Multivariate Analysis Of School District Wellness Policies And High School Practices On Adolescent Obesity

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Timeline- Utah & U.S. Efforts

2001-2005

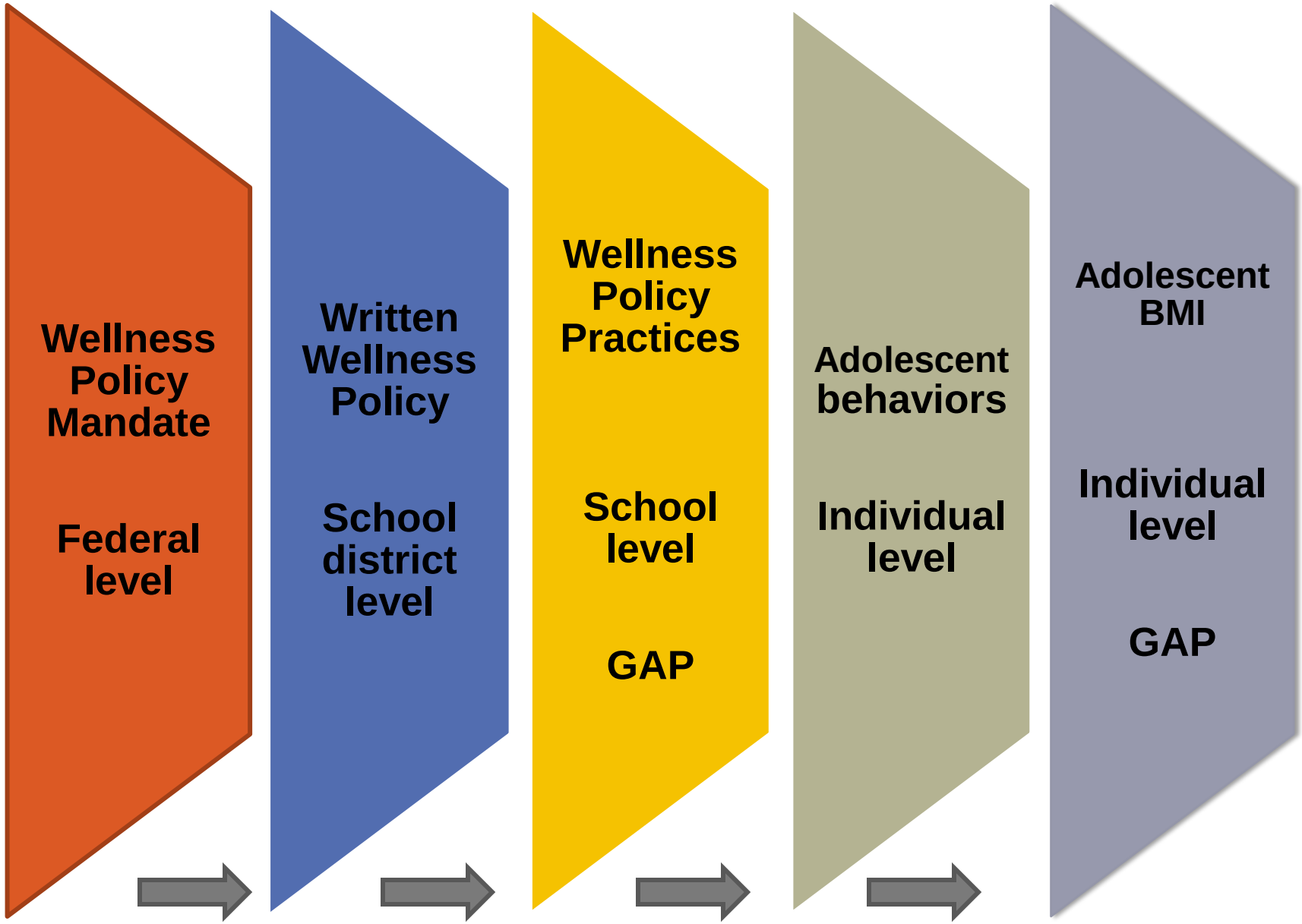
- Surgeon General's Report on Obesity in the United States
- IOM Report: Preventing Childhood Obesity
- Coalitions such as Action for Healthy Kids
- State Legislation Efforts- PE & Vending

2006-2008

- Federal Wellness Policy Mandate for School Districts
- Superintendent and Principal Education and Training
- District Wellness Policy Committee Participation
- Evaluation of Policy Content

2009-2012

- Association of Policy Content to Adolescent Obesity
- Teacher Focus Groups
- *Implementation (School Practices) and Adolescent Obesity*
- Adult Obesity Prevention Practices by Neighborhood and Adolescent Obesity


Wellness Policy Mandate
Federal level
Written Wellness Policy
School district level
Wellness Policy Practices
School level
GAP
Adolescent behaviors
Individual level
Adolescent BMI
Individual level
GAP

Are High School Practices Associated With Adolescent Overweight and Obesity?

Tools

1. Utah Population Database
2. School Health Profiles (*Profiles)* for each Utah high school post wellness policy deadline (2008)
3. Common Core of Data information on each Utah high school
4. School district wellness policy information from prior study
5. School district boundary maps

Covariates

Individual

age, sex, race, ethnicity, BMI

Maternal/Family

age, marital status, race, ethnicity, education level, BMI

School Characteristics

rurality, enrollment, race/ethnicity of student population, proportion eligible for free and reduced price lunch, (FRPL) school season

School Practices and School District Policies

competitive foods, PE exemptions, classroom topics, staff development and collaboration, district wellness policies

Methods

1) Obtained high school boundary maps from school districts

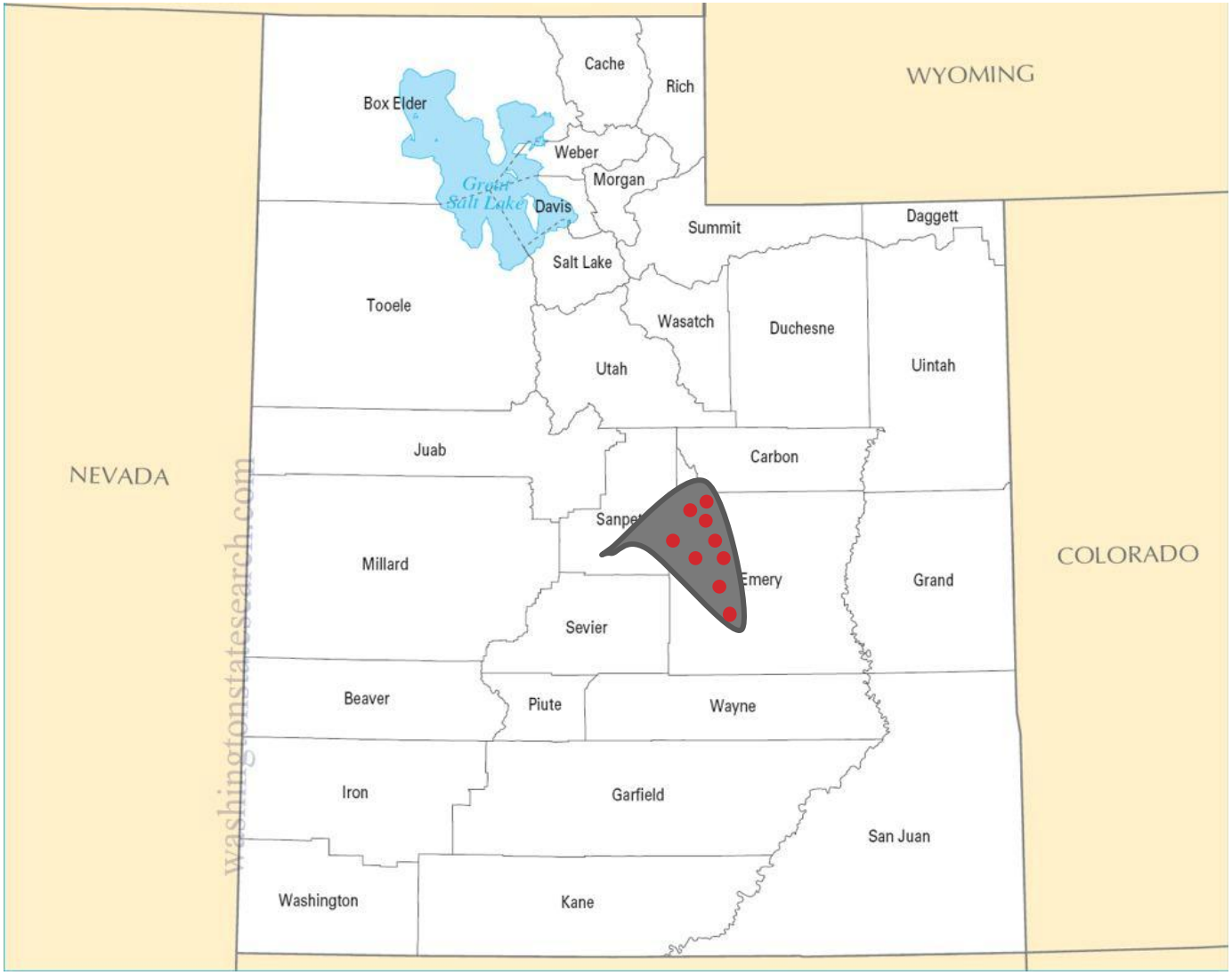
2) Mapped high school boundaries

3) Placed adolescents in high school boundaries using UPDB address

4) Each geo-coded student was then linked to the results of *Profiles* based on school boundary and the school calendar year they received their license

5) Bivariate and multivariate analyses of individual, family, school characteristics, school practices and adolescent BMI

   -Multinomial logistic regression using Huber-White sandwich estimator to adjust for clustering



n= 51,162 adolescents, ages 15-19

Characteristics of Utah High School Population, 2008

	Mean or %	SD	10%ile	90%ile
Race/ Ethnicity				
% Black	1.1	1.4	0.0	2.6
% Pacific Islander	1.0	1.0	2.0	1.3
% American Indian	5.3	1.7	0.2	7.7
% Asian	2.5	2.7	0.0	6.1
%Hispanic	10.6	1 1.4	1.7	2.6
%White	80.3	19.4	54.2	94.8
% Rural	36.9	NA	0.0	1.0
Free & Reduced Price Lunch (proportion eligible)	32.5	19.6	4.2	98.5
Student Enrollment	1010.9	741.7	116.0	1950.0

Unadjusted Risk Ratios And 95% Confidence Intervals From Multinomial Regression Of the Likelihood Of Being Overweight Or Obese By School Practices, n= 51,126.

School Practice	Overweight RR (CI)	p-value	Obese RR (CI)	p-value
Students can purchase fruits & vegetables				
Yes	0.86 (0.80-0.92)	0.001	0.81 (0.73-0.90)	0.001
No	1.0		1.0	
Intramural sports are available at school				
Yes	0.86 (0.81-0.93)	0.001	0.83 (0.75-0.92)	0.001
No	1.0			
Student can be exempt from PE for another class				
Yes	1.12 (1.03-1.21)	0.001	1.15 (1.01-1.31)	0.03
No	1.0			

Adjusted Risk Ratios And 95% Confidence Intervals From Multinomial Regression of the Likelihood of Being Overweight or Obese by School Practices, n= 51,126.

School Practice	Overweight RR (CI)	p-value	Obese RR (CI)	p-value
Students can purchase fruit/veg				
Yes	0.50 (0.13-1.79)	0.29	1.08 (0.23-5.07)	0.92
No	1.0		1.0	
Intramural sports are available at school				
Yes	1.10 (0.13-9.5)	0.93	2.68 (0.23-2.83)	0.41
No	1.0		1.0	
Student can be exempt from PE for another class				
Yes	0.87 (0.73-1.03)	0.11	0.76 (0.61-0.95)	0.02
No	1.0			

Adjusted Risk Ratios and 95% Confidence Intervals From Multinomial Regression of the Likelihood of being Overweight or Obese by Individual Attributes, n= 51,162.

Individual Attribute	Overweight RR (CI)	p-value	Obese RR (CI)	p-value
Sex				
Female	1.0		1.0	
Male	1.41 (1.23-1.62)	0.001	2.23 (1.87-2.66)	0.001
Race				
White	1.0		1.0	
Black	3.80 (1.37-10.48)	0.01	3.03 (0.82-11.19)	0.57
American Indian	1.73 (0.80-3.74)	0.16	2.04 (0.91-4.80)	0.02
Pacific Islander	1.51 (0.99-2.30)	0.001	1.96 (1.26-3.04)	0.001
Ethnicity				
Non-Hispanic	1.0		1.0	
Hispanic	1.29 (0.96-1.72)	0.09	1.47 (1.05-2.06)	0.03

Adjusted Risk Ratios And 95% Confidence Intervals From Multinomial Regression Of The Likelihood Of Being Overweight Or Obese By Maternal Attributes, n= 51,162.

Maternal Attribute	Overweight RR (CI)	p-value	Obese RR (CI)	p-value
Marital Status				
Married	1.0		1.0	
Not Married	1.35 (1.23-1.49)	0.001	1.46 (1.29-1.65)	0.001
Education				
<12 yrs	1.24 (0.98-1.58)	0.06	1.40 (0.99-1.77)	0.22
12-14 yrs	1.0		1.0	
15-16 yrs	0.94 (0.80-1.10)	0.43	0.83 (0.60-1.01)	0.83
>16 yrs	0.85 (0.69-1.04)	0.11	0.74 (0.57-0.96)	0.02
Age				
<20 yrs	1.0		1.0	
20-29 yrs	0.94 (0.56-1.55)	0.80	0.81 (0.69-0.94)	0.005
30-39 yrs	0.89 (0.77-1.02)	0.09	0.79 (0.67-0.93)	0.004
>=40 yrs	0.84 (0.66-1.08)	0.17	0.81 (0.61-1.09)	0.169
Maternal BMI				
<25 kg/m^2	1.0		1.0	
25-30 kg/m^2	1.95 (1.65-2.29)	0.001	2.65 (2.17-3.24)	0.001
>30 kg/m^2	3.08 (2.54-3.76)	0.001	6.06 (4.88-7.52)	0.001

Adjusted Risk Ratios And 95% Confidence Intervals From Multinomial Regression Of The Likelihood Of Being Overweight Or Obese By School Characteristics, n= 51,162.

School Characteristic	Overweight RR (CI)	p-value	Obese RR (CI)	p-value
Free & Reduced Price Lunch				
<15%	1.0		1.0	
15-29%	1.05 (0.86-1.29)	0.62	1.51 (1.16-1.95)	0.001
30-50%	1.06 (0.69-1.60)	0.70	1.28 (0.76-2.16)	0.35
>50%	1.17 (0.82-1.68)	0.37	1.02 (0.67-1.56)	0.91
>70% Non-White				
Yes	1.15 (0.83-1.59)	0.39	1.43 (1.16-1.74)	0.001
No	1.0		1.0	

District Wellness Policy Content and Practices of High Schools in that District are Not Related

District Policy (mandate language)	**School Practice** (*Profiles*)	**X^2**	**p-value**
District has competitive food guidelines	Students can purchase candy in vending, school store or canteen	0.05	0.88
District has a PA policy for school breaks/after school activities	Intramural sports are available	0.00	1.0
District has a staff wellness training policy	Teachers received PA training	1.74	0.19
District has plans for policy evaluation	School has a health advisory group	0.78	0.38

Strengths and Limitations

Strengths

Large number of adolescents

Multiple covariates, making it possible to examine several potential determinants of overweight and obesity at individual, family, school and policy levels

Potential Limitations

Profiles survey

Assigned to school boundaries by address, not enrollment

Self reported weight

Limited to maternal characteristics to describe family

Conclusion

Overall, the implementation of PA and nutrition practices was not associated with overweight or obesity in Utah

Research

Develop tools that further evaluate wellness policy implementation

Assess practices pre- and post Healthy and Hunger Free Kids Act

Examine intersection of family and school settings for adolescents

Practice

Focus on implementation for the complex high school environment

Explore opportunities for including family in school policy and programs

Policy efforts should prioritize racial and ethnic minority youth at the highest risk of overweight and obesity

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