School and Family-based Approaches to Obesity Prevention

Strategies to Promote Progress in Childhood Obesity Prevention in Oregon

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Jennifer Jackson, PhD, MS, RD Postdoctoral Research Associate
College of Public Health and Human Sciences, Oregon State University
Discussion Bullet Points

- Factors influencing childhood overweight and obesity
- Oregon Prevalence Data
- Evidence-based Best Practice
  - School-based PA promotion strategies
  - Oregon PA Policy and Programming Strategies
- Link between School and Family Home Environments
- Evidence-based Best Practice?
  - Rural Oregon Families
- Questions
Session Objectives

- **Participants will be able to:**
  - **Identify** multi-level factors that contribute to childhood obesity and impede progress in obesity prevention
  - **Understand** current physical activity and obesity trends among Oregon elementary students
  - **Communicate** the importance and potential impacts of obesity preventing policy actions such as Oregon’s HB 3141
  - **Understand** challenges and opportunities for obesity prevention in family-home environments
School-Based Approaches to Obesity Prevention

Is Oregon Ahead of the Curve?

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College of Public Health and Human Sciences
Over the next 20 years, the additional number of obese persons will cost the healthcare system an additional $550 billion. This exceeds US spending on Social Security, Transportation, Food & Ag, Science, Energy & Environment, International Affairs, Housing & Community, Veteran’s Benefits, Medicare & Health, Education & Govt. combined in 2015...
Overweight and Obesity Definitions

• Adults, 20 years and older
  – Overweight = Body Mass Index (BMI) 25-29.9 kg/m$^2$
  – Obese = BMI ≥ 30 kg/m$^2$

• Children and adolescents, 2-19 years
  – Overweight = BMI- for-age ≥ 85$^{th}$ < 95$^{th}$ percentile
  – Obese = BMI- for-age ≥ 95$^{th}$ percentile
Adult and Childhood Obesity Trends

Latest Numbers of Obese Americans

Youth aged 2-19 years: 17.2%
Adults aged 20 and over: 37.7%

Obesity Prevalence Among Youth 2-19 years, by age and sex

Obesity in Early Childhood
Cunningham et al. NEJM, 2014

- At kindergarten entry (5.6 y), 12.4% were obese and 14.9% were overweight (27.3%); in grade 8 (14.1 y), 20.8% were obese and 17.0% were overweight (37.8).
- Overweight 5 year-olds were 4 times more likely to become obese than healthy-weight 5 year-olds.
- Among children who became obese between 5-14, nearly 50% were already overweight at kindergarten entry.

These findings highlight the importance of further research to understand factors associated with the development of overweight during early childhood.

And confirm the need to implement effective intervention strategies in early childhood and pre-adolescence.
Data come from direct assessments in six elementary schools located in six distinct, rural, Oregon communities.
3-Year Prevalence: Overweight and Obesity
Oregon Children Grades K-6 (N=2006)

unpublished data; Gunter et al., 2016

Prevalence (%) out of N=2006

Overweight
- boys
- girls
- all

Obesity
- boys
- girls
- all

Healthy Weight
- boys
- girls
- all

18% to 20%
Obesity Prevalence in Oregon: Elementary (K-6) Students Spring 2013 (N=2006)

*denotes significance compared to grade K; Gunter et al., 2016
Untangling the Web of Obesity

International Factors
- Globalization of Markets
- Development
- Media Advertising

National/Regional Factors
- Transportation
- Urbanization
- Health
- Social Security
- Media & Culture
- Education
- Food & Nutrition

Community Factors
- Local Public Transportation
- Public Safety
- Health Care
- Sanitation
- Food Systems import/export
- Local Agriculture/Markets
- Built Activity Environment

Local Environment Factors
- Leisure Activities and Facilities
- Labor Influences
- Institutional Health
- Workplace Food and PA
- Family and Home Food and PA
- School Food and PA

Individual Factors

Population Weight

Energy Expenditure

Energy Intake

Adapted from Kumanyika S K et al. Circulation 2008;118:428-464
Childhood Obesity: Focus on Schools

- Schools as hub – but a systems approach needed.
- Multiple systems and sectors influence adoption of diet and PA behaviors.
- Interactions between local schools/districts and other relevant sectors required to achieve desired impacts.

Institute of Medicine, Educating the Student Body. 2013

96%-98% of U.S. youth ages 5-17 are enrolled in an institutional (public or private) school.
School administrators, teachers, and parents should advocate for a whole-school approach to PA that fosters and provides access in the school environment to **at least 60 minutes per day of vigorous- or moderate-intensity PA** - **more than half (>50 percent)** of which **should be accomplished during regular school hours.**

IOM committee on PA and PE in the school environment; 2013
PA for Childhood Obesity Prevention: Focus on Schools

Schools provide a unique framework for PA due to the tremendous opportunities to contact many students multiple times.
What Works to Get Kids Active

Schools and communities can help kids get the 60 minutes of physical activity they need each day.

- renovate parks +12 min
- provide in-class activity breaks +19 min
- add after-school programs +10 min
- support walking/cycling to school +16 min
- require daily P.E. +23 min

How much PA do Oregon elementary students get during the school day?
Oregon Children’s PA at School

Measured over a 6.5 Hour School Day (N=2000)

No kids are doing 60 minutes of MVPA at School

unpublished data; Gunter et al., 2016
Physical activity levels and obesity status of Oregon Rural Elementary School children

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Outcome. We observed an inverse relationship between PA at school (min/school-day) and body mass index (BMI, kg/m²) among rural elementary-aged children.
We Can Do Better

• Regardless of grade level, children accrued < 60 min/d of TOTAL activity and < 20 min/d of MVPA during a 6.5-hour school day.

• Obesity prevalence is high
Research demonstrates that PA policies influence child physical activity levels and success in school.

- Providing sufficient PA at school
- Providing classroom PA breaks
- Mandated PE minimums
- Mandated PA outside of PE
- Requiring Recess
- Prohibiting punitive PA restriction
What is Oregon Doing?

• Oregon House Bill 3141
  – Promoting PE Best Practice
  – Minute-per-week minimums (150; 225)
  – Minimum % time in MVPA (50%)
  – Promoting PE Inclusion

Why is this so important? And how does this place Oregon ahead of the curve?
Provision of PE is Insufficient in Oregon and the US

Figure 1.

<table>
<thead>
<tr>
<th>Year</th>
<th>% US Schools Meeting SHAPE America PE Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>8.0%</td>
</tr>
<tr>
<td>2006</td>
<td>6.4%</td>
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<tr>
<td>2014</td>
<td>3.4%</td>
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</table>

Figure 2.

<table>
<thead>
<tr>
<th>Year Set</th>
<th>% Oregon Schools Meeting SHAPE America PE Guidelines</th>
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</thead>
<tbody>
<tr>
<td>2010-2011</td>
<td>10.5%</td>
</tr>
<tr>
<td>2011-2012</td>
<td>9.7%</td>
</tr>
<tr>
<td>2012-2013</td>
<td>9.0%</td>
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<tr>
<td>2013-2014</td>
<td>9.9%</td>
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</tbody>
</table>
Oregon students are insufficiently active during the school day  
– Gunter et al, 2015

Opportunities to be active through school-based programming are insufficient  
– ODE, 2015
What Factors Predict Greater Success (provision of more PE minutes)?

• Great Question!
School Environment: SPAN-ET

- **Physical Activity (16 Items)**
  - Indoor PA/Active Play Space
  - Fixed Outdoor Features/Space
  - Shelter & Shade Structures
  - Surface and Surface Markings
  - Neighborhood Features
  - Portable Equipment
  - PA & Wellness Policy
  - Structured Physical Education

- **Nutrition (11 Items)**
  - Safe & Adequate Meal Service Area
  - School Meals
  - Healthy Food & Beverage Practices
  - Promoting Water Consumption
  - Nutrition & Wellness Policy
  - Health & Nutrition Education

Each item is scored and the tool provides a baseline measure that is sensitive to change. SPAN-ET data helps schools identify and prioritize areas of “opportunity”.
SPAN-ET: Identify Areas for Intervention to Promote PA and Enhance PE

- What environmental characteristics are associated with enhanced PE?
  - Space?
  - PE Specialists?
  - Creative PA/PE programming?

- How do neighborhood attributes or local policy actions influence PE

Institute of Medicine, Educating the Student Body. 2013
What role do families play?
Are you kidding?!
Healthy Eating and Physical Activity in Family-Home Environments: Challenges and Opportunities

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College of Public Health and Human Sciences
Oregon State University
Study Goal

To examine whether and how family-home environmental and behavioral factors were associated with body mass index (BMI), diet, and food insecurity among children living in rural Oregon.
Measures: Family Nutrition and Physical Activity (FNPA) screening tool

• Validated measure of family/child food and physical activity practices and policies that predispose children to becoming overweight

• **Nutrition**: 10 items
  - 5 constructs: Family meal patterns, Family eating habits, Food choices, Beverage choices, Restriction and reward

• **Physical Activity**: 10 items
  - 5 constructs: Screen time behavior, Healthy environment, Family activity involvement, Child activity involvement, Family routine

**Item Response Categories**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Almost Never (1)</td>
</tr>
<tr>
<td>Sometimes (2)</td>
</tr>
<tr>
<td>Usually (3)</td>
</tr>
<tr>
<td>Almost Always (4)</td>
</tr>
</tbody>
</table>

Ihmels et al, 2009
Measures:
At-risk for food insecurity (FI)

• Validated 2-item screener
  • 1) *Within the past 12 months we worried if our food would run out before we got money to buy more.*
  • 2) *Within the past 12 months the food we bought just didn’t last and we didn’t have money to get more.*

• Item response categories:
  • Never true/sometimes true/often true

• Affirmative response to either or both questions used to identify at risk for FI
  • Never true = not at-risk
  • Sometimes or often true = at-risk

Hager et al, 2012
Measures: Dietary intake

- **Block Kids Food Screener (BKFS)**
  - 2 page questionnaire, completed by parent/caregiver
  - Frequency and quantity of foods/beverages consumed by child during previous week
- Estimated intake of food groups and added sugars
Participants

- 69% (n=186) of the 270 children enrolled in GROW family study
- Family demographics
  - 56% eligible for free- or reduced-cost school meals
  - 43% at-risk for food insecurity
- Child demographics
  - Mean age: 8 years
  - 43% female
  - 89% White
  - 16% Latino
- 37% overweight or obese
- Average FNPA score: 3.3
Dietary intake per 1,000 kcals

- Fruits (cups/day)
- Vegetables (cups/day)
- Whole Grains (oz/day)
- Dairy (cups/day)
- Protein Foods (oz/day)
- Added Sugar (tsp/day)

Graph showing daily intake compared to recommended intake.
Summary of findings

• Some FNPA factors were associated with BMI or FI

• Modifying effect of eligibility for school meals program on odds of being at-risk for FI

• More favorable FNPA factors were associated with higher intakes of fruits, vegetables and dairy, and lower intake of added sugar

• Food insecurity was not associated with dietary intake
CONVERSATIONS WITH RURAL FAMILIES
Participants

• Sample demographics (n=34 parents/27 families)
  • 79% female
  • 92% white, non-Latino
  • 60% college graduates, 12% high school graduate or less
  • 25% eligible for free- or reduced-cost school meals
  • 24% at-risk for food insecurity
Results: Family Nutrition and Physical Activity

Behavioral factors

Themes for Nutrition

- Family Eating Habits
- Food Procurement

Themes for Physical Activity

- Family Physical Activity
- Screen Time
Behavioral factors that influence family nutrition

• Family eating habits
  • Emphasis on mealtime practices and policies

“And the TV is on quite a bit but...by the time we get to dinner time that’s the only downtime. So it [mealtime and TV] does get mixed together. Because usually something else has gone on and that’s our first time to even sit down.”

• Food procurement
  • Emphasis on foods purchased, grown, otherwise acquired

“And then we have a gigantic garden. So every year we make and can and freeze as much as we can.”
Behavioral factors that influence family activity

- Family physical activity
  - Most families were regularly active together
  - Children’s activity: home-based or organized programs

“The kids, like during the summer, a lot of times they’re just out running around. I mean like with the [summer] weather, water guns, they’ve got bicycles they ride around...So they just, yeah, go outside and play most of the day...And then weekends are chores.”
## Results: Family Nutrition and Physical Activity

### Environmental factors

<table>
<thead>
<tr>
<th>Theme</th>
<th>Nutrition</th>
<th>Physical Activity</th>
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<tbody>
<tr>
<td></td>
<td>Support</td>
<td>Barrier</td>
</tr>
<tr>
<td>Seasonal Variation</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Features of Home</td>
<td>X</td>
<td></td>
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<tr>
<td>Distance to Resources</td>
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<td></td>
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<tr>
<td>Eating Habits Promotion</td>
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<tr>
<td>Screen Access Limits</td>
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<tr>
<td>Financial Constraints</td>
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<tr>
<td>Schedule Constraints</td>
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<td></td>
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<tr>
<td>Outdoor Safety</td>
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Eating Habits Promotion

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“We actually lock up sugar. We put it in a drawer and lock it.”

“We always try to...get them [children] to have a fruit or vegetable...try to limit the bad stuff, but they do eat it...chips and sweets and sodas...we’re trying to work on portion control...not this ‘you can’t have it, it’s bad,’ but ‘here’s a little bit’ type thing.”
Screen Access Limits

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“That’s a huge challenge for us [regulating screen time]. And it does sort of seep into a half hour seeps into an hour...it is tough.”
Summary of findings

• Parents expressed strong values for healthy eating and physical activity, and used diverse practices to promote these behaviors in the family-home environment.

• Regulating children’s use of electronic media was perceived to be challenging in family-homes.

• Parents informed our understanding of rural family eating and physical activity behaviors at multiple levels of influence.
Prevention implications

- Consider health literacy levels, unique qualities of a family-home environments, and available resources when designing interventions to promote rural family nutrition and PA behaviors.

- Obesity prevention efforts in rural areas may need greater focus on parenting practices and physical activity.

- Potential strategies
  - Educational-environmental
  - Seasonal
  - Multi-level
  - Involve parents/community members in intervention design
Ponder this...

• How do we help families stay informed about positive changes in **school environments** and how do we support them to implement positive changes at **home**?
Thank You!

Questions??