a school health composite score. To assess the implementation and impact of the HSA, a compliance score for each school was created ranging from 0 – 38 using the School Health Profile. Figure 1 illustrates the components that make up the compliance score. The compliance score indicates the strength of the policy implementation at the school level. The compliance score range is 0 – 38, and the mean compliance score for DC public schools and DC public charter schools is 23 and 25, respectively. Data also include school-level data from the reading, math, and health education components of the DC Comprehensive Assessment System (DC CAS).

The DC CAS is a standardized test is used to measure reading and math knowledge in DC schools. This test has been replaced by the PARCC as of the 2014-2015 school year. The score was obtained from the State Agency that conducts the annual standardized exam. The score is part of DC's standardized test, the DC Comprehensive Assessment System (DC CAS) ("DC CAS | osse," n.d.). The math and reading components were administered to students in grades 2 - 10 in the spring of each school year from 2006 to 2014, and the State Agency reports the percent of students at each school who score proficient or above proficient on the test. School level data provide information on the percent of students performing at four performance levels: advanced, proficient, basic, or below basic. Use of standardized measure of reading and mathematics as a proxy for student academic achievement have been found to be associated with increased physical activity in other studies (Davis et al., 2011). We have constructed a relational database to organize these data and make use of STATA, the statistical analysis software, to undertake exploratory analyses when possible. Data are organized at the school level.

Results

As part of the HSA, DC became the first school system in the nation to use a system-wide standardized assessment for health and physical education knowledge. Table 2 presents the percent of children who achieved proficiency in the health knowledge component of the DC CAS. The data for both groups is generally flat, showing almost the same percent of students performing at the proficient level in each area of the assessment. The low percentages of scores at the proficient level for personal health (including awareness of sexually transmitted diseases) and nutritional awareness may indicate a lack of knowledge of this important information. Also remarkable are the generally low percentages of 8th graders who seemed to understand the importance of physical activity. In general, we find that schools have been successful in reaching the nutrition guidelines, offering a standardized health and physical education curriculum, and farm-to-school activities. However, schools have not been successful in offering the minutes of physical or health education as mandated by the Act.

In Figures 2 and 3, we present a visual representation of the relationship between compliance score and student achievement. The vertical axis represents the percentage of children at each school who performed at the proficient level for either reading (Figure 2) or math (Figure 3) on the annual standardized assessment. The horizontal axis presents the school health compliance score for elementary schools. Each of the dots on the graph represents the intersection between these two data points for each school. We also fit regression lines to show the general relationship between these two variables. Although the regression is not statistically significant, we see a generally positive relationship between these two variables. This positive correlation is consistent across demographic groups.

Finally, Figure 4 illustrates the relationship between the percent of children eligible for Free and Reduced Prices Meals (FARM) and the compliance score. We present this figure to illustrate two points: 1) DC is home to two distinctly different types of schools relative to this demographic, with the majority serving a large

percentage of children who are eligible for FARM and 2) that the variability relative to the provisions of the HSA seem relatively even among these two groups. The effect of this particular finding is that schools that serve children on the higher and lower ends of the socioeconomic spectrum in DC are about the same relative to providing healthy foods and access to PE. However, the effect of the limited provision of the requirements of the HSA might be more profound in schools where children must rely on the system for food or access to healthy options. For example, in schools were 60% or more of the children are eligible for FARM, they receive breakfast, lunch, a snack, and dinner from the school meal program. These children rely on the school system for the majority of their nutritional intake – the lack of quality foods as a much more significant effect on these children's diets than for those children who do not have to depend on the school lunch to combat hunger.

Scholarly Implications of the Study

Although this research and others demonstrate a relationship between health and academics, there is often little attention given to the intersection between these important issues. Ruglis and Freudenberg (2010) suggest that segmentation between the educational and health systems result in a lack of attention and focus on the reciprocal relationships between health and school achievement. Schools should be central, not only fostering academic development, but also providing students with comprehensive health supports, from food to violence prevention programs to health clinics to health education. In order to meet the demands of current initiatives related to student achievement and to create healthier school environments, schools will have to work in the cafeteria, on the playground, and in classrooms to increase awareness of health issues, practice health behaviors, and to develop academic programming that addresses core subjects integrated with health knowledge and practice. Further, in order to invest the time and effort required to make school-wide changes in the school health environment, school leaders must be convinced that these changes will reap benefits in the classroom as well as in the long term health of the children.

Limitations of this research include any selection bias in the results – our findings do not control for the nonrandom assignment of children into schools. We did attempt to control for percent of free and reduced lunch participation. The implications of this selection bias include the fact that children who perform better on assessments like the DC CAS may be enrolled in schools that have greater compliance with the HSA, and that the relationships we find may be due to this nonrandom assignment. However, another limitation is that this was a cross-sectional design and these results cannot be generalized outside of the DC area. Further, this school-level study does not account for variability in children's health and academic performance. Other limitations include the data reported through the School Health Profile is entirely self-reported data with no external verification. A final limitation is that the study only looked a quantity of physical education and not the quality of the instruction.

A comprehensive approach that includes multiple levels of influence and various elements of health (i.e. nutrition and physical activity as opposed to an isolated intervention) is most likely to be effective in managing children's weight (Katz, O'Connell, Njike, Yeh, & Nawaz, 2005). This is further supported by a study that showed a positive correlation between reported health assets such as healthy weight, physical fitness, fruit and vegetable consumption, participation in exercise, food security, family meals, etc. and improved performance on standardized tests for reading, writing, and mathematics (Ickovics, et al., 2014). The current study demonstrates that a comprehensive assessment of the health environment is necessary to evaluate the effects of the policy on children.

Obesity and poor health is not affected by a single cause; therefore, it is necessary to address various components that contribute to one's health decisions such as the surrounding environment, access to physical activity and foods, community norms, etc. Many behavior theories lend themselves to this idea including Social Cognitive Theory, Precede/Proceed Model, Behavioral Ecological Model, and Bronfenbrenner's Ecological Systems (Lohrmann, 2008). The concept of an ecological approach within the school setting addresses the various policy, school, and community

agencies that play a role in the organization and success of these components (Lohrmann, 2008). The Centers for Disease Control and Prevention (CDC) encourages this type of programming with the outlined components of a coordinated school health program including: health education, physical education, health services, nutrition services, counseling, psychological, and social services, healthy and safe school environment, health promotion for staff, and family/community involvement (CDC, 2013).

Although this study contributes to well-established research that demonstrates the negative effects of poverty on academic achievement, there is greater need to examine the relationship of, or controlled for, race, ethnicity or socioeconomic status to physical activity levels and student performance at the student level. Studies indicating the link between physical activity and student academic performance are similar to the study by Coe et al. (2006) who measured middle school-aged children where the average family income was higher than the state income. The longitudinal Maryland Adolescent Development Context Study used a study sample where 67% of the students were African American and 33% were European American (Fredericks and Eccles, 2006). Participation in school and extracurricular activities, such as sports, was a significant predictor of improved academic results and expectations. Specifically, sports participation by eighth-grade African-American boys resulted in goals to attend college and improved classroom behavior. Similar results were observed in female students and a reduction in absenteeism was also observed (Hawkins and Mulkey, 2005). While the current research links the health environment to academic success, other aspects of healthy behaviors, such as diet, knowledge of health, and the combination of physical activity and other variables, needs to be further explored.

Tables and Figures

Instrument	Description	Sample Variable
School Health Profiles Every January beginning in 2011	Describes the school health environment.	Minutes of physical education Minutes of health education Existence of a School garden
DC Health Full implementation: May 2012	Assessment of health education knowledge for 5, 8, 10 grades.	Test score for each grade level at each school.
DC Comprehensive Assessment System (CAS) Every Spring	Academic Student Achievement in reading, writing, math and science test scores	Percent students passing the comprehensive assessment exam
Annual Enrollment Data Ongoing	Student demographics	Student enrollment data. Number of students eligible for free or reduced lunch

Table 1: Data Sources

Year	**Emotional Health**	**Safety Skills**	**Human body & personal health**	**Disease Prevention**	**Nutrition**	**Alcohol, Tobacco & other drugs**	**Healthy Decision Making**	**PE**
5th Grade								
2012	77%	66%	44%	66%	70%	52%	59%	63%
2013	78%	66%	45%	66%	72%	52%	59%	65%
8th Grade								
2012	76%	68%	58%	70%	50%	64%	70%	51%
2013	76%	66%	59%	71%	50%	64%	71%	55%

Table 2: DC CAS Health Scores for 5th and 8th Graders

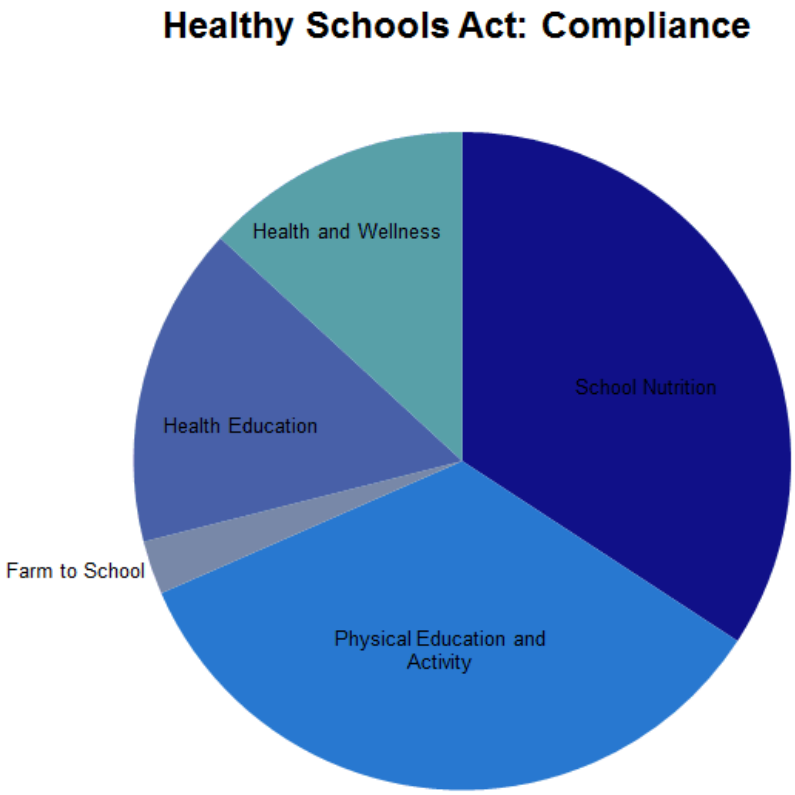

Figure 1: Elements of the Compliance Score

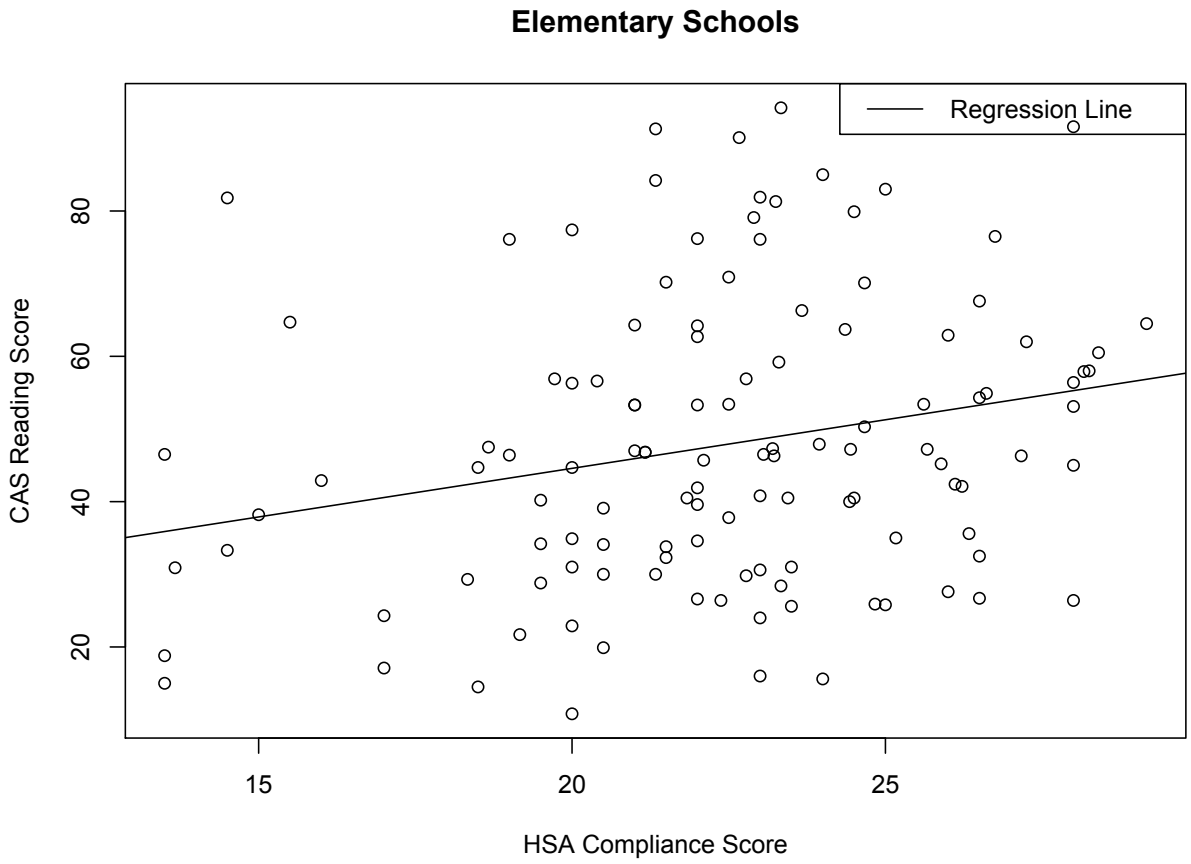

Figure 2: DC CAS Reading Score and HSA Compliance Score for Elementary Schools

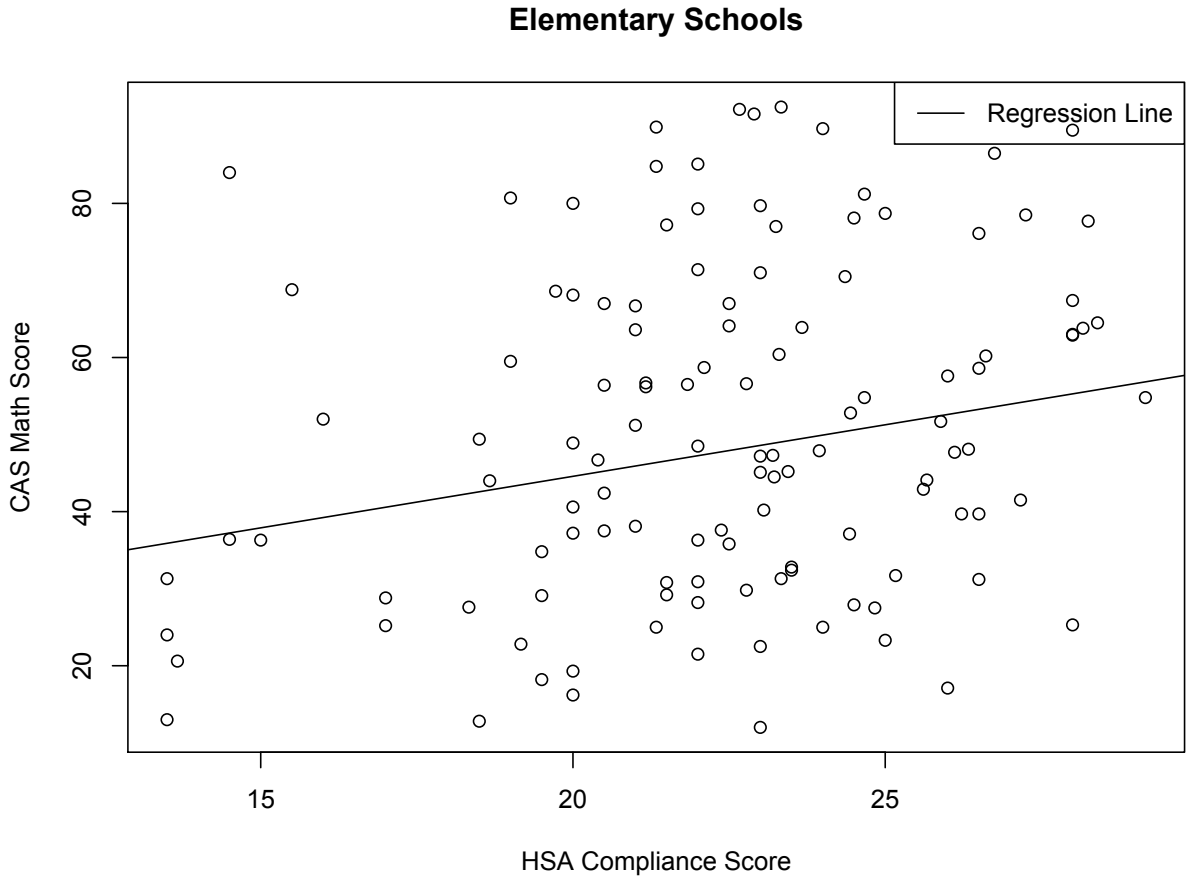

Figure 3: DC CAS MATH Scores and HSA Compliance Score for Elementary Schools

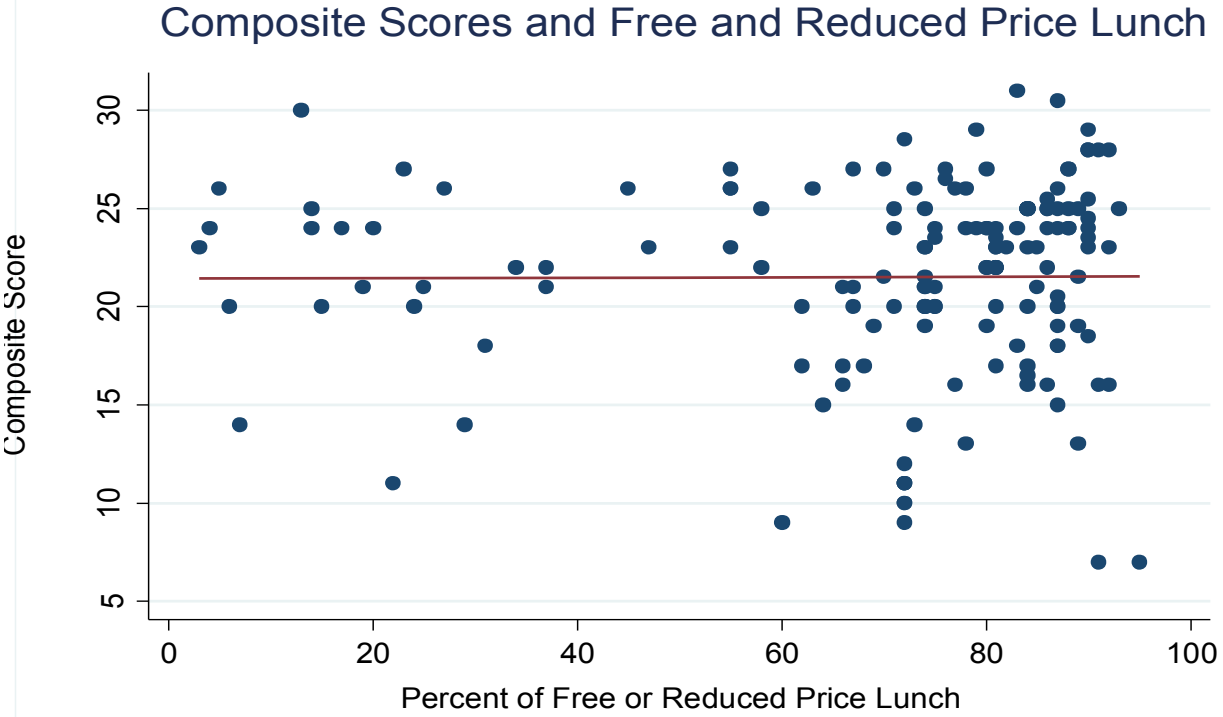

Figure 4: Compliance score and percent of children eligible for FARM

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