**Meeting 5**

# Promotion of Physical Activity

## Chair: Abby King

Members: John Jakicic, David Marquez, Melicia Whitt-Glover

# Experts and Consultants

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    The George Washington University

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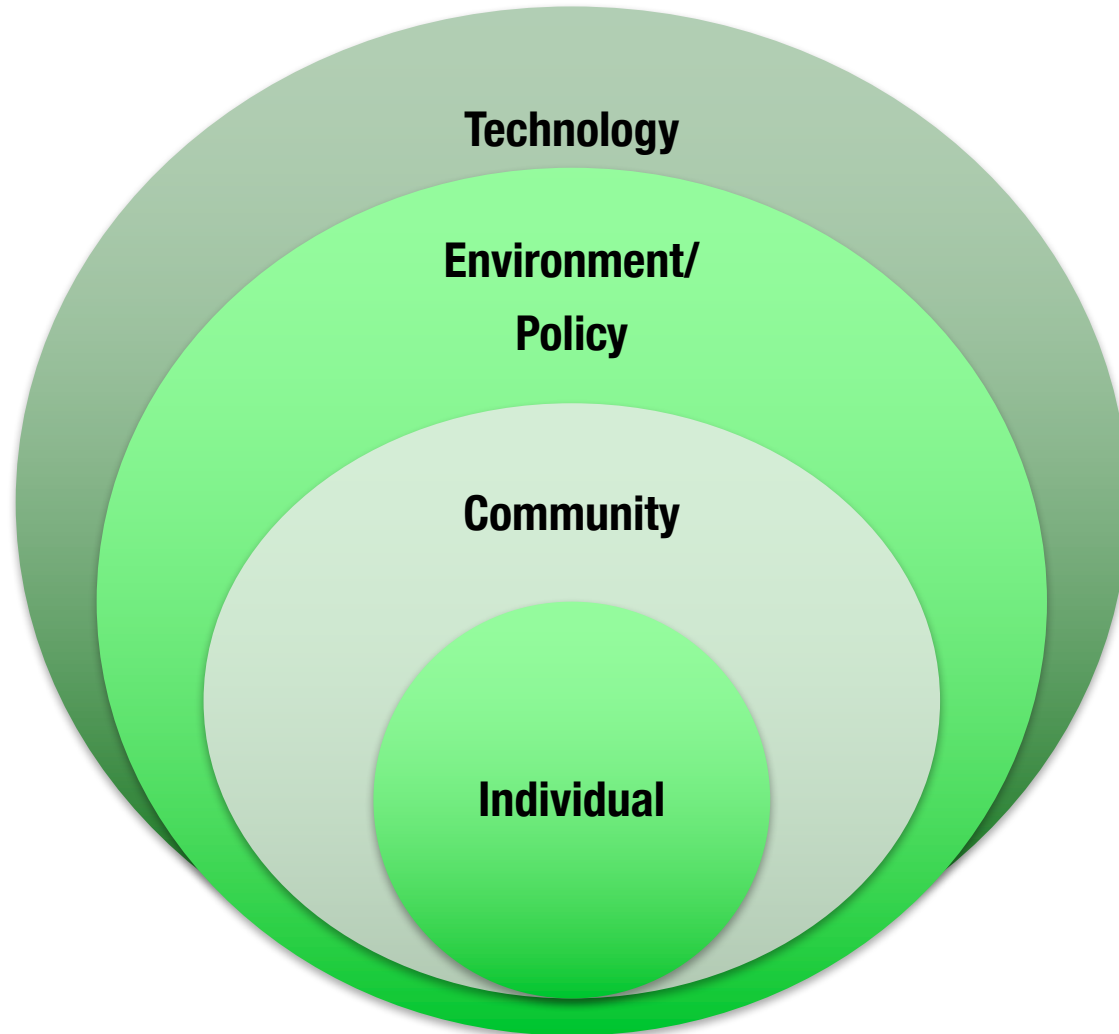
# Subcommittee Questions

1.  **What interventions are effective for <u>increasing physical activity</u> at different levels of impact?**

    a)  **Does the effectiveness vary by age, sex, race/ethnicity, or socio-economic status?**

2.  **What interventions are effective for <u>reducing sedentary behavior</u>?**

# Social Ecological Framework



Technology

Environment/
Policy

Community

Individual

# Question #1

- **What interventions are effective for increasing physical activity at different levels of impact?**

- **Source of evidence to answer question:**
  - **Systematic reviews**
  - **Meta-analyses**
  - **Pooled analyses**
  - **Existing reports**

- ***Focus on identifying areas for which sufficient evidence exists to assign an evidence grade***

# Analytical Framework

**Systematic Review Question 1**

**What interventions are effective for increasing physical activity at different levels of impact?**

**Target Population**

**People of all ages**

**Intervention/Exposure**

**Physical activity intervention(s) at different levels of impact**
- **Information Technology**
- **Built Environment and Policy/Legislation**
- **Community Settings (2 updates)**
- **Individual (2 updates)**

**Key Definition**
Intervention: any kind of planned activity or group of activities (including programs, policies, and laws) designed to prevent disease or injury or promote health in a group of people, about which a single summary conclusion can be drawn (*The Community Guide* http://www.thecommunityguide.org/about/glossary.html).

**Endpoint Health Outcome**

**Physical activity behavior change**

# Updates to *Community-Level* Conclusion Statements

As a consequence of continuing experience with the grading system across different levels & further evaluation of articles & subcommittee deliberations

- **Schools**
  - **Multi-component interventions**
    - **Strong evidence that interventions that impact multiple components of schools are effective for increasing PA during school hours in primary school-aged and adolescent youth. PAGAC Grade: Strong**
  - **Physical education class interventions**
    - **Strong evidence that interventions that revise the structure of physical education (PE) classes are effective for increasing in-class PA in primary school-aged and adolescent youth. PAGAC Grade: Strong**
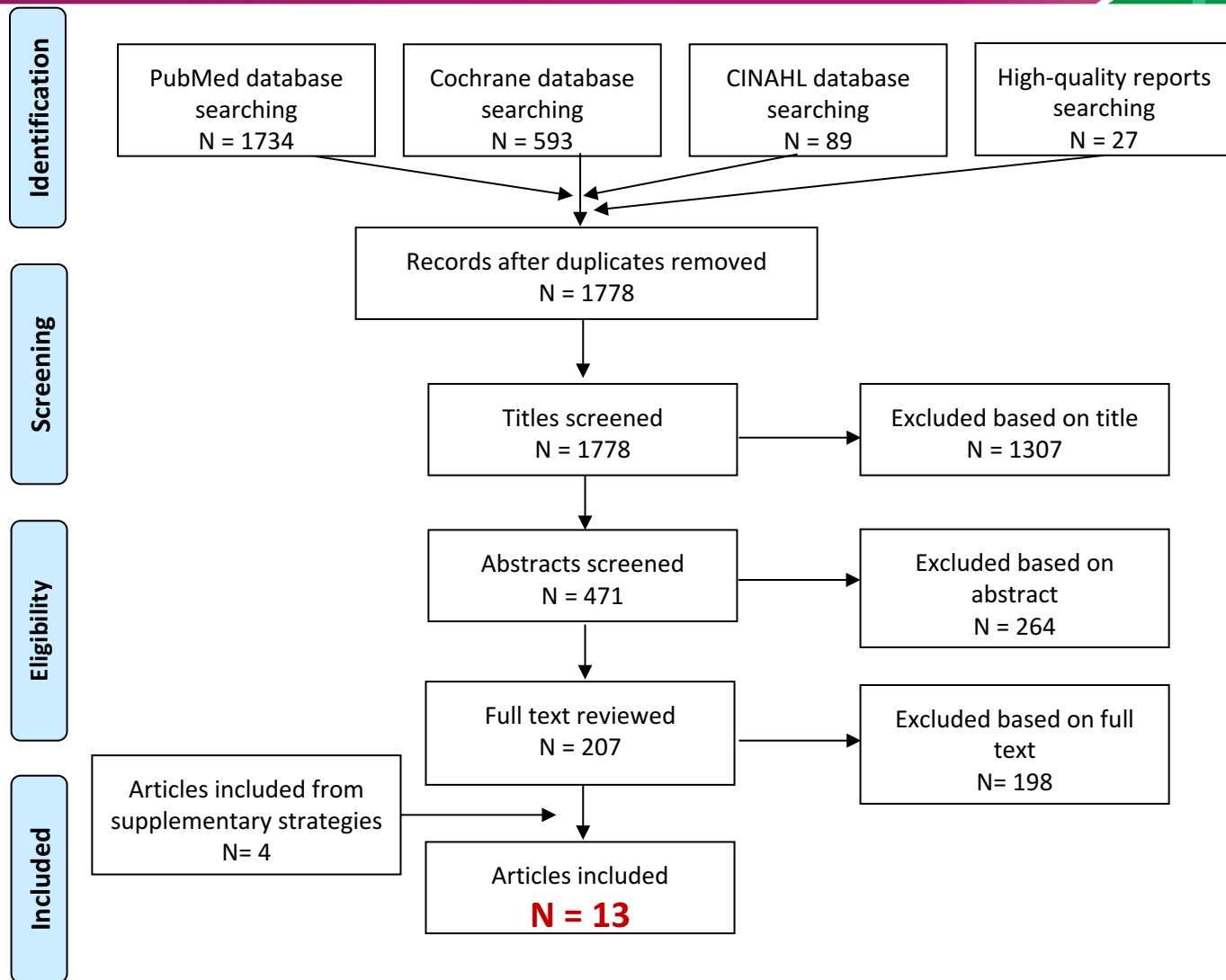
# Updates to *Individual-Level* Conclusion Statements

- ## Older Adults
  - **Strong evidence that PA interventions that target older adults have a small, positive effect on PA when compared with minimal or no-treatment controls, particularly over time periods of 6-12 months. PAGAC Grade: Strong**

- ## Theory-Based Behavioral Interventions
  - **Strong evidence that theory-based interventions and behavior change techniques are effective for increasing PA levels in general adult populations compared with interventions that are not theory-based. PAGAC Grade: Strong**

# Environment & Policy: Definition

- ***Environmental and policy level interventions*** broadly include those features of a locale that relate directly to the built environment (e.g., access to parks, trails, recreational facilities; pedestrian or bicycling infrastructure), or to laws, local ordinances, organizational policies, and institutional practices that can impact physical activity levels.

- Evidence depends more heavily on observational studies (though increasing number of longitudinal designs, quasi-experimental designs, & natural experiments).

# Search Results – Environment & Policy: Reviews[1] and Reports



**Identification**

| PubMed database searching N = 1734 | Cochrane database searching N = 593 | CINAHL database searching N = 89 | High-quality reports searching N = 27 |

Records after duplicates removed
N = 1778

**Screening**

Titles screened
N = 1778 → Excluded based on title
N = 1307

**Eligibility**

Abstracts screened
N = 471 → Excluded based on abstract
N = 264

Full text reviewed
N = 207 → Excluded based on full text
N= 198

**Included**

Articles included from supplementary strategies
N= 4

Articles included
**N = 13**

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[1] Reviews include systematic reviews, meta-analyses, and pooled analyses.

- **Strong evidence that interventions that target <u>point of decision prompts</u> to use stairs vs. escalators or elevators are effective in increasing short term stair use among adults. PAGAC Grade: Strong**

- **Moderate evidence that having <u>access</u> to indoor and/or outdoor recreation facilities or outlets, including parks, trails, and natural or green spaces, is positively associated with PA among adults and children. PAGAC Grade: Moderate**

- **Moderate evidence that built environment characteristics and infrastructure that support active transport to destinations (e.g., safe routes to school programs, street connectivity, a mix of connected residential, commercial, and public land uses) are positively associated with <u>walking and cycling for transport</u> among children, adults, and older adults. PAGAC Grade: Moderate**

- **Moderate evidence that community design and characteristics that support PA, such as having safe and readily usable walking and biking infrastructure and other favorable built environment elements are positively associated with <u>recreational forms of PA</u> among children and adults. PAGAC Grade: Moderate**

# *Draft* Key Findings - Examples of Evidence:
# Point of Decision Prompts to Take Stairs

- **Studies conducted in different community settings (e.g., transit hubs, worksites, hospitals); used behavioral observation**

- **Designs included A-B-A, pre-post, & similar quasi-exptal.**

- **In 1 SR [Jennings, 2017] of 67 studies, 77% reported increases in post-intervention stair use** (2/3 had study durations of $\leq$12 wks.)

- **In studies with significant effects** (n=55 studies), **increases in % stair use ranged from 0.3% - 34.7%**

- **Odds ratios ranged from 1.05** (95% CI: 1.01 – 1.10) **to 2.90** (95% CI: 2.55 – 3.29)

- **When reported, these effects were observed across population subgroups varying in age, sex, weight status**

- **Access measures included objective [GIS] & some perceived measures; mix of cross-sectional & longitud.**

- **In <u>Adults,</u> greater access was sig. related to more PA (e.g., [MA=16 studies] Odds Ratio = 1.20 [95% CI: 1.06 – 1.34]) (Duncan, 2005)**

- **In <u>Youth,</u> 9 of 13 studies showed sig. relations between access and PA, particularly for girls (Mozaffarian, 2012)**

- **Evidence related to population subgroups generally limited**

# *Draft* Key Findings - Examples of Evidence: Active Transport (walking, cycling)

- **Environmental measures included GIS & self-report; mix of cross-sectional & longitud**

- **In <u>Adults</u>, a large natural expt. [RESIDE] & multiple smaller prospective quasi-exptal. studies found sig. increases in active transport over time in response to supportive environ. characteristics** (e.g., walkability, land-use mix/destinations)

- **In 7 studies prospectively comparing more vs. less activity-supportive environs., higher transport walking in former** (median = 38 more mins/wk)

- **In <u>Youth</u>** (from 8 SRs), **activity-supportive environs positively associated with active transport, particularly to school. Odds ratios ranged from 1.8 (95% CI: 1.05 – 3.42) to 3.46 (95% CI: 1.6 – 7.47).**

- **In <u>Older Adults</u>, MA of 42 studies** (Cerin, 2017) **found sig. positive associations with walkability components** (e.g., res. density, street connectivity, land-use mix)

- In 7 studies comparing more vs. less activity-supportive environs., Adults in activity-supportive neighborhoods reported median of **50.4** more mins/week of MVPA

- In 19 studies evaluating neighborhood walkability indices (combination of res. density, street connectivity, land-use mix), **2/3** reported higher levels of MVPA associated with higher walkability scores

- In **Adults**, e.g., positive association between higher walkability index & PA yielded OR = **2.4** (95% CI: 1.18-4.88) (Feng, 2010)

- In **Youth**, e.g., positive association between higher walkability index & PA yielded OR = **1.9** (95% CI: 1.04-3.59) (Feng, 2010)

a)  Does the effectiveness vary by age, sex, race/ethnicity, or socio-economic status?

*Evidence (similar to other levels) insufficient to determine an evidence grade*

# Policy Interventions

- **Defined as: Laws, local ordinances, organizational policies, and institutional practices that can impact physical activity levels.**

- **1 formal review located; mostly descriptive in nature**

- **1 prospective study described in the Community Guide (2017) that evaluated impacts of policies on sprawl found significant positive impacts on transport & recreational activity**

- **Insufficient evidence to provide an Evidence grade**

# *Draft* Implications:
# Environment & Policy level

- Contextual factors related to built environments are important to take into account when developing PA Promotion interventions

- A number of different settings can be included in promoting PA-friendly environments, such as schools, worksites, transit hubs, parks, neighborhoods, and residential settings

- Less information currently available related to rural environments and factors influencing PA behavior, relative to more urban environments

- Relatively little systematic evidence available evaluating effects of policies related to sprawl, land-use mix, and other factors on different types of PA and for different population segments

# *Draft* Research Recommendations: Environment & Policy level

- Systematically examine built environment characteristics as <u>moderators</u> of PA interventions at other levels of impact (individual, community, technology)

- Examine the <u>mix</u> of these factors among different age, gender, cultural, geographic, and socio-economic groups

- Evaluate combined effects of environmental characteristics and <u>cultural/ social contexts & preferences</u> for participating in physical activity

- Expand research on <u>environment prompts</u> for activity, including uses of technology at decision points for PA

- Further examine environmental characteristics in different <u>settings</u> (i.e., rural vs urban, school, worksites) & how they can be modified to promote PA

- Broaden the reach of environmental interventions to sociodemographic populations at <u>highest risk</u> for physical inactivity

- Systematically examine the impacts of <u>policies</u> (e.g., Safe Routes to Schools, sprawl regulation) on physical activity for different population segments

# *Committee Discussion*

1.  **What interventions are effective for increasing physical activity at different levels of impact?**

    a) **Does the effectiveness vary by age, sex, race/ethnicity, or socio-economic status?**

# Question #2

- ## What interventions are effective for *reducing sedentary behavior?*

## Definition of Sedentary (SED) Behavior Interventions

Strategies that seek to reduce sedentary behavior outcomes, which may include self-reported or context-specific forms of sedentary behavior (e.g., television viewing), accelerometer- or movement-based outcomes, or posture-based outcomes (e.g., lying or seated behaviors at <1.5 METs)

# Analytical Framework

**Systematic Review Question 2**

## What interventions are effective for reducing sedentary behavior?

**Target Population**

People of all ages

**Intervention/Exposure**

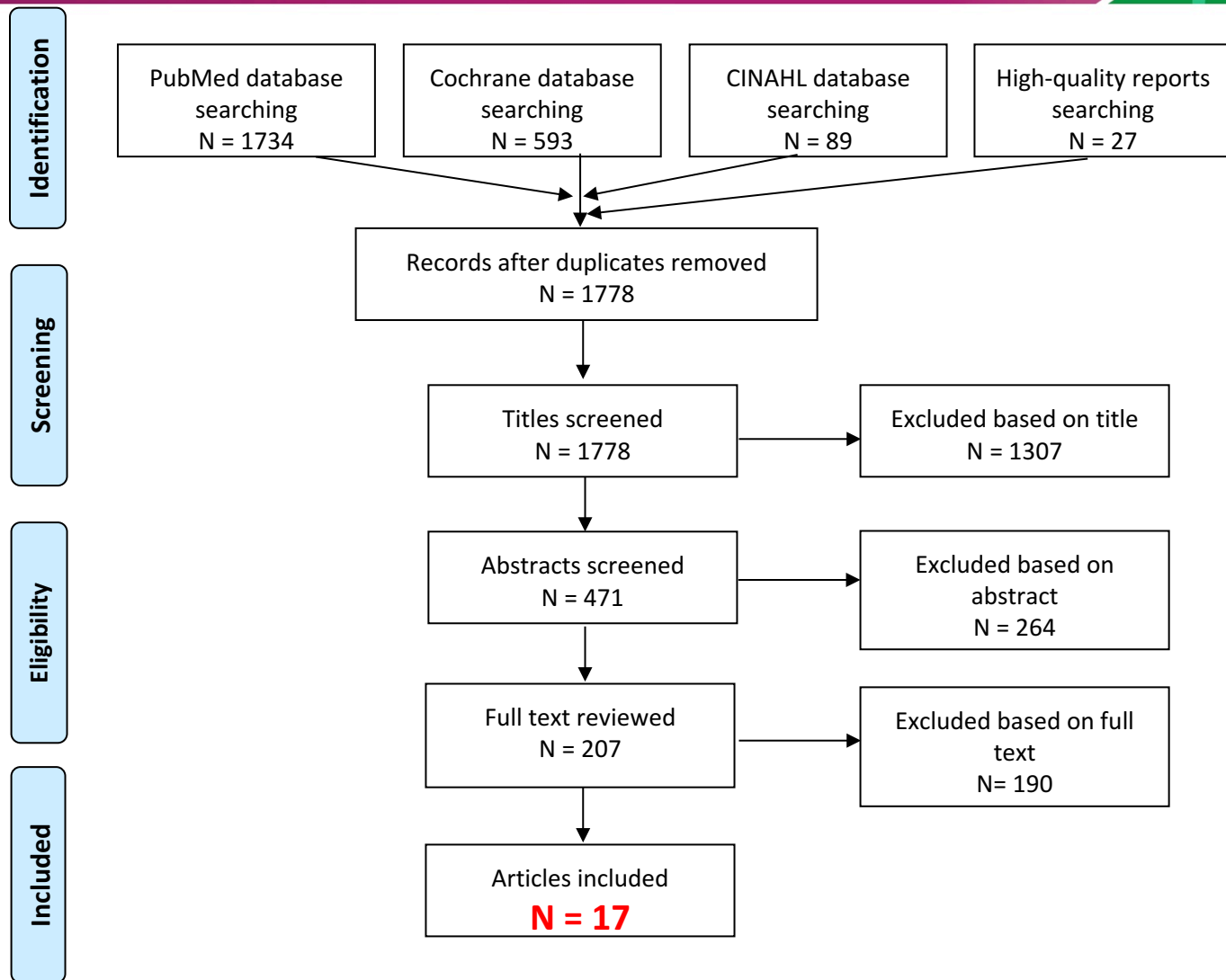Sedentary behavior reduction intervention(s)

**Endpoint Health Outcome**

Sedentary behavior change

**Key Definition**

- **Sedentary (SED) Behavior Interventions: Strategies that seek to reduce sedentary behavior outcomes, which may include self-reported or context-specific forms of sedentary behavior (e.g., television viewing), accelerometer- or movement-based outcomes, or posture-based outcomes (e.g., lying or seated behaviors at <1.5 METs).**

PRISMA flow diagram

**Identification**

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**Included**

Articles included **N = 17**

[1] Reviews include systematic reviews, meta-analyses, and pooled analyses.

# Description of the Evidence

3 Sub-categories (that emerged from the search):

- *Youth:* 8 reviews (4 MA, 4 SR); 130 studies

- *Adults:* 5 reviews (3 MA, 2, SR); 201 studies

- *Worksites:* 4 reviews (2 MA, 2 SR); 101 studies

# *Draft* Conclusion Statement: Youth

- **Moderate evidence that interventions targeting youth (ages 3-15 yrs.), primarily through reductions in TV viewing and other screen-time behaviors in community & school settings, have small but consistent effects on reducing sedentary behavior.**

- **PAGAC Grade: Moderate**

# *Draft* Key Findings: Youth

- **Majority of studies at least 6 months in duration, with no pattern of efficacy based on intervention length; few data on sustainability of sedentary reductions once intervention ended**

- **Occurred in a range of settings (e.g., community, clinical, school)**

- **Some targeted sedentary behavior exclusively, while others included it in multiple behavior change interventions (i.e., primarily SED + PA; some also included diet)**

- **In one review, reductions in sedentary time averaged 20.4 mins/day (95% CI: -30.69 to -10.20) mins/day**

- **In School interventions targeting reduced screen time, SMD= -0.25: (95% CI: -0.37 to -0.13) hours/day**

- **Accelerometer-based studies generally showed greater reductions in sedentary behavior than studies with self-reported outcomes**

# *Draft* Conclusion Statement: Adults

- **Limited evidence that sedentary behavior interventions targeting decreases in overall sedentary time in general adult populations are effective.**

- **PAGAC Grade: Limited**

# *Draft* Key Findings: Adults

- **Interventions targeting SED behavior <u>exclusively</u> had most promising effects** (SMD= -41.76; CI: -78.92, -4.60), **but were of short duration (< 3 months), limited follow-up, & had other methodological constraints**

- **Interventions targeting <u>PA</u> had small to no effect on SED behav. (in 1 review, 6/19 [32%] had sig. effects; their** SMD = -0.22 [-0.35 to -0.10]**)**

- **<u>Multiple behav.</u> Interventions (SED + PA and/or diet) had small & variable effects on SED (in 1 review, 6/20 [30%] had sig. effects, their** SMD = -24.18 [95% CI: -40.66,-7.70]**)**

# *Draft* Conclusion Statement: Worksites

- **Moderate evidence that interventions targeting sedentary behavior in worksites–particularly among office workers who perform their job duties primarily while seated–have moderate to large short-term effects in reducing sedentary behavior.**

- **PAGAC Grade: Moderate**

# *Draft* Key Findings: Worksites

- **Environmental** changes (predominantly addition of sit-stand workstation, & some treadmill desk or stationary cycle ergometer studies) had consistently medium to large effects (SMD = -72.78 [-104.92, -40.64 mins/8-hour workday]). **These effects were stronger when environmental changes were combined with educational & behavioral support** (SMD = -88.80 [95% CI: -132.69, -44.61 mins/8-hour workday])

- **Walking workstations and cycle ergometers appear to have more limited efficacy compared to sit-stand workstations at reducing workplace sedentary time (i.e., sitting)**

- **Interventions providing educational or motivational support only showed small and inconsistent effects on sedentary behavior** (SMD = -15.52 [-22.88,-8.16 mins/8-hour workday])

# *Draft* Implications: Sedentary Interventions

- SED interventions may <u>complement</u> PA interventions given that they can be implemented during times when PA is generally not feasible (e.g., during school class time, work time).

- Overall, <u>targeted</u> approaches to SED behavior reduction appear more efficacious than broader-based lifestyle interventions which include reducing sedentary time.

- <u>Environmental supports</u> (e.g., sit-stand workstations) may be necessary for substantive changes in sedentary time in work settings, particularly among office workers & similar jobs.

- Across subgroups, <u>objective SED assessments</u> consistently captured stronger effects than self-report, & postural sensors that distinguish sitting vs. standing had stronger intervention effects than accelerometer-based sensors.

# *Draft* Research Recommendations

- **Specifically target <u>behavioral & environmental</u> strategies for reducing overall sedentary time**

- **Evaluate intervention strategies that target the <u>full waking day</u> (e.g., magnitude of total sedentary change, and explore behavioral compensation)**

- **<u>Broaden enrollee targets</u> to increase diversity & generalizability (e.g., racial/ethnic minority & lower-income children and adults, non-office workers, and individuals with varying job types and schedules)**

- **Evaluate behavioral relations and synergies between changes in sedentary behavior and PA in different populations**

# *Committee Discussion*

- ## What interventions are effective for reducing sedentary behavior?

# Next Steps

- **WRITE**

- **WRITE SOME MORE**

- **KEEP WRITING**

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