

# The Impact of Policy and Environmental Outcomes on Youth Physical Activity

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# Presentation Overview

- Background and Significance
- The Impact of the Built Environment on Adolescent Physical Activity
- The Impact of Policies on Neighborhood Environments

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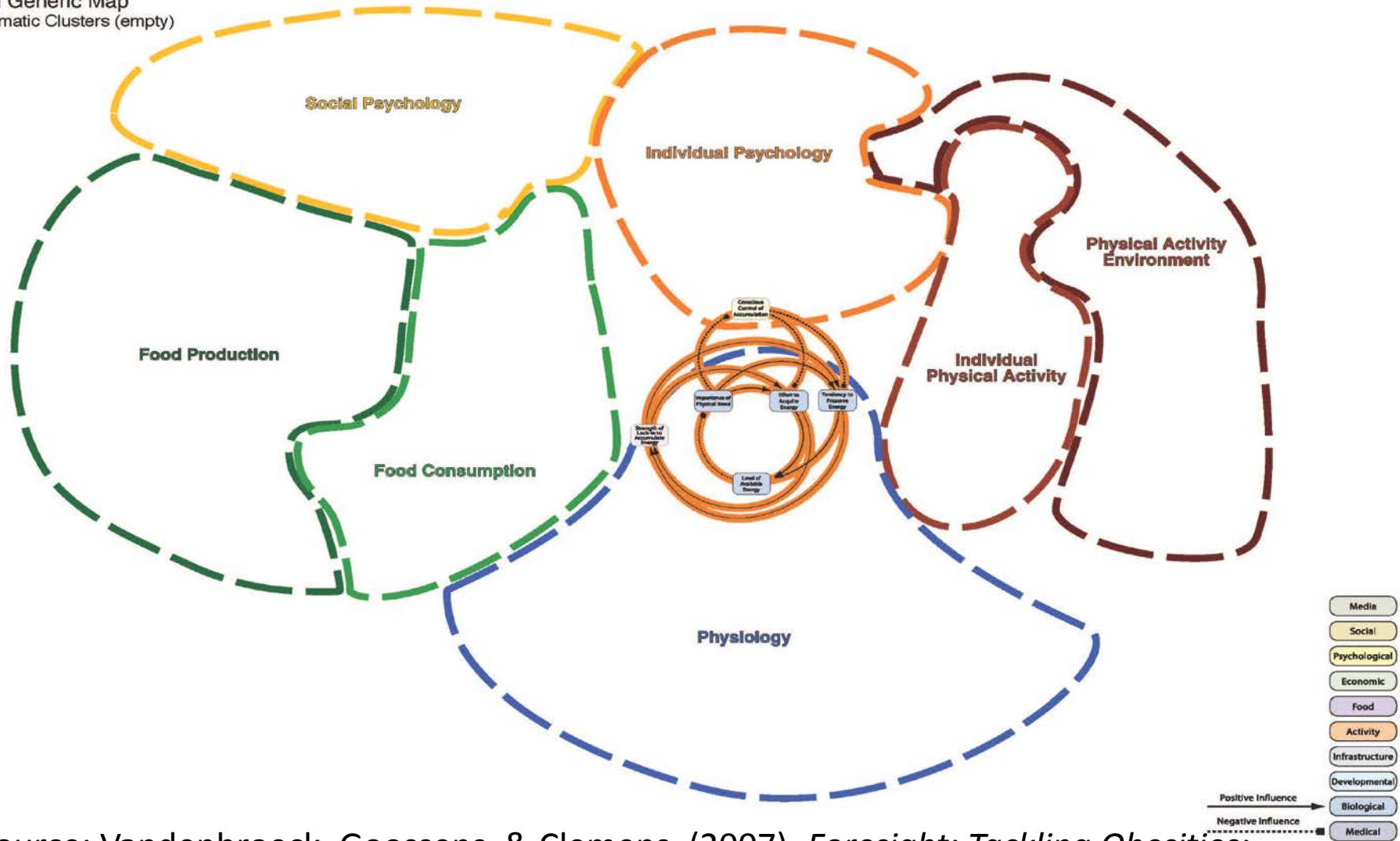
# Background and Significance

- 32 percent of youth are at risk of being overweight or overweight and prevalence of obesity increases as youths move into adolescence.
- 48 percent of boys and 35 percent of girls (aged 6-11) obtain 60 minutes of daily physical activity.
- 12 percent of boys and just over 3 percent of girls (aged 12-15) obtain 60 minutes of daily physical activity.

(Ogden et al. 2008; Troiano et al. 2007)

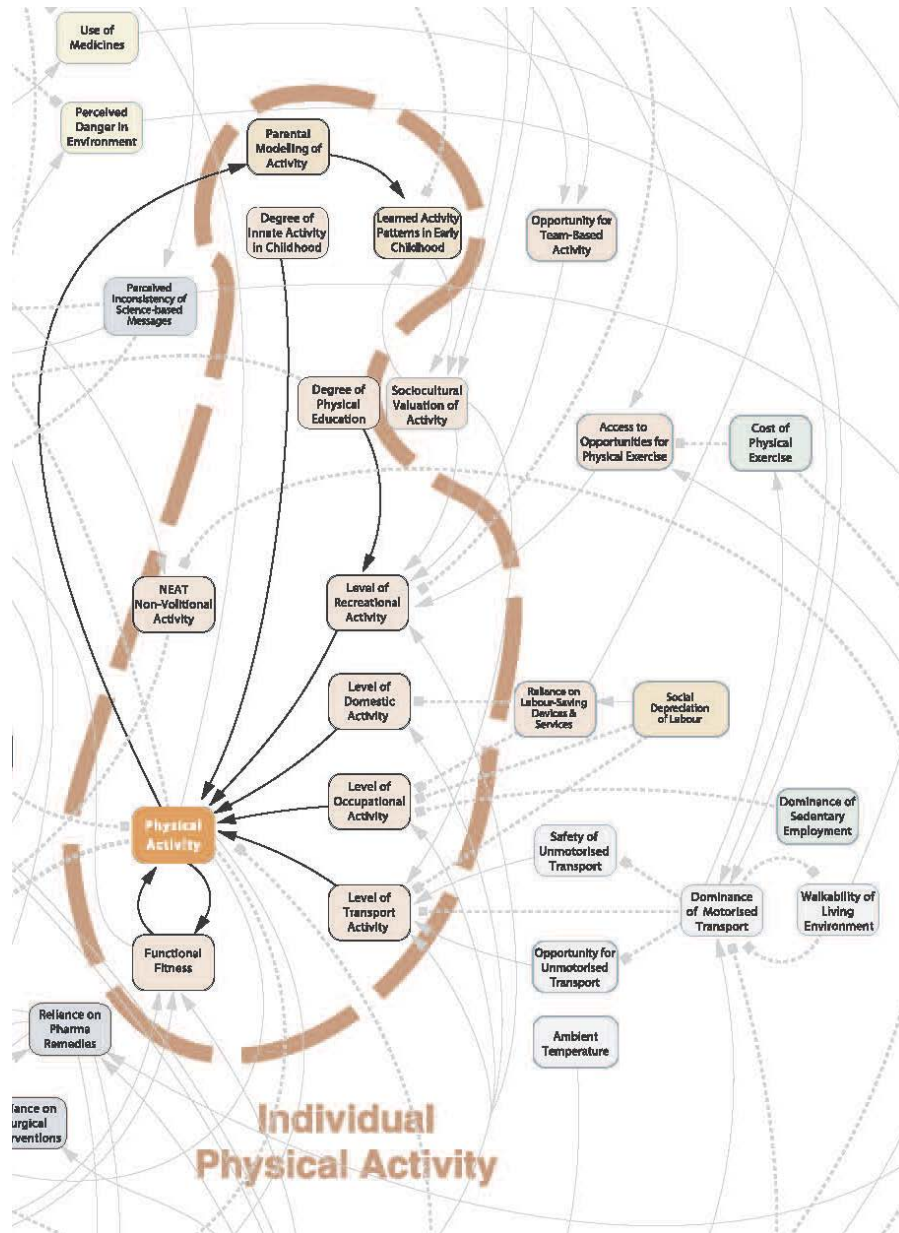
# Obesity Systems Map Framework

Full Generic Map  
Thematic Clusters (empty)



Source: Vandebroek, Goossens, & Clemens. (2007). *Foresight: Tackling Obesities: Future Choices – Obesity System Atlas*.

Available: <http://www.bis.gov.uk/assets/bispartners/foresight/docs/obesity/11.pdf>



## Key Individual Physical Activity Levers

Recreational activity

Domestic activity

Occupational activity

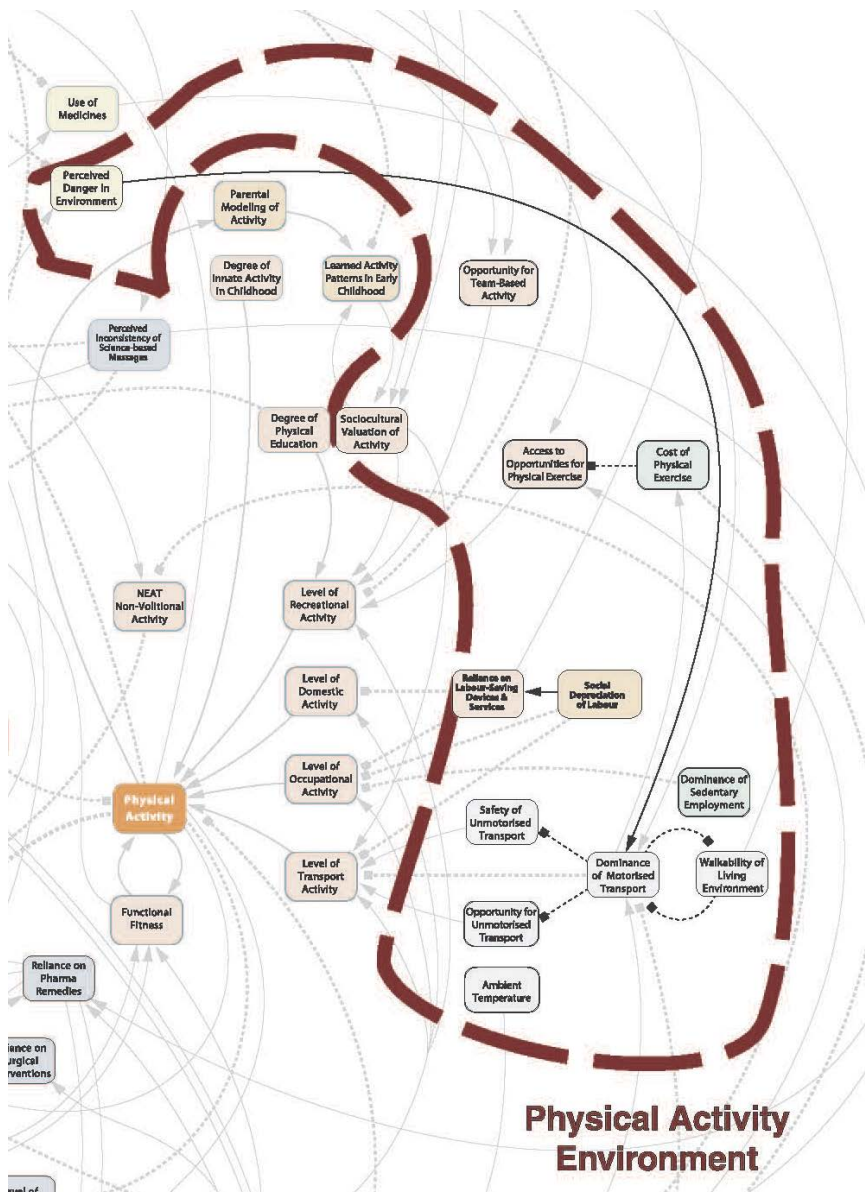
Transport activity

Physical education

Innate activity in childhood

Learned activity patterns in  
early childhood

Parental modeling of activity



## Key Physical Activity Environment Levers

Perceived danger in the environment

Opportunities for team-based activity

Sociocultural valuation of activity

Access to/cost of opportunities for physical exercise

Reliance on labor-saving devices and services

Social depreciation of labor

Dominance of motorized transport

Safety of/opportunity for unmotorized transport

Walkability of living environment

Dominance of sedentary employment

Ambient temperature/ seasonality

**After a Systematic Review of the Scientific Literature, the Task Force on Community Preventive Services Recommends the Following Environmental and Policy Approaches to Increase Physical Activity**

<b>Environmental Policy Approach</b>	<b>Strategies</b>
Enhanced School-based Physical Education	Increase # of minutes spent in MVPA
Community-Scale and Urban Design Land Use Policies	Mixed use, street connectivity, aesthetics and safety
Street-Scale Urban Design Land Use Policies	Roadway design standards, traffic calming, safe street crossings, street lighting

# *Promise of Built Environment Changes*

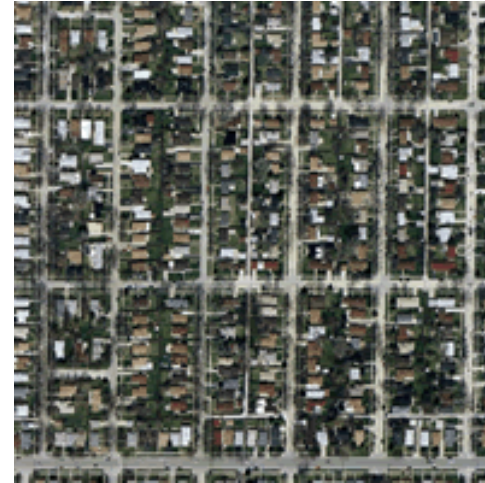
- Many believe we have built a world that supports unhealthy habits.
  - Neighborhood design requires driving
  - Lack of walking and biking infrastructure
  - Many options for sedentary behavior
- For long-term solutions, built environment changes may be an essential component.
- Built environment changes are permanent



# The Built Environment



**Example:** Traffic Circle



**Example:** Compact Neighborhood



**Example:** Neighborhood Park



**Example:** Bike Paths



**Example:** Sidewalks

# Results of the Association between Environmental and Physical Activity Measures

- Built Environment Measures
  - physical disorder scale, outdoor pa settings scale, commercial pa facilities, student perception of safety, walkability index, street safety
- MTF data on student reports of physical activity, height and weight (2001-2003)
  - frequency of vigorous exercise; participation in school athletic teams (sports); participation in sports, athletics, and exercise (PA); and indicator for overweight

Source: Slater et al., 2010

# Results of the Association between Environmental and Physical Activity Measures

Found that:

- Higher levels of physical disorder were significantly associated with reduced sports participation and higher prevalence of overweight.
- Greater numbers of commercial PA facilities were significantly associated with increased vigorous exercise and sports participation.
- Students' perception of feeling unsafe going to and from school was significantly associated, particularly for girls, with decreased vigorous exercise, sports participation, and PA participation.
- More walkable neighborhoods were associated with reduced sports participation and lower prevalence of overweight.
- Changes in the built environment could have the greatest effect on decreasing adolescent overweight, i.e., the youth most at risk.

Source: Slater et al., 2010

**Impact of the built environment and Safe Routes to School-Related policies on youth active travel in a national sample of public elementary schools- Preliminary Results**

# A Snapshot of the Built Environment

Preliminary descriptive results of about 7,000 residential street segments audited in a nationally representative sample of communities where 8<sup>th</sup>, 10<sup>th</sup> and 12<sup>th</sup> grade students reside shows:

- Less than 1 percent of streets had bike lanes
- The average number of land uses was 1.6 (min. 0, max. 12)
- About 3 percent of segments had special speed limits posted (e.g. school zones)
- Street/sidewalk lighting was present on 50 percent of the streets
- Sidewalks were present on 38 percent of streets (30 percent on both sides of street)
- 10 percent of streets had marked crosswalks
- Approximately 1 percent of streets had traffic calming features (traffic circles, speed humps or bulbouts)
- Walkability Scale=5.5 (CA=0.79, Range: 0-25 walkability markers)

# The Food and Fitness Survey Data

- The Food and Fitness Project was launched in 2007 to assess obesity-relevant policies and practices among US elementary schools and their corresponding schools districts.
- Data were obtained from annual mail-back surveys of school administrators at nationally representative samples of public elementary schools in 2007, 2008, and 2009.
- Stacked cross-sectional analysis of 1,020 public elementary schools, nested within 47 states.
- State laws were obtained through primary legal research.
- All models controlled for region, school locale, racial composition, free-reduced lunch, and total number of students

# The Food and Fitness Survey Data

- 17.6 percent of students in the sample walk/bike to school, 84% of schools allow students to walk/bike.
- 54% of schools in sample allow all students to bike to school
- 77% allow all students to walk to school
- 31% of principals reported lack of sidewalks as a barrier to walking/biking
- 56% of principals reported traffic danger as a barrier to walking/biking
- 44% of principals reported distance as a barrier to walking/biking
- 20% of principals reported lack of crossing guards as a barrier to walking/biking
- On average buffers had an intersection density of 372/sq. mi.
- On average 55% of the streets in our buffers had higher road classifications (i.e. speed limits)

# The Food and Fitness Survey Data

- 49% of states have a Minimum Bussing Distance law.
- 22.2% require Sidewalks to be maintained or constructed around schools.
- 9.8% require crossing guards
- 38.6% require traffic control measures (e.g. speed humps, traffic calming devices)
- 81% require speed zones around schools.



# Impact of state laws on elementary schools allowing students to walk/bike to school

Found that:

- States with minimum bussing laws were more likely to allow all students to walk to school.
- Schools were more likely to allow all students to bike to school in states requiring crossing guards around school.
- State laws requiring crossing guards around schools are effective at reducing barriers to walking/biking to school.
- State laws requiring speed zones around schools increased the prevalence of youth walking/biking to school.

Source: Chriqui et al., forthcoming

# Impact of built environment on principal-reported barriers to elementary student walking/biking to school

Built Environment Measures	Principal Reported Barriers to Walking/Biking to School			
	Distance	Traffic	Lack of Sidewalks	Lack of Crossing Guards
Speed Limit	1.07 (0.8, 1.3)	1.03 (0.8, 1.3)	<b>1.29 (1.1, 1.7)</b>	0.95( 0.7, 1.3)
Intersection Density	<b>0.99 (0.9, 0.9)</b>	<b>0.99 (0.9, 0.9)</b>	<b>0.99 (0.9, 0.9)</b>	<b>0.99 (0.9, 0.9)</b>
Ratio of 4-Way Intersections	1.63 (0.7, 3.9)	0.61 (0.3, 1.4)	0.43 (0.2, 1.2)	1.22 (0.4, 4.3)
Traffic Danger	<b>2.54 (1.6, 3.8)</b>	<b>1.82 (1.2, 2.7)</b>	1.11 (0.8, 1.5)	<b>1.6 (1.1, 2.3)</b>

Source: Slater et al., in development

# Impact of built environment on elementary schools allowing all students to walk/bike to school-Preliminary Results

Independent Variables	Allow all students to walk to school*		Allow all students to bike to school	
	Adj. OR	95% CI	Adj. OR	95% CI
Speed Limit	0.72	0.47, 1.10	1.07	0.85, 1.33
Intersection Density	1.00	0.99, 1.00	1.00	0.99, 1.00
Ratio of 4-way Intersections	2.59	0.51, 3.15	<b>2.34</b>	<b>1.04, 5.29</b>
Traffic Danger	0.81	0.46, 1.42	0.67	0.49, 0.91
Minimum Bussing Dist.	<b>2.25</b>	<b>1.12, 4.51</b>	<b>1.80</b>	<b>1.25, 2.61</b>
Hazardous route exemption	1.11	0.57, 2.13	<b>2.32</b>	<b>1.65, 3.28</b>
Sidewalk construction	1.01	0.70, 1.44	<b>0.75</b>	<b>0.61, 0.92</b>
Crossing guards	0.94	0.59, 1.49	<b>1.35</b>	<b>1.06, 1.72</b>
Traffic control	1.17	0.82, 1.65	0.98	0.81, 1.19
Speed zones	1.01	0.97, 1.04	1.21	0.77, 1.92

\*2009 only

Source: Slater et al., in development

## Impact of the built environment and Safe Routes to School-Related policies on youth active travel in a national sample of public elementary schools-Preliminary Results

Independent Variables	Students Walk/Bike	
	OR	95% CI
Speed Limit	0.78	0.55, 1.10
Intersection Density	<b>1.01</b>	<b>1.01, 1.01</b>
Ratio of 4-way Intersections	<b>6.90</b>	<b>1.54, 30.74</b>
Traffic Danger	1.04	0.73, 1.45
Minimum bussing distance	1.72	0.99, 2.98
Hazardous route exemption	1.71	0.98, 2.97
Sidewalk construction	1.21	0.88, 1.65
Crossing guards	<b>1.51</b>	<b>1.02, 2.22</b>
Traffic control measures	0.98	0.73, 1.32
Speed zones	1.04	0.53, 2.00

Source: Slater et al., in development

# Conclusions

- We found different measures of the built environment were associated with schools allowing all students to walk vs. bike to school.
- Results also show that policies impact the built environment, which in turn affects school active travel policies, and the prevalence of youth active travel behavior.
- Our analyses show that policies are effective at changing the built environment directly surrounding schools, which can increase elementary students active travel to and from school.