### SCHOOL-BASED LUNCH AND RECESS: THE IMPACT OF RECESS SCHEDULE ON CHILDREN'S NUTRITION AND PHYSICAL ACTIVITY BEHAVIOR

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# Biography

- Doctoral Candidate: University of Illinois
  - MS Kinesiology: University of Illinois
  - BS Sport and Exercise Science: Leeds Metropolitan University
- Research areas of Interest
  - School health policy and programming
  - Physical education
  - Children's physical activity and nutrition behavior



## **Overview of Presentation**

- Introduction to childhood obesity and school health promotion
- Current evidence based surrounding policies and practices in school environment
- Overview of project:
  - Methods
  - Analysis procedures
  - Results
  - Conclusions
- Overview of dissertation research



## **Obesity and Health Behaviors**



**Obesity Prevalence** 

Survey years

#### THE 2016 UNITED STATES REPORT CARD ON **Physical Activity for Children and Youth** 48.6 AGE 6-11 YEARS AGE 12-15 YEARS 42.5 36.1 AGE 16-19 YEARS 11.7 7.3 7.5 5.1 3.0 2.8 GIRLS OVERALL BOYS

Source: 2005-06 National Health and Nutrition Examination Survey. Physical activity levels were obtained by objective measurements using accelerometers.

ERCENT

# Median **Daily Vegetable Intake** Among Adults in the United States

CA



## **Health Behaviors in the School Setting**





## **Successful School-Based Interventions**

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- Multi-modal approaches to health promotion:
  - Modifications to school lunch menu; afterschool health club to promote physical activity (Bogart et al., 2016)
  - Curricular intervention to educate children on physical activity and nutrition (Fairclough et al., 2013; Hollar et al., 2010)
  - Removal of poor nutritional quality foods from lunch menu; scheduling additional time for physical activity (Marcus et al., 2009)



## Recess and Lunch: Current Practices and Policies

#### RECESS



- Contributes significantly to daily PA
- 8 out of 50 states require daily recess in K-5/6 setting
- Duration
  - At least 20 minutes per day
- Timing
  - Before lunch



## **Prior Research**

- Less plate waste and children more on task when recess scheduled before lunch (Getlinger et al., 1996; Hunsberger et al., 2014)
- Increasing recess-based physical activity:
  - Longer duration (Erwin et al., 2014)
  - □ Additional equipment (Verstraete et al., 2006)
  - Recess coaches/structured activities (Huberty et al., 2014; Erwin et al., 2014)
- No research conducted to assess impact of recess timing and duration on physical activity and nutrition



## **Aim and Hypothesis**

Aim: Examine interactive effects of lunch timing and nutritional intake on moderate-to-vigorous activity (MVPA), energy intake, and consumption of lunch items

Hypothesis: Relationship between contextual (recess/lunch timing and duration) and behavioral factors



Body Composition

## **Methods: Participants**

- □ Children in 4<sup>th</sup> and 5<sup>th</sup> grade
  - □ N= 128
  - Males= 49
  - □ Females= 79
- Low income school populations
  - □ 72% (school 1) and 52% (school 2) eligible for free/reduced lunch



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## **Methods: Lunch and Physical Activity**

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#### School Lunch/Plate Waste Quality

 Plate waste technique assisted by digital photography\*



Sharper Image® Precision Digital Food Scale



*Diagram taken from:* Washburn et al. Med Sci Sports Exerc.

- Data collected averaged over 5-day period
- Statistical Analyses
  - Pearson bivariate correlations (2-tailed)
  - Independent samples t-test (sex, recess time, school)
  - 2 X 2 ANCOVA (controlling for sex and BMI %ile for age)



## **Results: Example Lunch Trays**

#### **Pre-Consumption**



### **Post-Consumption**





## **Descriptive Data**

	Total (N=128)	Males (n=49)	Females (n=79)
	Mean±SD	Mean±SD	Mean±SD
BMI-for-age %tile	67.1±28.4	72.3±28.5	63.8±28.0
Sedentary Time, %	41.2±12.9	38.4±15.9	42.9±10.7
Light Physical Activity, %	30.2±7.8	30.3±8.0	30.1±7.6
Moderate Physical Activity, %	12.0±3.9	12.9±4.7	11.5±3.3
Vigorous Physical Activity, %	16.5±6.7	18.2±7.6*	15.5±5.9
Moderate to Vigorous Physical Activity, %	28.6±9.6	31.1±11.4*	26.9±7.9
Energy, kcal	335.7±96.0	357.9±99.1*	320.7±91.6
Sugar, g	7.3±4.9	7.9±4.8	6.9±4.9
Protein, g	13.9±7.5	16.0±7.8*	12.7±7.2
Carbohydrate, g	36.8±20.1	41.7±19.4*	33.7±19.9
Fat, g	9.1±5.6	10.3±5.4	8.4±5.7
Fruit, %	57.6±29.4	58.9±29.8	56.6±29.3
Vegetable, %	63.1±41.1	59.6±43.6	65.6±39.5
Milk, %	52.5±28.5	58.7±28.9	48.5±27.7
Entrée, %	71.9±22.7	78.2±21.6*	67.8±22.6

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### **Pearson Bivariate Correlations (2-tailed)**

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Sex (M=0; F=1)												
2. BMI Percentile	147											
3. Sedentary	.117	.035										
4. Light PA	.055	.120	399**									
5. Moderate PA	-1.88*	.054	728**	.190*								
6. Vigorous PA	188*	249**	656**	142	.709**							
7. MVPA	190*	152	716**	.257**	.780**	.808**						
8. Energy Intake (Kcals)	200*	.251**	.143	216*	071	.000	116					
9. Fruit (%)	.040	.116	016	047	.042	.079	.073	.276**				
10. Vegetable (%)	.072	008	.065	.066	074	145	132	.003	.090			
11. Entrée (%)	224*	.280**	.196*	075	.086	.077	.089	.708**	014	016		
12. Milk (%)	177	.223*	.011	121	219*	176	213*	. 410**	.330**	064	.182	



## **Results: Activity Difference by Sex**





### Results: Sex and Weight Status Drive Behavior

Coefficients						
	Sex (Male =0; Female =1)	BMI-for-age %tile	%MVPA	Energy Intake (Kcal)		
Sex (Male =0; Female =1)						
BMI-for-age %tile	147					
%MVPA	190*	152				
Energy Intake (Kcal)	200*	.251**	116			

\*= p<.05, \*\*= p<.01



### Results: Interaction Effects for Physical Activity

Recess Before Lunch

Recess After Lunch



% MVPA



## **Results: Main Effect on Energy Intake**





## **Results: Timing Effects**







#### **Recess Before Lunch**

#### **Recess After Lunch**



## Conclusions

- PA and Lunch intake related to recess/lunch timing and duration
  - Importance of contextual factors
- Shorter recess periods before lunch and longer recess periods after lunch promote greater PA
  - More favorable energy balance with recess after lunch
- Plate waste reduced when recess is before lunch
  Greater proportion of vegetables consumed when recess is after lunch
- Divergent with existing recommendations (USDA)



## **Aims Revisited**





## **Challenges to School-Based Work**

### Timing

- Fixed schedule and short time window to put accelerometers on participants
- Use of class time for child assent, surveys, and cognitive testing
- Variability in Environment
  - Schedule changes
  - Teachers not always present
  - Changes of testing location



## **Advantages to School-Based Work**

- Building a Strong Rapport
  - Including teachers in decision making
  - Respectful of schedules and routines
- Accessibility to a large sample
  - Transportation issues avoided
  - Work with more "generalizable" populations



## **Future Directions**

- Longitudinal research to examine temporal changes in behavior
  - Children gain weight over the school year
  - Impact of environmental factors can change
- Examining changes in school schedule and effects on diet/PA
  - Low-cost solutions are necessary
- Review of local and state policy to promote consumption of healthier foods and PA
- School settings may provide opportunities for sustainable means of promoting healthful behaviors



## Acknowledgements

#### Investigators

- Naiman A. Khan, Ph.D, RD
- Amelia Woods, Ph.D
- □ Kim Graber, Ed.D.

#### Graduate Students

- Caitlyn Edwards
- Alicia Covello
- Undergraduate Students
- Schools, Participants, and Teachers
  Champaign School District
- Department of Kinesiology and Community Health UIUC





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## **Dissertation Research**

- Role of physical education within comprehensive school health promotion environment
  - Urban schools in the Midwest nationally recognized by the Alliance for Healthy Generation's Healthy Schools Program
  - Mixed-methods case study
    - Physical activity assessment of students
    - Physical education curriculum assessment
    - Systematic observation of physical education lessons
    - School health policy analysis
    - Semi-structured interviews with key school stakeholders
    - Document analysis
    - Field notes



## **Thank You!**

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