Connecting you with experts. Exploring the latest childhood obesity news and research.

We will begin at 2:05 to allow participants time to join the webinar.
1. Spotlight
   • Measures Registry User Guides
   • Individual Physical Activity
   • Physical Activity Environment

2. One on One

3. Upcoming Events
Need technical assistance? Have a question for our speakers?

Type your question(s) in the chat box on the right and a representative will respond shortly.
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#ConnectExplore

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Today’s Speakers

Elaine Arkin
National Collaborative on Childhood Obesity Research

James Morrow, Jr., PhD, FACSM, FNAK
Regents Professor Emeritus, Department of Kinesiology, Health Promotion, and Recreation, University of North Texas

David Berrigan, PhD, MPH
Program Director, Health Behaviors Research Branch, National Cancer Institute, National Institutes of Health

Gregory Welk, PhD
Associate Professor, Department of Kinesiology, Iowa State University

James Morrow, Jr., PhD, FACSM, FNAK
Regents Professor Emeritus, Department of Kinesiology, Health Promotion, and Recreation, University of North Texas
Today’s Speakers

Pedro Saint-Maurice, PhD
Postdoctoral Fellow, National Cancer Institute, National Institutes of Health

James Sallis, PhD
Distinguished Professor Emeritus, Department of Family Medicine and Public Health, University of California, San Diego.

Jordan Carlson, PhD
Director, Community Engaged Research, Children’s Mercy Kansas City
INTERACTIVE POLL
Measures Registry User Guides
• Designed to:
  – Provide an overview of measurement
  – Describe general principles of measurement selection
  – Present case studies to walk users through the process of using the Measures Registry to select appropriate measures
  – Direct researchers and practitioners to additional resources
The User Guides cover the four domains of the Measures Registry:

– Individual Diet
– Food Environment
– Individual Physical Activity
– Physical Activity Environment
Measures Registry User Guides

- Aim to help move the field forward by fostering more consistent use of measures, which will allow for standardization, meta-analyses, and synthesis
Measures Registry

http://www.nccor.org/nccor-tools/measures/
Measures Registry User Guides

To help researchers choose the most appropriate measures for their work in childhood obesity, NCCOR has developed four Measure Registry User Guides. This project was funded through NCCOR's first strategic funding alliance with The JPB Foundation. The Measures Registry User Guides are designed to:

- Provide an overview of measurement
- Describe general principles of measurement selection
- Present case studies that walk researchers through the process of using the Measures Registry to select appropriate measures
- Direct researchers to additional resources and sources of useful information

Click the boxes below to access the User Guides.

http://www.nccor.org/nccor-tools/mruserguides/
Click the boxes below to access the User Guides.

- Individual Diet
- Food Environment
- Individual Physical Activity
- Physical Activity Environment

WHAT'S HAPPENING IN NCCOR NEWS

NCCOR publishes new white paper on health, behavioral design, and the built environment

NCCOR's 2016 Annual Report: Expanding Our Outreach

NCCOR launches Measures Registry User Guides

NCCOR Year in Review: 2016

Assessing the Prevalence and Trends in Obesity: Navigating the Evidence Q&A

EXPLORE

- Case Studies for each User Guide
- Teaching Resources for each User Guide
- NCCOR Measures Registry
- Feedback

http://www.nccor.org/nccor-tools/mruserguides/
## Authors and Expert Panels

<table>
<thead>
<tr>
<th>Food and Nutrition</th>
<th>Physical Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Individual Diet</strong></td>
<td>3. Individual Physical Activity</td>
</tr>
<tr>
<td><strong>Authors:</strong> Sharon Kirkpatrick and Amanda Raffoul (U. of Waterloo)</td>
<td><strong>Authors:</strong> James Morrow, Jr. (U. of North Texas), Gregory Welk (Iowa State University), Pedro Saint-Maurice (NIH)</td>
</tr>
<tr>
<td><strong>2. Food Environment</strong></td>
<td>4. Physical Activity Environment</td>
</tr>
<tr>
<td><strong>Authors:</strong> Leslie Lytle and Allison Myers (U. of North Carolina at Chapel Hill)</td>
<td><strong>Authors:</strong> Jordan Carlson and Kelsey Dean (Children’s Mercy Kansas City), James Sallis (UC San Diego)</td>
</tr>
</tbody>
</table>

### Food and Nutrition Expert Panel
- Alice Ammerman, DrPH, RD
- Carol Boushey, PhD, MPH, RD
- Karen Webb, PhD, MPH
- Gail Woodward-Lopez, MPH, RD

### Physical Activity Expert Panel
- Genevieve Dunton, PhD, MPH
- Patty Freedson, PhD
- Brian Saelens, PhD
Measures Registry User Guides: Individual Physical Activity

Greg Welk, Jim Morrow, and Pedro Saint-Maurice
Need for Accurate Estimates of Individual Physical Activity Behavior

- To understand physiological mechanisms underlying adaptations to PA
- To understand amount of PA needed for health
- To monitor patterns and trends in PA
- To identify correlates of PA and to test theories of PA behavior
- To evaluate effectiveness of interventions designed to change PA
Overview of Major Categories of Physical Activity Measures

- **Report-based Measures**
  - Self-Report
  - Proxy Report
  - Diaries

- **Monitor-based Measures**
  - Accelerometers
  - Pedometers
  - HR monitors
  - GPS

- **Criterion Measures**
  - Calorimetry
  - Observation
  - DLW
Feasibility/Validity Continuum

Figure 5a: Physical Activity Assessment Tools and Their Relative Positions on the Feasibility/Validity Continuum

- **Report-based Measures**
  - Diaries
  - Self-reports

- **Monitor-based Measures**
  - Pedometers
  - HR Monitors
  - Accelerometers

- **Criterion Measures**
  - Direct Observation
  - Indirect Calorimetry
  - Doubly-labeled Water
Principles of Measurement and Evaluation
Distinctions between Reliability and Validity
# Reliability – Consistency of Measurement

<table>
<thead>
<tr>
<th></th>
<th>Inter-rater</th>
<th>Test-retest</th>
<th>Internal consistency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition for</td>
<td>The extent to which measurements are repeatable between two or more evaluators</td>
<td>The extent to which measurements are repeatable over time</td>
<td>The extent to which items within a scale are correlated</td>
</tr>
<tr>
<td>environmental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>measures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measure/method</td>
<td>Correlation coefficient; Cohen’s kappa</td>
<td>Correlation coefficient; subtracting $1 - r$ = estimate of random error</td>
<td>Cronbach’s alpha; Internal consistency</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Validity – Truthfulness of Measurement

<table>
<thead>
<tr>
<th>Definition for environmental measures</th>
<th><strong>Criterion</strong></th>
<th><strong>Face</strong></th>
<th><strong>Construct</strong></th>
<th><strong>Content</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The extent to which the measure agrees with an external standard measure or a more accurate instrument</td>
<td>The extent to which the instrument appears to be measuring what it is supposed to measure</td>
<td>The extent to which the measure “behaves” in a way consistent with theoretical hypotheses</td>
<td>The extent to which an instrument samples items from the full breadth of the content desired</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measure/method</th>
<th><strong>Criterion</strong></th>
<th><strong>Face</strong></th>
<th><strong>Construct</strong></th>
<th><strong>Content</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation with some other valid measure</td>
<td>Expert judge review; not statistically evaluated</td>
<td>Correlation with other measures in ways that make sense</td>
<td>Expert judgment or factor analysis</td>
<td></td>
</tr>
</tbody>
</table>
## Summary of Validity Indices Used in Physical Activity Research

<table>
<thead>
<tr>
<th>Continuous Variables (e.g., Minutes)</th>
<th>Categorical Variables (e.g., Meets PAG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pearson Product Moment</td>
<td>• Proportion of Agreement</td>
</tr>
<tr>
<td>• Test of Mean Differences</td>
<td>• Kappa</td>
</tr>
<tr>
<td>• Bland Altman</td>
<td>• Sensitivity</td>
</tr>
<tr>
<td>• Standard Error of Estimate</td>
<td>• Specificity</td>
</tr>
</tbody>
</table>

**Continuous Variables**
- Pearson Product Moment
- Test of Mean Differences
- Bland Altman
- Standard Error of Estimate

**Categorical Variables**
- Proportion of Agreement
- Kappa
- Sensitivity
- Specificity
Distinctions between Individual- and Group-level Estimation

- Many papers cited in the Measures Registry may use correlations to reflect validity. This is just an indicator of the association and not indicative of accuracy of estimates.

- Papers may also report “total error”, a group-level statistic. A more useful indicator of individual error is computed as the Mean Absolute Percent Error (MAPE).
Measurement Issues in Health Outcomes Research

- Analyses often use categorical variables (for calculation of odds ratios or relative risk)
- Large sample sizes compensate for low precision of measures
- Stronger measures would provide greater power to detect effects (i.e., studies likely underestimate the potency of physical activity)
Measurement Issues in Surveillance Research

• Need to measure a lot of people efficiently
• Self-report or interviewer-administered instruments are common, but objective measures are now available
• Small differences in wording of questions can lead to large differences in responses
• Lack of equivalence among different instruments plagues research
• Need to assess absolute amounts of PA
Measurement Issues for PA Intervention Research

- Ensure outcome measure is sensitive to change
- Outcomes must be measured accurately to ensure sufficient power to detect change
  - Power calculations are needed to determine sample based on the size of effect to detect
Citation

Abstract
INTRODUCTION: Although the health benefits of walking for physical activity have received increasing research attention, barriers specific to walking are not well understood. In this study, questions to measure barriers to walking for physical activity were developed and tested among college students. The factor structure, test-retest and internal consistency reliability, and discriminant and criterion validity of the perceived barriers were evaluated.

METHODS: A total of 305 undergraduate students participated. Participants had a mean age (± SD) of 20.6 (± 3.02) years, and 70.3% were female. Participants responded to a questionnaire assessing barriers specific to walking for physical activity. Perceived barriers to vigorous exercise, walking for transportation and recreation, and participation in lifestyle activities (such as taking the stairs instead of the elevator) were also assessed. Subsamples completed the walking barriers instrument a second time after 5 days in order to determine test-retest reliability (n = 104) and wore an accelerometer to measure moderate-intensity physical activity (n = 85).

RESULTS: Factor analyses confirmed the existence of three factors underlying the perceived barriers to walking questions: appearance (four items), footwear (three items), and situation (three items). Appearance and situational barriers demonstrated acceptable reliability, discriminant validity, and relations with physical activity criteria. After we controlled for barriers to vigorous exercise, appearance and situational barriers to walking explained additional variation in objectively-measured moderate physical activity.

CONCLUSION: The prediction of walking for physical activity, especially walking that is unstructured and spontaneous, may be improved by considering appearance and situational barriers. Assessing barriers specific to walking may have important implications for interventions targeting walking as means for engaging in physical activity.

Full Text
not available
Measurement in Action
List of Included Case Studies

• Case Study 1: Examining the Independent and Joint Associations of Physical Activity and Sedentary Behavior on Body Mass Index Among Middle and High School Students

• Case Study 2: Determining Compliance with Physical Activity Recommendations Across Different Grade Levels

• Case Study 3: Identifying Predisposing Factors for Active Commuting in Elementary School Children Who Live in Urban and Suburban Settings

• Case Study 4: Testing the Potential of a New Recess-Based Physical Activity Program Designed to Increase the Time Children Spend in MVPA During Recess
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• Case Study 3: Identifying Predisposing Factors for Active Commuting in Elementary School Children Who Live in Urban and Suburban Settings

• Case Study 4: Testing the Potential of a New Recess-Based Physical Activity Program Designed to Increase the Time Children Spend in MVPA During Recess
Case Study 2: Determining Compliance with Physical Activity Recommendations Across Different Grade Levels (Surveillance Research)
Case Study 2: Background

PA outcome:

• Percentage of youth accumulating 60 minutes of MVPA per day
  – At least 30 minutes of activity accumulated at school
Case Study 2: Considerations

- Age appropriate measure (8-18yrs):
  - Any of the measures in the Measures Registry
- A measure that captures the context of PA:
  - Self-reports and diaries
- Favor feasibility and educational value:
  - Self-reports need to be considered carefully
  - Diaries can present challenges for young children
Case Study 2: Measures Selection

PA measure:

• Data collected using a web-based self-report
### Case Study 2: Summary Table

**Title:** Determining Compliance with Physical Activity Recommendations Across Different Grade Levels

<table>
<thead>
<tr>
<th>Type of Case Study</th>
<th>• Surveillance Research</th>
</tr>
</thead>
</table>
| Background          | • Youth should accumulate at least 30 minutes/day of MVPA in the school setting  
|                    | • The project examined the proportion of youth meeting the recommended guidelines for PA |
| Considerations      | • A measure that captures the various dimensions and domains of physical activity |
| Measure Selection   | • A measure that captures the context of PA  
|                    | • Favor feasibility over accuracy  
|                    | • The assessment needs to provide educational value  
|                    | • Suggest using a web-based version of a self-report |
Conclusions

• The Behavioral Epidemiology Framework directly influences measurement decisions in PA research
• Measurement issues of reliability and validity are paramount
• The Feasibility/Validity Continuum impacts tool selection
• Case studies provide illustrations of considerations in instrument selection
QUESTIONS?
Please type your question(s) in the chat box located on the right.
Why study Physical Activity Environments?

• Multiple settings are important for physical activity, including neighborhoods, parks/recreation, schools, and homes.
• Built environments within each setting can support or inhibit physical activity.
• Measuring physical activity environments can inform intervention strategies and support evaluation for both research and practice.
• Many measures are in the Measures Registry.
Table 1. Measures with evidence of reliability and/or validity are available for many physical activity settings

<table>
<thead>
<tr>
<th>SETTING</th>
<th>METHOD OF ASSESSMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GIS</td>
</tr>
<tr>
<td>Community design</td>
<td></td>
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<tr>
<td>Transportation system</td>
<td></td>
</tr>
<tr>
<td>Streetscapes</td>
<td></td>
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<tr>
<td>Trails</td>
<td></td>
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<tr>
<td>Parks</td>
<td></td>
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<tr>
<td>Recreation</td>
<td></td>
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<tr>
<td>Schools and child care</td>
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<tr>
<td>Homes</td>
<td></td>
</tr>
<tr>
<td>Workplaces</td>
<td></td>
</tr>
<tr>
<td>Other buildings</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td></td>
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</tbody>
</table>
Levels of Environment Attributes

- "Macro-scale" attributes describe the layout of communities (connectivity, land use).
- "Micro-scale" attributes indicate the design of a setting (streetscape, park, building).
- "Social" environments include people in the environment and evidence of people's behavior (safety, social disorder).
Proximity, Accessibility, and Quality

• These dimensions of attributes can be assessed
  – Proximity – presence, absence, or distance to an environmental feature.
  – Accessibility – the ease of getting to the feature. This considers barriers (freeways) or quality of pedestrian/bicycle connections.
  – Quality – ratings of a feature's design, aesthetics, appeal, condition, ease of use, or safety.
Measurement in Action
Introduction to Case Studies

- Case studies show the measures selection process in action.
- Considerations in measures selection include:
  - Project purpose
  - Evidence of reliability and/or validity
  - Burden to respondents and/or investigators
  - Comprehensiveness and specificity
Case Study 1: Improving Parks and Streetscapes around Schools (Intervention Planning)
Case Study 1: Background

• A local bicycle and pedestrian advocacy organization is working with the city planning department to improve environments around schools to support active living.

• The organization plans to apply for grant funding to support specific environmental improvements and would like the improvement targets to be identified through a community needs assessment.

• Their goal is to identify specific locations and types of improvements for which to seek funding.
Case Study 1: Considerations

• Target environments known to be related to physical activity in youth
• Focus on attributes that would be feasible to modify during the 2-year grant period
• Involve community members in project; thus measure needs to be brief and require little training
• Use questionnaire, GIS, or audit tool
Case Study 1: Measures Selection

- “Physical Activity Environments” and “Environmental Observation” are selected as filter options in the registry.
- “Street” and “Park” are used as search terms.
- “Compare” check box helps narrow results.
- After reviewing the measures results, they select:
  - Street Audit Tool: Active Neighborhood Checklist
  - Park Audit Tool: a subset of the CPAT park audit tool
### Case Study 1: Summary Table

#### Title: Improving Parks and Streetscapes Around Schools

<table>
<thead>
<tr>
<th>Type of Case Study</th>
<th>Intervention Planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td>Improving streetscapes around schools and facilities within parks to support active living</td>
</tr>
<tr>
<td>Considerations</td>
<td>Need brief, low-burden measures that can be used by community members</td>
</tr>
<tr>
<td>Measure Selection</td>
<td>Streetscape and park audit tools are selected because they can identify environmental features that can be improved in a short amount of time</td>
</tr>
</tbody>
</table>
Case Study 3: Evaluating Changes Resulting from Streetscape Neighborhood Renovation Projects (Intervention Evaluation)
Case Study 3: Background

- A redevelopment grant is awarded to a city with special emphasis on pedestrian-oriented renovation projects through the city’s main urban corridor.
- A project team would like to evaluate the extent to which the grant results in improvements in streetscape features related to physical activity.
Case Study 3: Considerations

- Due to the project being focused on streetscape features, the team narrows search to streetscape self-report and audit tools.
- Construct validity (relation to physical activity) is especially important.
- Measure Options:
  - Self-reports? Lack specificity.
  - Audit tools? Need to be sensitive to change given the 1-year timeline.
Case Study 3: Measures Selection

- Registry results are filtered to “Physical Activity Environments” and “Environmental Observation”
- “Street” is used as a search term
- Simple checklists are ruled out because high detail/specificity is desired
- Use “Compare” check box to compare measures
- Measures chosen:
  - Specific items and scales from the Irvine-Minnesota Inventory (IMI) are selected based on their consistent associations with physical activity in previous research and their ability to be affected over a 1-year time frame.
## Case Study 3: Summary Table

**Title:** Evaluating Changes Resulting from Streetscape Neighborhood Renovation Projects

<table>
<thead>
<tr>
<th>Type of Case Study</th>
<th>Intervention Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Background</td>
<td>Evaluate streetscape improvements during 1-year urban renovation grant</td>
</tr>
<tr>
<td>Considerations</td>
<td>Focused on streetscapes, related to physical activity, and sensitive to change</td>
</tr>
<tr>
<td>Measure Selection</td>
<td>Irvine-Minnesota Inventory (IMI) is selected because of its consistent associations with physical activity and likelihood of being sensitive to change</td>
</tr>
</tbody>
</table>
Conclusions

• The expanding field of physical activity environment research can make it difficult to select appropriate measures from the many that are available.

• NCCOR Measures Registry and User Guides can facilitate measure selection for research or practice.

• We hope the Measures Registry and Guides will lead to improved research and practice that will accelerate movement towards activity friendly environments.
QUESTIONS?

Please type your question(s) in the chat box located on the right.
UPCOMING EVENT
Visit NCCOR at ACSM!

• Tutorial at ACSM
  – June 1, 2017, 1:00 p.m. MT
  – Hot off the Presses: A Revised Youth Compendium of Physical Activities

• Exhibition Hall Booth 125
  – May 31, 2017 – June 2, 2017
TOOLS YOU CAN USE
Health, Behavioral Design, and the Built Environment White Paper

- Discusses use of behavioral design strategies and approaches to foster healthy eating and active living
- Encourages childhood obesity researchers and practitioners to consider the role of behavioral design in their work and use it for research and practice

http://www.nccor.org/projects/health-built-environment/
Acknowledgments: Project Team

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Other reviewers:
We would also like to thank Seung Hee Lee-Kwan, PhD, MS; Latetia Freeman Moore, PhD, MSPH; Sohyun Park, PhD; Jesus Soares, ScD, MSc; and Tina Kauh, PhD, for reviewing the final draft of the guides.
FURTHER QUESTIONS?

Other questions about NCCOR or upcoming activities?

Email the NCCOR Coordinating Center
nccor@fhi360.org
WHAT'S HAPPENING IN
NCCOR NEWS

NCCOR at APHA

Connect & Explore "SNAP-Ed Evaluation Framework Q&A"

Connect & Explore: Evaluating Health Care-Community Collaborations: Hospital-Based Programs

Three ways NCCOR is accelerating progress to reduce Childhood Obesity

NCCOR Childhood Obesity Declines – New RWUP Signs of Progress Data

Connect & Explore

Upcoming Webinars

Mark your calendar for these upcoming Connect & Explore webinars!

- **NOV 10**  Evaluating Health Care-Community Collaborations: Implications and Recommendations for the Field

Archived Webinars

Missed a webinar? Check out videos from past webinars.


- **OCT 27**  Looking Back and Looking Forward: Nine Years of School District Wellness Policy Implementation

- **SEP 14**  Evaluating Health Care-Community Collaborations - A Three-Part Series
THANK YOU!