
Exercise in Primary Care

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Presenter Disclosure Information

- I have no disclosures

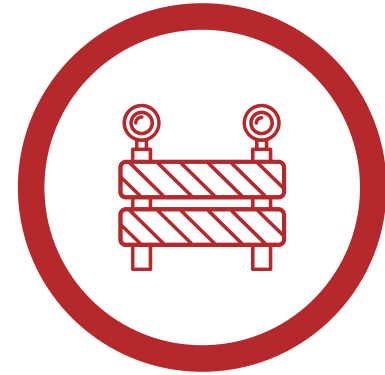
Learning Objectives



Discuss both aerobic exercise and resistance training benefits with patients



Identify special considerations for patients with complications



Determine and address barriers to physical activity

Types of exercise and physical activity



Aerobic
exercise



Resistance
exercise



Flexibility
exercises



Balance
exercises

A close-up photograph of an elderly woman with short, light-colored hair, smiling warmly at the camera. She is wearing a white t-shirt and is in the middle of lifting a small blue dumbbell with her right hand. The background is softly blurred, showing what appears to be a gym or a bright indoor space with some equipment. The overall mood is positive and active.

Benefits of exercise and physical activity

Benefits of Aerobic Exercise

T1D and T2D:



**Lower cardiovascular
and overall mortality
risks**

T2D:



**Reduces A1C, triglycerides,
blood pressure, and insulin
resistance**

Benefits of Resistance Exercise

Improvements in:



Muscle mass



Bone mineral density



Body composition



Insulin sensitivity



Strength



Blood pressure



Physical function



Lipid profiles



Mental health



Cardiovascular health

J Cardiol 2011;58:173–180
Med Sci Sports Exerc 2011;43: 1334–1359
Diabetes Res Clin Pract 2009;83:157–175

Benefits of Resistance Exercise

- Resistance training **enhances insulin action** similarly, as do HIIT and other modes.
- Combining endurance exercise with resistance exercise may provide greater improvements, **and HIIT may be superior to continuous aerobic training** in adults with diabetes.



Insulin Action and Physical Activity

- Acutely, aerobic exercise **increases muscle glucose uptake** up to fivefold through insulin-independent mechanisms. After exercise, glucose uptake remains elevated by insulin-independent (2 h) and insulin-dependent (up to 48 h) mechanisms if exercise is prolonged
- Improvements in insulin action may last for 24 h following shorter duration activities (20 min) if the intensity is elevated to near-maximal effort intermittently.
- Regular aerobic training **increases muscle insulin sensitivity** in individuals with prediabetes and type 2 diabetes in proportion to exercise volume

Effect of Exercise on Glucose Control

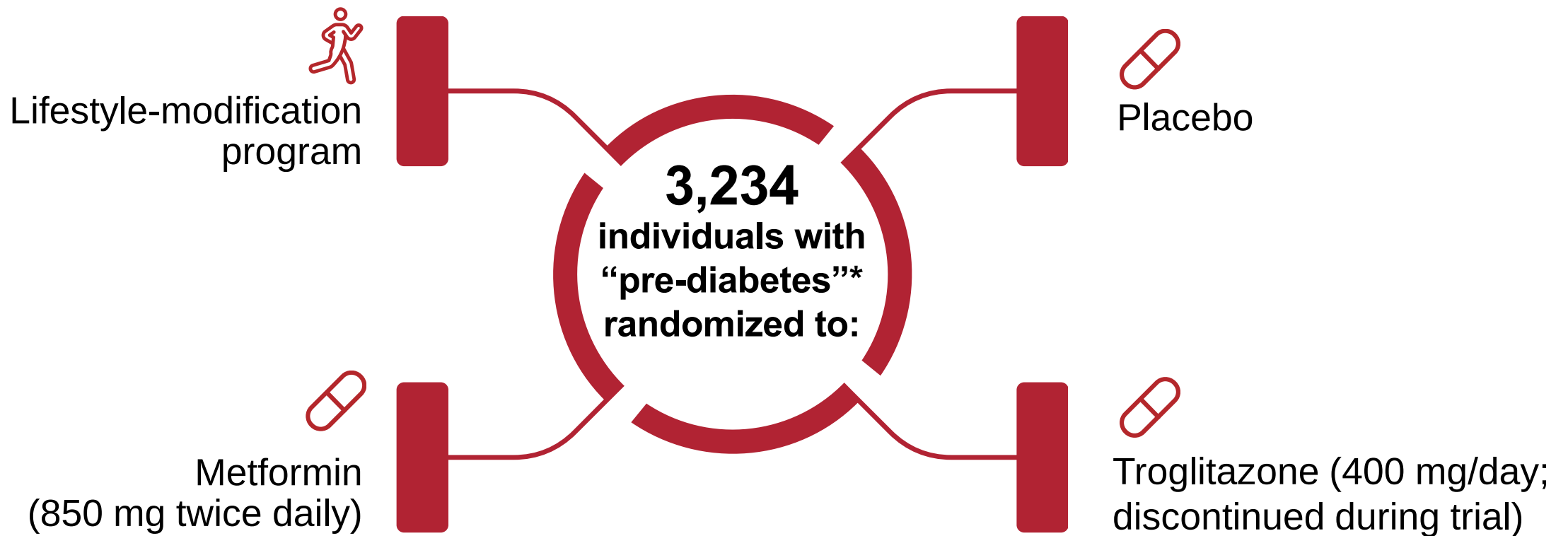
- Improves A1C by **0.57%**
- A meta-analysis of 12 trials in adults with T2D reported a greater reduction (difference of 20.18%) in A1C following **aerobic compared with resistance training** but no difference in cardiovascular risk marker reduction
- For glycemic control, **combined training** is superior to either type of training undertaken alone
- Adults with type 2 diabetes should ideally perform **both aerobic and resistance** exercise training for optimal glycemic and health outcomes.

Flexibility and balance training

- Flexibility and balance exercises are important for older adults with diabetes
 - does not affect glycemic control
- Balance training can reduce falls risk by improving balance and gait, even when peripheral neuropathy is present



Prevention of Diabetes: Diabetes Prevention Program (DPP)

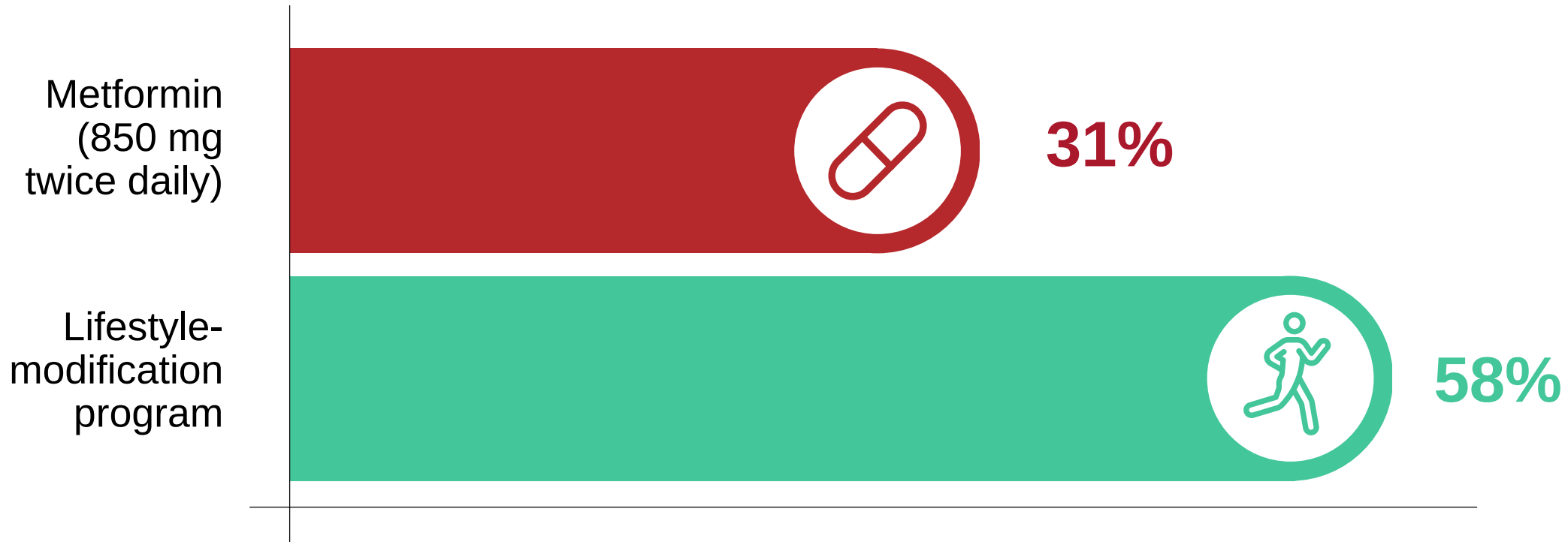


*elevated fasting and post-load plasma glucose

DPPRG. Reduction in the Incidence of Type 2 Diabetes with Lifestyle Intervention or Metformin. NEJM, 2002;346(6):393-403.

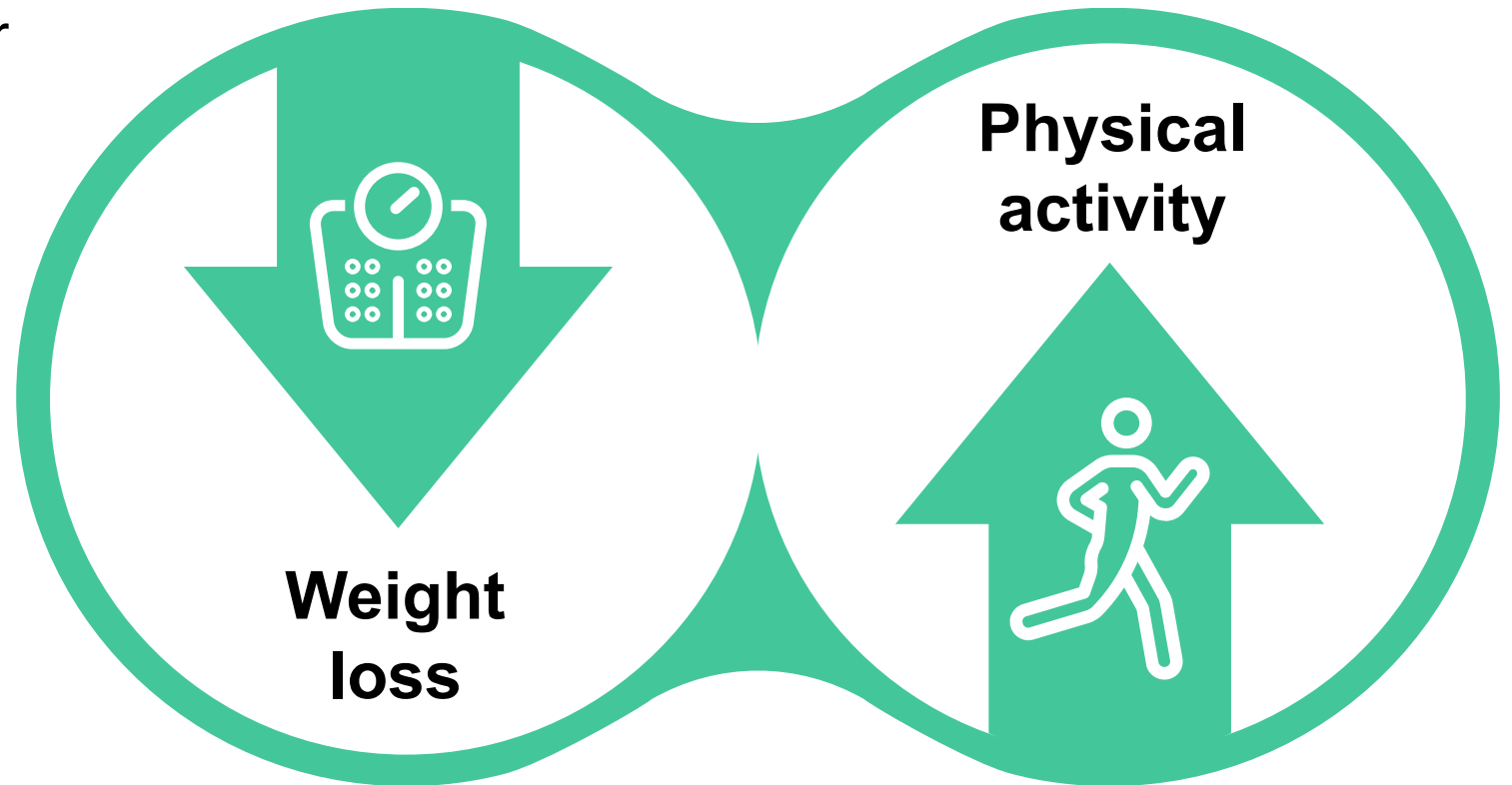
DPP: Reduction in incidence of diabetes compared to usual care group

Reduction in incidence of diabetes compared to usual care group



Where do we fit in?: The relation between sessions attended and outcomes

Close relation to number of sessions attended:



Diet and Exercise programs work

53 studies:

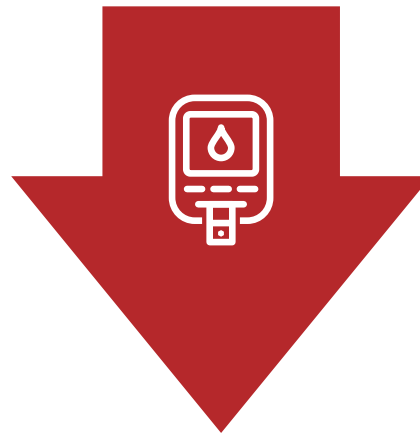
Compared with usual care, diet and physical activity promotion programs:



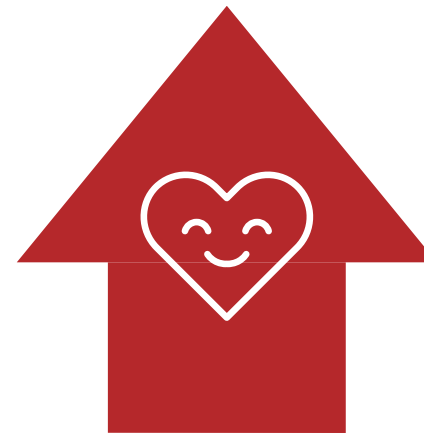
Reduced T2D
incidence (RR,
0.59)



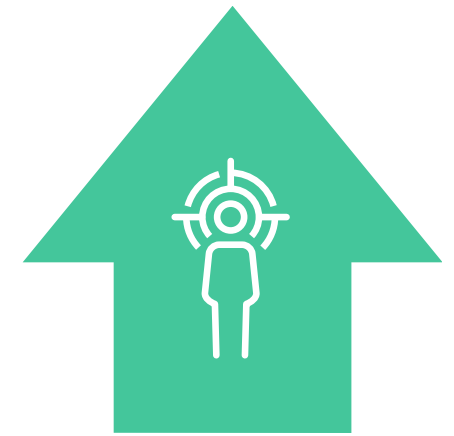
Decreased body
weight (−2.2%)



Decreased
fasting blood
glucose level



Improved other
cardiometabolic
risk factors



More intensive
programs were
more effective.

LOOK AHEAD Trial

- Largest randomized trial evaluating lifestyle intervention in older adults with T2D
- The intensive lifestyle intervention group targeted weight loss of at least 7% through:
 - a modest dietary energy deficit
 - at least 175 min/week of unsupervised exercise.



Results – LOOK AHEAD Trial

- Major cardiovascular events - the same in both groups
- The intensive lifestyle intervention group achieved significantly greater sustained improvements in:



Weight loss, cardiorespiratory fitness, blood glucose control, blood pressure, and lipids with fewer medications



Sleep apnea



Less severe diabetic kidney disease and retinopathy



Depression



Sexual dysfunction



Urinary incontinence



Knee pain



Better physical mobility maintenance and quality of life



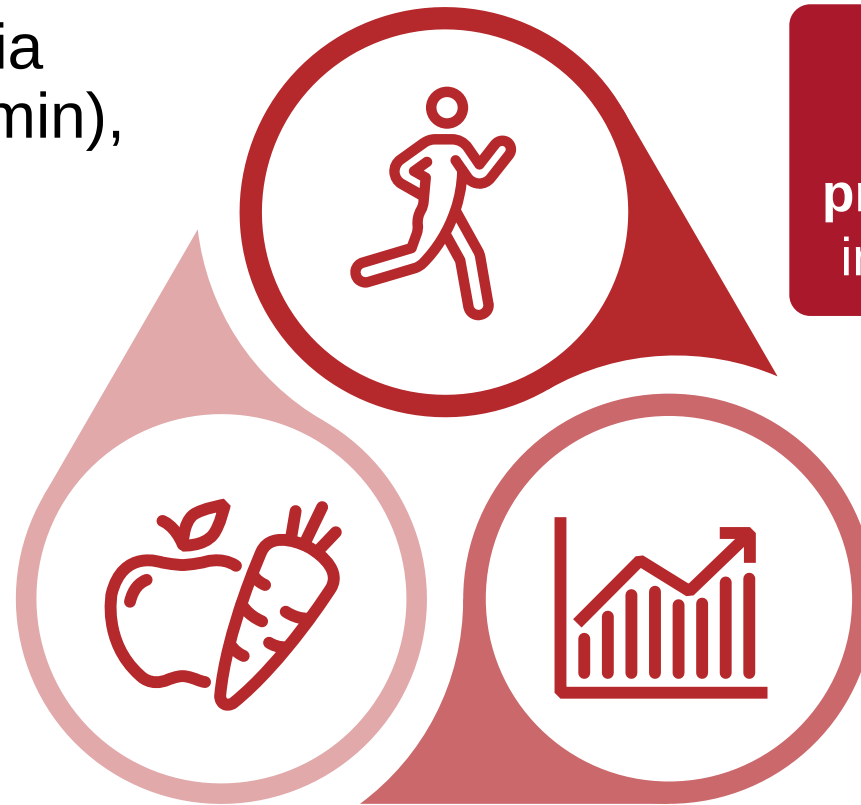
Lower overall health care costs

N Engl J Med 2013;369:145–154
Curr Nutr Rep 2014;3:387–391

Management of Food and Insulin With Physical Activity

To prevent hypoglycemia during prolonged (>30 min), predominantly aerobic exercise:

Additional
carbohydrate
intake



Blood glucose concentrations **should always be checked prior to exercise undertaken by individuals with type 1 diabetes.**

And/or reductions in insulin are typically required.

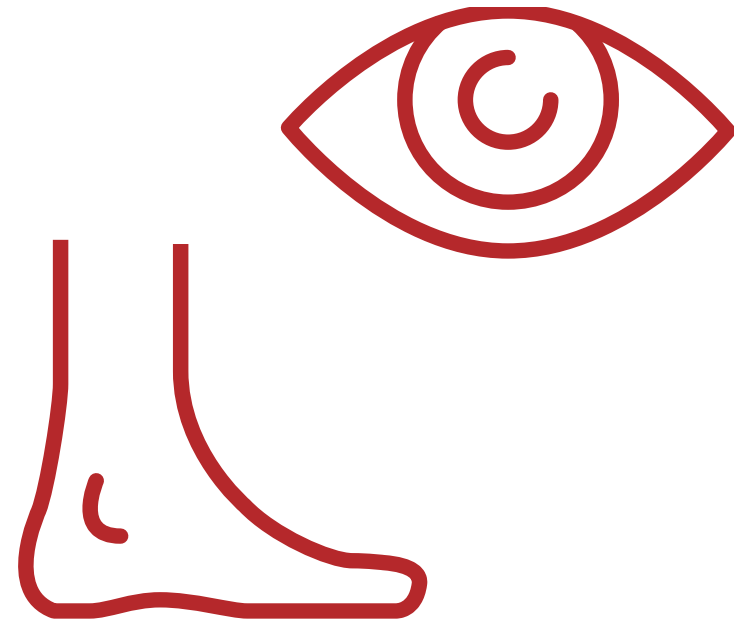
Pre-participation evaluation

- Generally unnecessary for asymptomatic individuals prior to beginning low- or moderate-intensity physical activity not exceeding the demands of brisk walking or everyday living.
 - No current evidence suggests that any screening protocol beyond usual diabetes care reduces risk of exercise-induced adverse events in asymptomatic individuals with diabetes



Managing physical activity with health complications

- Peripheral neuropathy -- proper foot care necessary to detect and prevent problems early to avoid ulceration and amputation.
- Autonomic neuropathy -- certain precautions are warranted to prevent problems during activity.
- Diabetic retinopathy -- jumping, jarring, head-down activities and breath holding should be avoided (severe nonproliferative and unstable proliferative diabetic retinopathy).



A photograph of a woman with short grey hair and two children walking through a grassy field. The woman is in the center, holding the hands of a young boy on her left and a young girl on her right. They are all smiling and looking towards the right. The background is a soft-focus view of trees and a bright sky. The word "Recommendations" is overlaid on the left side of the image, preceded by a short red horizontal line.

Recommendations

Reducing sedentary time

- Higher amounts of sedentary time are associated with increased mortality and morbidity, mostly independent of moderate-to- vigorous physical activity participation

Ann Intern Med 2015;162:123–132
Diabetes Care 2016;39:2065–2079



Reducing sedentary time

- In people with or at risk for developing type 2 diabetes, extended sedentary time is also associated with poorer glycemic control and clustered metabolic risk
- All adults, and particularly those with type 2 diabetes, should decrease the amount of time spent in daily sedentary behavior. (B)



Reducing sedentary time

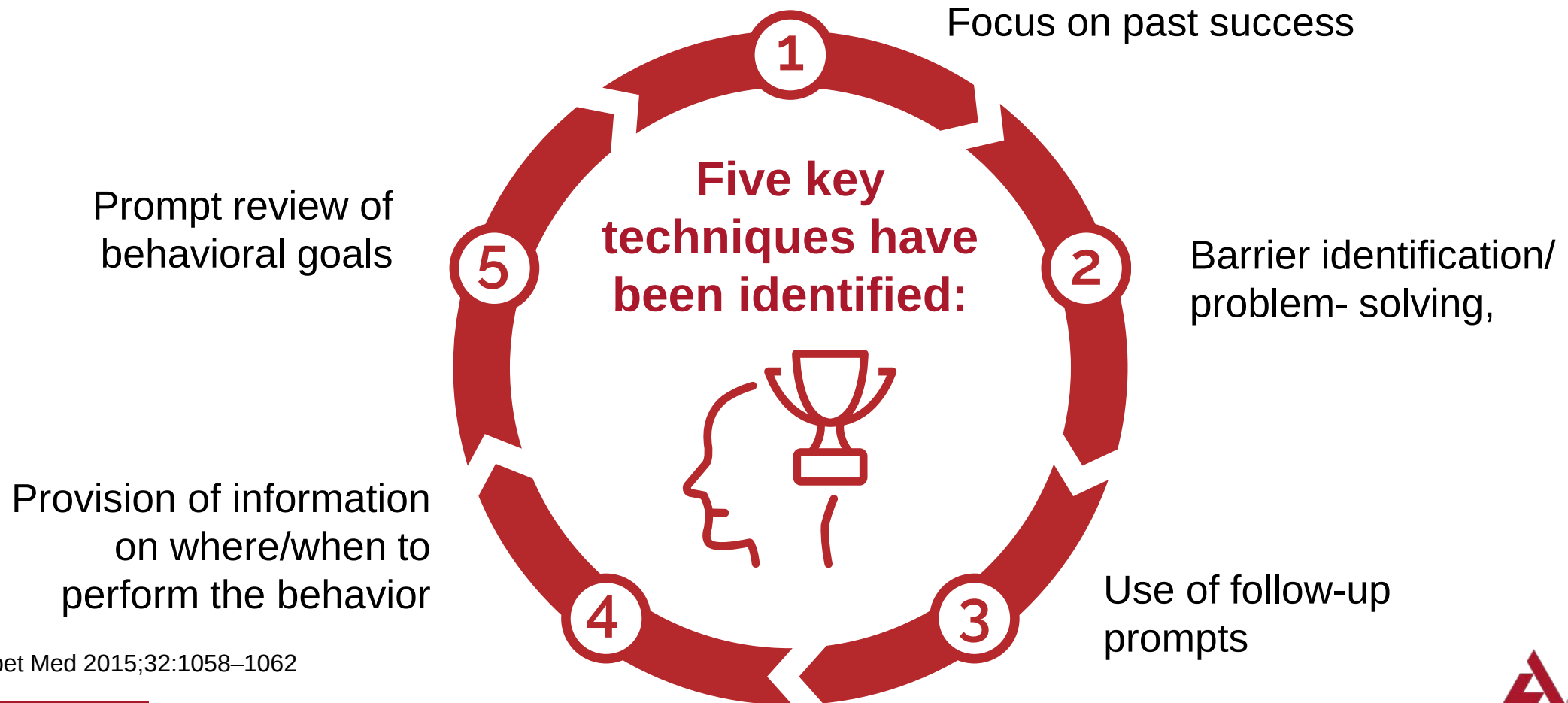
- Prolonged sitting should be interrupted with bouts of light activity every 30 min for blood glucose benefits, at least in adults with type 2 diabetes (C)



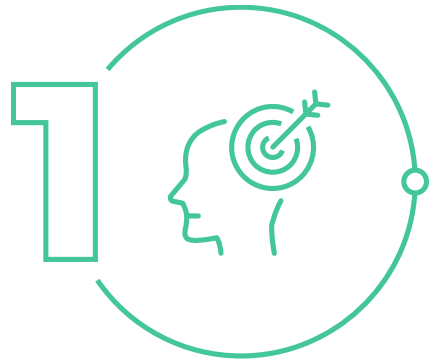
Physical activity and type 2 diabetes recommendations

- Most adults with diabetes should engage in **150 min or more of moderate-to-vigorous intensity activity weekly**, spread over at least 3 days/week, with no more than 2 consecutive days without activity.
- Shorter durations (minimum 75 min/week) of vigorous- intensity or interval training may be sufficient for younger and more physically fit individuals.
- Adults with type 2 diabetes should ideally perform **both aerobic and resistance** exercise training for optimal glycemic and health outcomes.

Behavior-Change Strategies



Advising Patients



Primary goal –
Develop
exercise habit

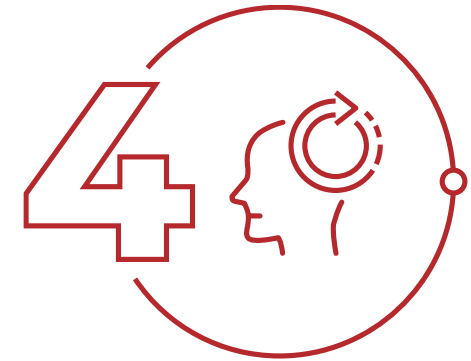


Next – Set
concrete steps:

- Short-term goals
- Long-term goals
- Team approach –
personal trainers



Anticipatory
guidance –
Anticipate
hurdles



Follow-up

Advising Patients



Why

- Discuss the short and long-term health and quality of life benefits of beginning an exercise program.



Provide Options

After providing information about why to exercise, provide options from which the patient can choose:



Do Nothing



Medication



Diet/
Exercise



Meds/Diet/
Exercise

What?

- What type of exercise?
- What level of exertion?
- How long? How often?



Activity Level

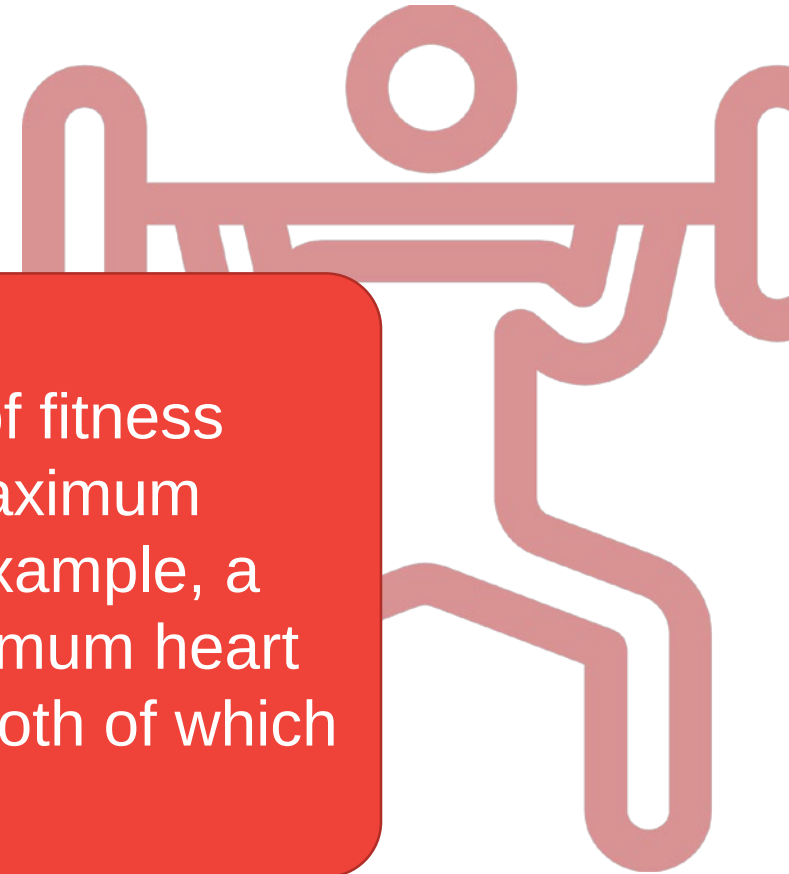
Intensity can be described in two ways:

Absolute Intensity:

Expressed in METS - 1 MET is equivalent to the resting metabolic rate or the energy expenditure while awake and sitting quietly

Relative Intensity:

Is specific to your level of fitness and based off of your maximum capability of work. For example, a percentage of your maximum heart rate or oxygen uptake, both of which are signs of fitness.



Activity Level

Moderate

- 3-6 METS
- walking briskly; raking the yard

Vigorous

- >6 METS
- jogging or running; strenuous fitness class



Activity Level

- Heart Rate - 60-80% of max heart rate (220-age).
- Talk Test –
 - Moderate-intensity aerobic activity: can talk, but not sing, during the activity.
 - Vigorous-intensity activity: generally cannot say more than a few words without pausing for a breath.



Where?

- Where are you going to exercise?



When?

- What days?
- What time of day?



Who?

- Who is your behavioral coach?



Summary

- Regular exercise may prevent or delay type 2 diabetes development
- Exercise **improves blood glucose control** in type 2 diabetes, **reduces cardiovascular risk factors**, contributes to **weight loss**, and improves **well-being**
- Prolonged sitting should be interrupted
- Most adults with diabetes should engage in **150 min or more of moderate-to-vigorous intensity activity weekly**, spread over at least 3 days/week, with no more than 2 consecutive days without activity.

Resource

- Physical Activity/Exercise and Diabetes: A Position Statement of the American Diabetes Association - Diabetes Care 2016;39:2065–2079 | DOI: 10.2337/dc16-1728
- <http://www.exerciseismedicine.org>