Preventing Diabetes in Community Settings: Evidence-Based Interventions to Promote Physical Activity

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Objectives

1. To understand the importance of physical activity promotion in prevention and control of type 2 diabetes.
2. To understand the basis for evidence-based physical activity interventions.
3. To describe the process and results of the Guide to Community Preventive Services.
4. To explore the limits of evidence-based decision making and practice.
5. To describe tangible steps and resources for practitioners implementing interventions.
Prevention & Control of Type 2 Diabetes

• Growing body of evidence
  • Randomized trials and prospective cohort studies
• Lifestyle changes (activity, healthy eating) decrease risk of developing type 2 diabetes
• Among individuals with diabetes, walking improves insulin sensitivity
• Key seems to be weight control
Data from Recent Trials

Data from Recent Trials

Why do Programs/Policies Fail to Achieve Maximum Potential?

- Choosing ineffective intervention approach
- Selecting a potentially effective approach, but weak or incomplete implementation or “reach” (aka, Type III error)
- Conducting an inadequate evaluation that limits generalizability
What is “evidence?”

“…the available body of facts or information indicating whether a belief or proposition is true or valid.”

Where to go for evidence of intervention effectiveness?
What are evidence-based methods?

OR

How do we decide what works in public health interventions?
What is an Evidence-Based Method?

- Based on interventions that have been evaluated in scientific studies
  - Generally in journal articles
- Systematic reviews
  - Based on narrative or quantitative techniques
- May (should) include economic evaluations
- In limited instances for emerging areas, expert opinions
Advantages to Using Evidence-Based Methods

- Higher likelihood of success
- Identification of common indicators
- Defend/expand an existing program
- Advocate for new programs
- New knowledge is generated to help others
Main Sources of Information on Intervention Effectiveness

• Your own knowledge
• Other experts you work with
  ✓ Other grantees, CDC, NIH, academe
• Input from the public or policy makers (stakeholders)
• Reading/searching the peer-reviewed literature
  ✓ Look for systematic reviews or guidelines
Systematic Reviews and Evidence-Based Recommendations
Logic Framework for PA Interventions

- **Interventions**
  - Mass Media Campaigns
  - Creation of worksite facilities

- **Modifiable Determinants**
  - Knowledge, attitudes
  - Organizational policies to facilitate PA

- **PA Behavior**
  - Increased dose of PA (duration, frequency, intensity)

- **Intermediate Physiological Outcomes**
  - Aerobic capacity
  - Muscular endurance
  - Adiposity

- **Health Outcomes**
  - Morbidity
  - Mortality
The Community Guide

- Recommendations based on effectiveness
  - Not necessarily on feasibility
- Based on scientific evidence
- Systematic reviews
- Coordinated by CDC scientists
- Reviewed/approved by independent Task Force
- Follows on the work of the US Preventive Services Task Force
Target Audience for the Community Guide

People who plan, fund or implement services and policies at health care systems, communities and states
The *Community Guide* is a Valuable Tool

- Program planning
- Efficient use of resources
- Research agenda
Rationale for the Methods and Process

- Obtain and distill the best available (or best feasible) evidence for decision making
- Studies reviewed based on
  - Design
  - Execution
- Rigor without *rigor mortis*
Suitability of Study Design

- **Greatest**
  - Prospective *and*
  - Concurrent comparison

- **Moderate**
  - Retrospective *or*
  - Multiple measurements over time; no concurrent comparison

- **Least**
  - Single before-and-after measurement; no concurrent comparison *or*
  - Exposure and outcome measured at single point in time
What Factors Determine Quality of Execution?

- Description of intervention and study population
- Sampling procedures
- Exposure and outcome measurements
- Approach to data analysis
- Interpretation of results
  - Follow-up
  - Confounding
  - Other bias
- Other issues
Search for Evidence

- PA behavior main focus of intervention
- English, since 1980
- Behavioral and/or fitness outcomes
- Incorporate a comparison group
Physical Activity Measures by Study

Donnelly JE, 1996
SPARK, 1997
CATCH, 1996

* 2 data points
% class time increase of 762% not shown
Physical Activity Chapter Domains

1. Informational Approaches to Increasing PA
2. Behavioral and Social Approaches to Increasing PA
3. Environmental and Policy Approaches to Increasing PA
1. Informational Approaches

- Community-wide campaigns
- Mass media campaigns
- Point-of-decision prompts
- Classroom-based health education
  - Information provision
  - Decision making skills
Community-wide campaigns
Strongly Recommended

- Multi-component
  - May include: mass media, social support, education, environmental and policy change, risk factors screenings

- Transmitted through diverse media
  - For example: billboards, television, newspapers

- Directed at large audiences
Community-wide campaigns

Net % Change from Baseline

-20% 0% 20% 40% 60% 80% 100% 120% 140% 160%

% exercising

Energy expenditure

Median increase

EE = 16.3%

% active = 4.2%
Point-of-decision prompts to encourage stair use

Recommended

YOUR HEART NEEDS EXERCISE,
Use The...

Stairs.
Point-of-Decision Prompts Increase in Stair Climbers:

Median = 53.9\%
Insufficient Evidence

- Mass Media Campaigns
- Classroom-based health education
  - Information provision
  - Decision making skills
2. Behavioral and Social Approaches

- School-based physical education (PE) curricula and policy
- Individually-adapted health behavior change
- Social support in community setting
- College-based health education and PE
- Classroom-based health education focusing on reducing television viewing and video game playing
- Family-based social support
School-based PE curricula and policy
Strongly Recommended
Individually-adapted health behavior change programs
Strongly Recommended
Individually-adapted Health Behavior Change

- Goal setting and self-monitoring
- Building social support
- Behavioral reinforcement
- Structured problem solving
- Relapse prevention
Social support interventions in community settings

Strongly Recommended
Social Support in Community Contexts

- Creating, strengthening, and maintaining social networks
- Use of ‘buddy’ systems
- Contracting
- Walking groups
Social support interventions in community settings

- Median
  - Frequency = 19.6%
  - Time = 44.2%

Net % change from baseline

- Frequency of Physical Activity
- Time Spent in Exercise
Insufficient Evidence

- College-based health education and PE
- Classroom-based health education focusing on reducing television viewing and video game playing
- Family-based social support
3. Environmental and Policy Approaches

- Create or enhance access
- Urban planning and land use
  - Community-scale
  - Street-scale
- Transportation policies and practices

(Diverse and challenging literature for urban planning & transportation)
Creation of or enhanced access to places for PA

Strongly Recommended
Creation and/or enhanced access to places for physical activity

- Built environment - trails and/or facilities access
- Reducing barriers - safety, affordability
- Training & incentives
- Site-specific programs
Urban (city) design & land use approaches

- Community-scale changes
  - More residents living within walking distance of shopping, work, and school
  - Improved connectivity of streets and sidewalks
  - Preserve or create green-space and improve aesthetic qualities of the built environment
Strongly recommended

- Community-wide campaigns
- School-based PE curricula and policy
- Individually-adapted health behavioral change
- Social support interventions in community settings
- Create or enhance access

Recommended

- Point-of-decision prompts
Insufficient evidence

- Mass media campaigns
- Classroom-based Health education
- TV/video game turn off
- College-age health education and PE
- Family-based social support
Under Review

- Urban design: community scale
- Urban design: street scale
- Transportation policy

Also whole set of diabetes self-management recs + research questions

- R. Glasgow helped to coordinate
Findings Can be Applied at Every Level of a Community

Community-based organizations:
- Encourage selection of appropriate options for local context
- Tailor to local needs

Researchers:
- Use “insufficient evidence” findings to focus research and in proposing additional research
- Evaluate programs that work in one place in a new area
Limits of Evidence-Based Methods

• Lack of evidence doesn’t mean intervention doesn’t work

• Cultural and geographical bias
  – Largely western world phenomena
  – Evidence may be a luxury in some parts of the world

• Potential bias or randomness in what is funded & studied
Limits of Evidence-Based Methods

• Do a reasonable job of telling us “what” and “how much”
• Give less information on “how” and “why”
• At local level, what works may be the most expensive
• Community-based, participatory approaches
  – May seem counter-intuitive to an evidence-based process
Making Sense of What Works

Guidelines:

- Should *not* be viewed as the sole source for informed decision-making
- Are not conceptualized to address the needs of the community, cultural appropriateness, and political considerations
- Will be most useful when used in conjunction with community needs assessment and planning
The LOCAL Spin on What Works

- Choose realistic strategies
  - Tailored to local needs
  - Balance evidence approaches with innovation/creativity

- Pursue and use local data
  - Greatly enhance likelihood of success
  - Gain local “buy in”

- Discover what drives overall trends in activity and obesity
  - Youth focuses vs. adult focused
Resources to Enhance Decision-Making
Some Useful Sources

• Comprehensive Review

• Ecological Models
Some Useful Sources

- **Environmental and Policy Interventions**

- **General Intervention Effectiveness**
Some Useful Sources

● Evidence-Based Approaches

● Evaluation
Resources to Enhance Decision-Making

Free on CDC website (www.cdc.gov)
<table>
<thead>
<tr>
<th>“Watershed” event</th>
<th>Year</th>
<th>Public Health Intervention</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papanicolaou test perfected</td>
<td>1943</td>
<td>Screening programs for cervical cancer established in all state health departments</td>
<td>1995</td>
</tr>
<tr>
<td>US Surgeon General’s Advisory Committee concludes that smoking causes disease</td>
<td>1964</td>
<td>Statewide tobacco control programs established in all states</td>
<td>1993</td>
</tr>
<tr>
<td>US Surgeon General’s report on physical activity</td>
<td>1996</td>
<td>Statewide physical activity promotion programs established in all states</td>
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BEAT DIABETES
BUY 5 JR FROSTYS
FOR $1
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