"Obesity Preventative Measures for Adolescents Through Physical Activity in Washington State"

2025 WTN Youth Science Competition

Program and Policy Design

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Problem Identification

According to the National Institute of Health (NIH), obesity increases the chance of type 2 diabetes, heart disease, fatty liver diseases, some cancers, and pregnancy, fertility, and mental health problems, among others (2023).

This problem can start early as a result of many environmental factors, and research has shown that around 80% of obese adolescents will still be obese in adulthood (Simmonds et al., 2016). Therefore, preventing childhood obesity can be greatly beneficial for the children as they mature into adults.

Research correlates how more exercise can affect weight loss in a positive manner. The following cluster chart uses data from the NSCH (National Survey of Children's Health) to represent the obesity percentages and the days of exercise per week (60 minutes) in adolescents in regards to HRSA (The Health Resources and Services Administration) regions.



Figure 1: BMI and Days of Exercise (60 min) per Week for Adolescents (6-17) v. HRSA Region (2022-2023). Data from Data Resource Center for Child and Adolescent Health.

Chart made using Excel.

If we take the HRSA regions with the most and least percentage of adolescents (VI and VIII), we can see how the percentages correlate in Figure 2. HRSA Region VIII, which has the least

percentage of obese adolescents (light purple) does more exercise per week than adolescents in region VI (dark purple).



Figure 2: HRSA Region VI v. HRSA Region VIII Regarding Obesity and Days of Exercise (60 min) in Adolescents (6-17) (2022-2023). Data from Data Resource Center for Child and Adolescent Health.

Chart made using Excel.

Washington is in HRSA Region X with an obesity percentage of 14.9 and \sim 46.9% of adolescents getting lower than the recommended amount of exercise. The following charts show Washington's individual statistics with a C.I (Confidence Interval) of 95%. It is evident that our state struggles with obesity and making sure our children get the appropriate amount of exercise.

	Underweight (less than 5th percentile)	Normal weight (5th to 84th percentile)	Overweight (85th to 94th percentile)	Obese (95th percentile or above)		0 days	1-3 days	4-6 days	Every day
%	9.9	62.7	12.5	14.8	%	8.4	41.5	33.4	16.7
C.I.	7.4 - 13.2	58.3 - 66.9	10.0 - 15.6	11.8 - 18.5	C.I.	6.4 - 10.9	37.2 - 45.8	29.5 - 37.6	13.9 - 20.1
Sample Count	72	537	106	104	Sample Count	78	328	298	151
Pop. Est.	105,069	665,608	133,172	157,384	Pop. Est.	94,230	466,976	376,650	188,626

Figure 3: Weight status of adolescents (6-17) in Washington State (2022-2023). Data from Data Resource Center for Child and Adolescent Health.

Figure 4: # of days per week a % of adolescents (6-17) exercised, played a sport, or participated in physical activity for ≥60 minutes in Washington State (2022-2023). Data from Data Resource Center for Child and Adolescent Health.

One important factor in making sure children get adequate exercise habits starts in school. The following 2 maps show the BMI of ages 16-19, as well as the percentages of adults who have not graduated high school.



Figure 5: BMI in Washington State. Data from Washington Tracking Network. Figure 6: % of adults without a high school diploma in Washington State. Data from Washington Tracking Network.

It is clear, from these two maps, the correlation of obesity and percentage of children who have not graduated high school. This represents how paramount school is to the health of the people in Washington. Hence, when crafting our policy, we have decided to use schools in order to make sure all children get access to safe areas to exercise.

Proposed Solution

Our policy includes the following:

- Each school zone is required to have ≥1 public playground/gym. This can be included as part of the school.
 - If there is not an adequate amount of space, facilities can be used interchangeably as long as the space poses no risk to any student's physical health.
 - The school must provide an adequate amount of equipment to meet all the state fitness requirements whatever they may be.
- The required amount of recess each school week increases to 200 minutes.
 - One school week in Washington State is equivalent to 5 days.
 - An additional 50 minutes added toward the required amount of 150 minutes per school week (30 per day) required by the senate.
 - This is to match CDC's (The U.S. Center for Disease Control and Prevention) recommendation of 60 minutes of exercise per day (300 minutes per school week) (2024). Assuming that schools are also following RCW 28A.230.040, stating that 100 hours of physical education are required per week, this will successfully meet the 300 hours per week recommendation.
- Each school is required to have an indoor recess program that must be put in place when outdoor recess is not possible (at administration discretion).
 - Indoor recess requirements are the following:
 - Incorporation of aerobic, strength training, and flexibility exercises.
 - \rightarrow 3 of every 5 indoor recesses must involve strength training exercises as per CDC recommendation (2024).
 - Indoor recess may take part in a school gymnasium, hallway, classroom, cafeteria, or any open space within the school that can be safely utilized.
- Junior high and high schools are required to have ≥1 non-cut after-school sports team in place per season for each sex. Co-ed sports count as one for both.
 - \circ This is to ensure kids that want to be active have the opportunity to, despite skill.
- Public park/gym requirements per county based on population (current public parks/gyms count towards the total number):
 - \leq 5,000 people = \geq 4 public parks/gyms.
 - For every consecutive 5,000 people, 10 public parks/gyms are required to be installed.
 - Each park/gym is required to be ≥4300 sq feet large. If 9,700+ sq feet, it may count as 2 parks/gyms; however, more than 50% of the required park/gyms must be "different" in order to maintain greater location variety.
 - Each public park/gym must be regularly maintained on a minimum 1-month basis.

Impact

Obesity affects one's ability to experience a healthy life. Change in school can prevent obesity levels from rising from childhood. Providing facilities and opportunities for children to exercise ensures people lead healthier lives from early on to adulthood.

Higher exercise levels improve the quality of life. Without health complications, people can focus on other issues, and productivity will improve with healthier bodies. Additionally, the National Institute of Health discovered that "65% of patients admitted to the hospital for general medical conditions were overweight (34%) and obese (31%)" (Hossain et al., 2018). Lower obesity levels will decrease hospitalizations, and thus hospitals will be able to use their resources elsewhere. In response, healthcare costs will also decrease.

Restructuring recess will boost a child's performance. According to the School of Education, recess improves the memory storage of nerve cells, and children have greater attention span and memory span (2020). Recess also improves social well-being, problem-solving, and negotiation skills.

Social Significance

Obesity limits one's ability to live a healthy life. The National Institute of Health stated that being overweight or obese can jeopardize self-esteem due to the stigma around obesity (Segal & Gunturu, 2024). Obese people are more likely to seclude themselves from society. The mix of a negative personal image, health problems, and societal views pushes many to depressive and overly anxious emotions. This is detrimental for a community. Improving health can aid in reintegrating people back into a community. Healthier bodies also mean more mobility and a longer lifespan. Society will be greatly impacted by a healthier community.

Equity

According to the National Institute of Health (NIH), women have higher obesity rates than men (2022). To provide for both sexes, no-cut teams for both sexes will be provided by all schools. Additionally, since school is a mandated for all children, this enables all students to have the opportunity to play on a team regardless of their background – such as sex, financial situation, skill, and location. Likewise, additional time for recess will be provided for all schools and so children. Children will be given equal access to school, which is why change was emphasized greatly in schools rather than other establishments not all children may have access to.

All parks have a minimum size-ensuring all parks have a minimum size regardless of population. However, to acknowledge the differing populations within Washington, larger parks may be established to provide for larger amounts of residents. Additionally, to offer a play structure to all residents, our policy will encourage schools to open their pre-existing playgrounds for public use. To accommodate for all residents, regardless of their location, status, or characteristic, parks will be provided for everyone based upon the "10 public parks per 5000 residents" notion. Therefore, distance will not be an issue since there will be parks spread out based on population numbers. Overall, we tried to incorporate as much equity as we could into our policy.

Process Reflection

We have decided to target obesity as it is a growing concern among many residents in the U.S. After doing some research, we decided to niche down into adolescents as it also relates to us more. There were many interesting things we could have tackled as we found data for how sleep, food quality, and parents affect children's obesity rates. We thought of ideas including: parents getting funding for specific grocery items only (vegetables + fruits), wider and safer sidewalks regulations, and requirements based on neighborhoods. However, we decided the first one would be too unrealistic and complicated. The second idea wouldn't make much of an impact for the effort required, and the third idea wouldn't be equitable as not every family lives in a neighborhood, and those that do, are typically more privileged. Eventually, we found that a lot of our ideas related to physical activity, so we decided to focus more on that.

Additionally, we also had a lot more ideas related to schools. We initially planned to do more with the school zones like enforcing stricter speed limits, sidewalk regulations, and perhaps making them larger. However, we concluded that those were probably improbable. Regarding the recess policies, we also thought about adding 1 hour before and after school where administrators are required to supervise the playground for any kids willing to play, but decided to scrap that idea because it was expecting a lot from the school, it is hard to enforce, and it wouldn't benefit the kids that go on school buses and/or live further away. We have also decided to make the recess requirement per week and not per day in order to prevent too much scheduling hassle.

For the public park/gym requirement, we decided to go with population rather than location as some of the largest counties have a lower population. Often, the largest counties are more rural (Garfield, Columbia, Ferry) and the smaller ones are more urban (King, Snohomish, Pierce). This trend was found using USA.com, but since we couldn't confirm when and how the data was collected, we didn't use the site for anything else. The following is a projected census for 2024 from the U.S. Census Bureau.

Adams County, Washington	21,039
Asotin County, Washington	22,523
Benton County, Washington	218,190
Chelan County, Washington	81,228
Clallam County, Washington	77,958

Clark County, Washington	527,269
Columbia County, Washington	4,025
Cowlitz County, Washington	113,982
Douglas County, Washington	45,795
Ferry County, Washington	7,543
Franklin County, Washington	101,238
Garfield County, Washington	2,404
Grant County, Washington	104,717
Grays Harbor County, Washington	77,893
Island County, Washington	86,478
Jefferson County, Washington	33,944
King County, Washington	2,340,211
Kitsap County, Washington	281,420
Kittitas County, Washington	48,172
Klickitat County, Washington	24,124
Lewis County, Washington	87,049
Lincoln County, Washington	11,862
Mason County, Washington	69,632
Okanogan County, Washington	44,942
Pacific County, Washington	24,245
Pend Oreille County, Washington	14,332
Pierce County, Washington	941,170
San Juan County, Washington	18,668
Skagit County, Washington	132,736
Skamania County, Washington	12,660
Snohomish County, Washington	864,113
Spokane County, Washington	555,947
Stevens County, Washington	49,015
Thurston County, Washington	302,912
Wahkiakum County, Washington	4,800
Walla Walla County, Washington	62,068
Whatcom County, Washington	234,954
Whitman County, Washington	48,399
Yakima County, Washington	258,523

Community playgrounds are usually 4,300-9,700 square feet and public parks are usually more than 9,700 square feet ("Playground Sizes," n.d.). If we count every 45 square feet as one child/adult, the minimum capacity is ~95 people. Rounding that up to 100, we figured 1 park for every 500 people would be a good number as people can go to parks/gyms at different times. Because population is volatile, just saying 1 park for every 500 people is a lot of work and not the most effective way of doing things. We were originally planning on adding benchmarks, but

that came to be incredibly wordy and long, so instead, we just went with 10 parks for every 5,000 people.

Overall Reflection

Process-wise, this definitely took a lot of patience. The file somehow crashed during school, and we lost four paragraphs of writing. Sophia's laptop crashed a few times from running so many windows at once, and it was a hassle getting data because of how specified our age-group was. Throughout all of this, we have supported each other.

Nowadays, both online and in-person, we have seen many instances of fat-shaming and hate towards obese people. Many people do not understand how hard it is to break from that cycle of overeating and instead resort to judging. We personally know some people who have run into many problems being overweight, and rather than hating them, we were inspired to suggest some policies that could be helpful. Getting better habits when younger can help many people never experience the pain of being obese in the future.

This project was fun to make, and we both learned a lot from what we have researched. We learned how much thought it takes to form any policy – there are so many perspectives, ideas, and reality checks needed. In the end, we are pretty sure we haven't even scratched the surface, and this policy could deficiently need more refining. Being healthy is a privilege and it's easier for certain people compared to others: many have diseases, are disabled, or simply cannot afford to spend their time exercising. A lesson we will take into the future is simply the multi-faceted nature of life. We cannot criticize the government for things we do not fully understand, and we cannot judge others who are living in a situation we do not know.

AI Reflection

No AI was used in the making of this project as it was deemed unnecessary.

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