

Physical Activity and Breast Cancer Outcomes in the Pathways Study:

The Evidence and the Message

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Three Key Takeaways

1. Develop an understanding of **physical activity definitions** essential for interpreting public health guidelines and scientific evidence.
2. Obtain an understanding of the **Physical Activity Guidelines for Americans (PAGs)** and differentiate between the PAGs and the **“10,000 steps per day”** messaging in the popular media.
3. Gain an understanding of the **evidence linking regular PA with improved breast cancer outcomes in the Pathways Study**

Physical Activity Definitions and the Physical Activity Guidelines



Key Physical Activity Definitions

- **Physical Activity (PA)**
 - Recreational or leisure-time PA
 - Occupational
 - Household/garden/yard
- **Exercise – A specific routine w/ goals**
 - Health-related fitness (health/function)
 - Sport-related fitness (a sport or event)
- **Physical Inactivity**
 - No regular PA during leisure time
- **Sedentary Behavior**
 - An independent behavior characterized by low energy expenditure (*ex: sitting or lying on a couch to read, relax or watch TV*)
- **F.I.T.T. Principle – components of PA/exercise prescription**
 - Frequency,
 - Intensity,
 - Time (duration),
 - Type (mode of exercise)
- **The Physical Activity Guidelines include two types of PA:**
 - Aerobic PA
 - Muscle Strengthening PA

Physical Activity Guidelines for Americans (HHS)

- ✓ **Move more and sit less** throughout the day.
- ✓ For **aerobic PA**, aim for **150-300** minutes/wk of moderate-intensity PA, or **75-150** minutes of vigorous-intensity PA. Aerobic PA should be spread throughout the week.
- ✓ For **muscle-strengthening**, perform activities that target all major muscle groups on **2 or more days** a week. Older adults (age 65 and above) should also incorporate **balance training**.
- ✓ If that's more than you can do, do what you can. **Any amount of activity is better than inactivity.**

MOVE YOUR WAY

Adults need a mix of physical activity to stay healthy.

Moderate-intensity aerobic activity*
Anything that gets your heart beating faster counts.

at least **150 minutes a week**

Muscle-strengthening activity
Do activities that make your muscles work harder than usual.

at least **2 days a week**

AND

* If you prefer vigorous-intensity aerobic activity (like running), aim for at least **75 minutes a week**.

If that's more than you can do right now, **do what you can**. Even 5 minutes of physical activity has real health benefits.

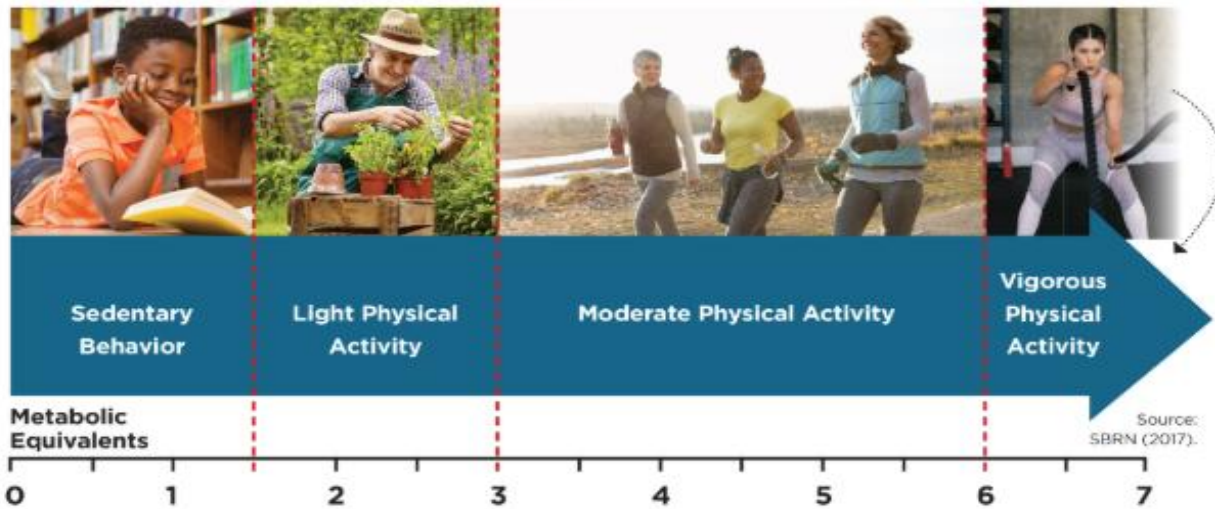
Walk. Run. Dance. Play. **What's your move?**

Defining Intensity for Aerobic PA Guidelines

Absolute Intensity: Used in the Research

Every activity has an assigned value of “intensity” (termed a metabolic equivalent of task, or “MET”) regardless of body size or ability – Values published in the PA Compendium

ENERGY EXPENDITURE CONTINUUM



Relative Intensity: Used “in practice”

An individualized self-rating of intensity or perceived exertion (RPE)

1	Very Light Activity	Hardly any exertion, but more than sleeping, watching TV, Etc.
2-3	Light Activity	Feels like you can maintain for hours, easy to breathe and carry on a conversation
4-6	Moderate Activity	Breathing Heavily but you can still hold a short conversation, Still somewhat comfortable, but becoming noticeable more challenging
7-8	Vigorous Activity	Borderline uncomfortable, short of breath, can speak a sentence
9	Very Hard Activity	Very difficult to maintain exercise intensity, can barely breathe and speak only a few words
10	Maximal Effort	Feels almost impossible to keep going, completely out of breathe, unable to talk, cannot maintain for more than a very short amount of time

PAGS

Determining Activity Levels in The Pathways Study

Step One:

Participant reports all physical activities performed at each time point.

- ✓ Baseline/enrollment
- ✓ One-year follow-up
- ✓ Three-year follow-up

Step Two:

Identify MET value in the PA Compendium that Best Represents Reported Physical Activities

17152	2.8	Walking, 2.0 to 2.4 mph, level, slow pace, firm surface
17160	3.5	Walking for pleasure (Taylor Code 010)
17161	2.5	Walking from house to car or bus, from car or bus to go places, from car or bus to and from the worksite
17162	2.5	Walking to neighbor's house or family's house for social reasons
17165	3.0	Walking the dog
17170	3.0	Walking, 2.5 mph, firm, level surface
17180	3.3	Walking, 2.5 mph, downhill
17190	3.8	Walking, 2.8 to 3.4 mph, level, moderate pace, firm surface
17200	4.8	Walking, 3.5 to 3.9 mph, level, brisk, firm surface, walking for exercise

Step Three: Standardize by Calculating MET hours to Classify by Activity Level

Participant walks 40 minutes per day at this pace, for a total of 280 minutes per week. To standardize this in MET hours:

- 280 minutes x 3.8 = 1064 MET minutes
- 1064 minutes/60 min per hour = 17.7 MET hours per week
- Total MET hours for all activities are then categorized according to the PAG activity levels which include: Inactive, low active, moderate active, or high active

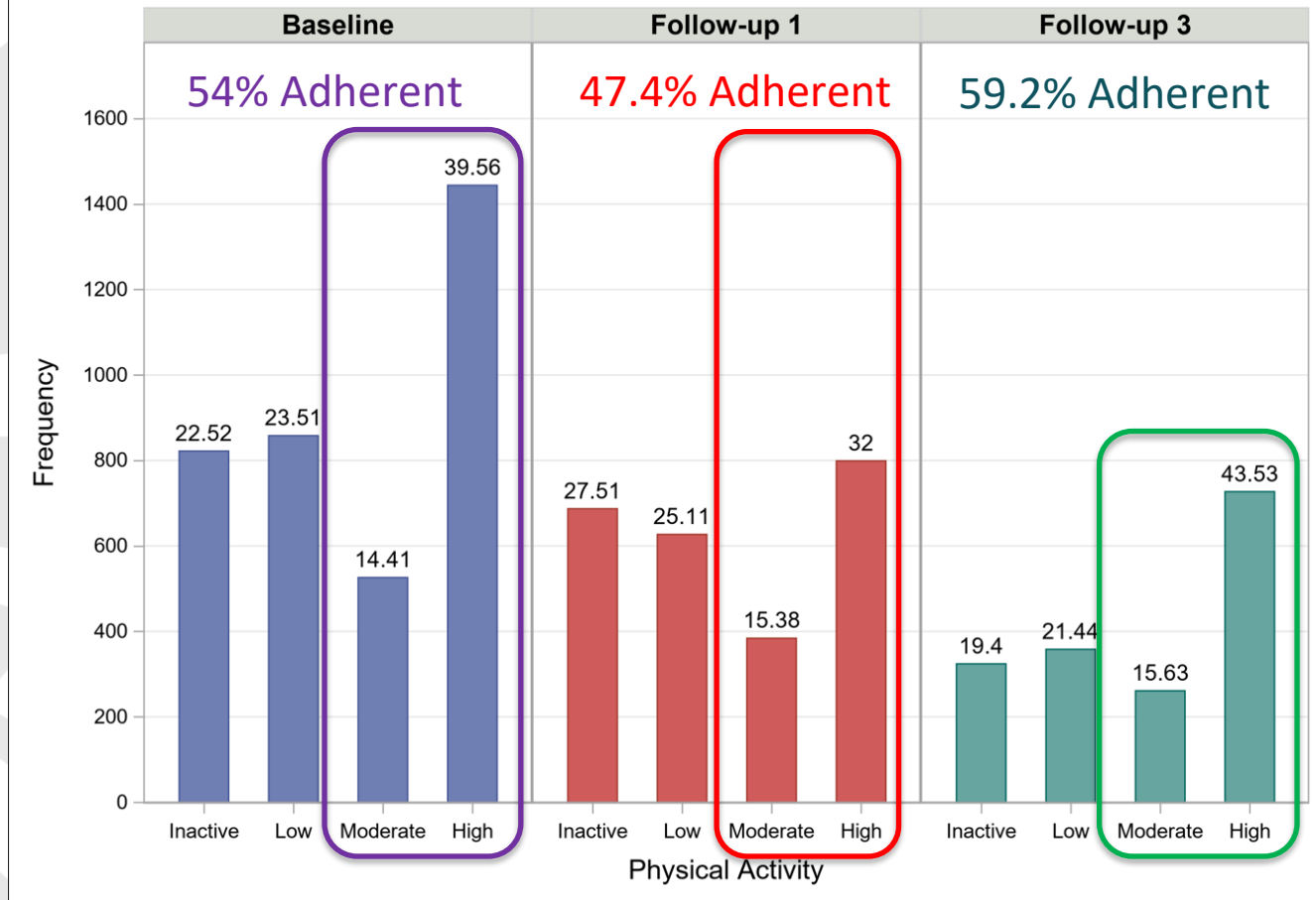
Physical Activity Levels and Breast Cancer Outcomes in the Pathways Study



What is the Prevalence of Meeting the PAGs in the Pathways Study?

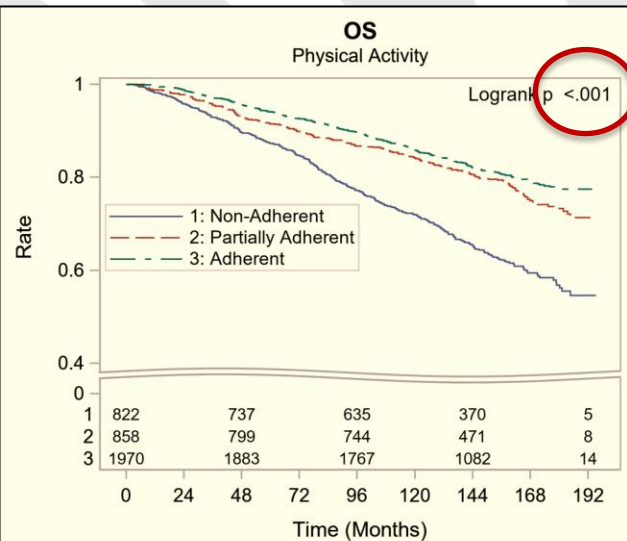
Classifying Activity Level According to MET hours per Week:

- **Inactive** = no regular PA during leisure time
- **Low activity** = some regular activity but not meeting the PAGs (>.5 and < 7.5 MET hrs per week)
- **Moderate activity** = meeting the minimum PAGs (7.5-15.0 MET hours per week)
- **High activity** = exceeding the minimum PAGs for aerobic PA (>15.0 MET hours per week)
- **Adherence** = Moderate and High Combined

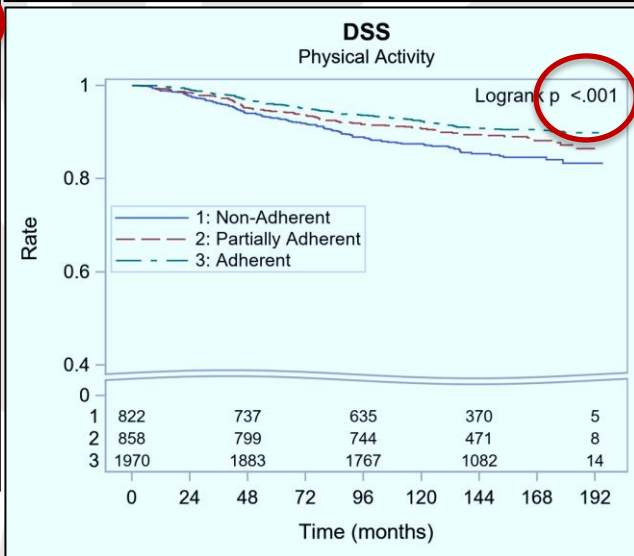


Survival Outcomes According to Self-Reported PA at the Time of Enrollment in the Pathways Study

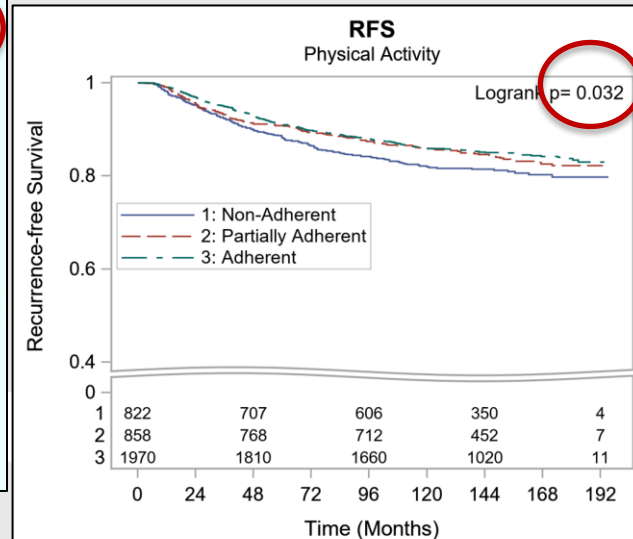
Overall Survival



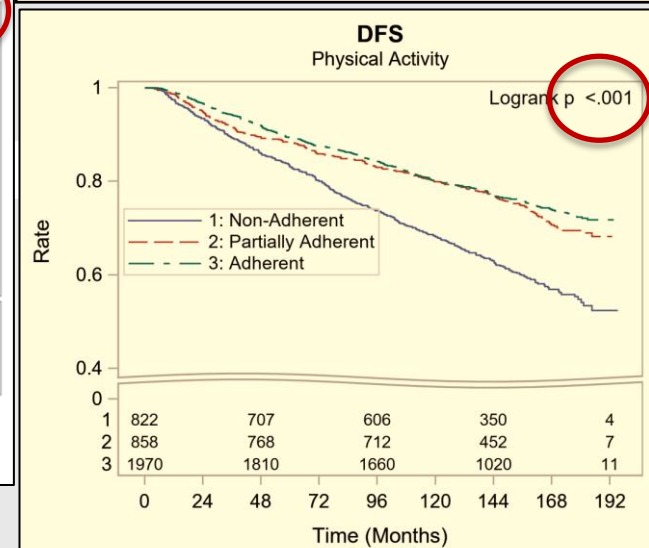
Breast Cancer Survival



Recurrence-Free Survival



Disease-Free Survival



Meeting or exceeding the minimum Physical Activity Guidelines at the Time of Study Enrollment is Associated with Significantly Improved Survival Outcomes in the Pathways Study

PA and Overall Mortality in the Pathways Study

Association of Self-reported PA at Enrollment with Overall Mortality

- ✓ Full adherence to the PAGs vs. inactivity is associated with a **42% reduction in all-cause mortality**
- ✓ Partial adherence (low activity) vs. inactivity is associated with **30% reduction in mortality.**

Association of **Average PA Level** over Time with Overall Mortality

- ✓ Full adherence versus inactivity: **54% decrease in all-cause mortality**
- ✓ Partial adherence versus inactivity: **37% decrease in all-cause mortality**

Note: Analyses account for age of diagnosis, menopause status, stage, marital status, Charlson Comorbidity Index, and breast cancer subtype.

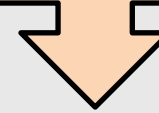
PA and **Breast Cancer Mortality** in the Pathways Study

Association of Self-reported
PA at **Enrollment** with
Breast Cancer Mortality



- ✓ Full adherence to the PAGs vs. inactivity is associated with a **35% reduction** in breast-cancer specific mortality
- ✓ Partial adherence vs. inactivity: **No significant association** with BC Mortality

Association of **Average PA Level** over Time with
Breast Cancer Mortality



- ✓ Full adherence vs. inactivity: **46% reduction** in breast-cancer specific mortality
- ✓ Partial adherence vs. inactivity: **No significant association**

PA and **Progression** in the Pathways Study

Note:

In today's talk, 'Progression' represents a combination of all outcomes represented in the survival curves including disease recurrence or death from any cause.

Association of Self-reported PA at **Enrollment** with **Progression**

- ✓ Full adherence versus inactivity: **31% reduction in progression**
- ✓ Partial adherence versus inactivity: **26% reduction in progression**

Association of **Average PA Level over Time** with **BC Progression**

- ✓ Full adherence to the PAGs vs. inactivity is associated with a **41% reduction in progression**
- ✓ Partial adherence (low activity) vs. inactivity is associated with **28% reduction in progression**

Physical Activity Guidelines vs. Steps Per Day



How Many Steps Per Day are Needed to Meet the Physical Activity Guidelines?

- ❑ No public health guidelines regarding steps/day
- ❑ Steps can be broken down into ‘purposeful steps’ (PA/exercise), ‘incidental steps’ (daily living), and ‘total’ steps.
- ❑ Data combined from several recent studies suggests that more total steps are better, but benefits start “leveling off” at **10,000 steps** for all-cause mortality and **12,000 steps** for cancer-related mortality
- ❑ Evidence suggests the “leveling off” is **lower for women or older adults (~8,000 steps)**, but more evidence is needed before data is translated into public health guidelines



Summary of What We Learned

- ✓ The PAGs recommend moving more and sitting less, aiming for **150-300 minutes** of moderate-intensity aerobic PA (or **75-150 vigorous minutes**), and strength training 2x per week. (Add balance training for age 65 and above)
- ✓ In the Pathways Study, about **half** of the participants report meeting the aerobic PAGs, which is associated with up to **54% decrease in overall mortality**, a **46% decrease in breast cancer-specific mortality**, and a **41% decrease in progression**.
- ✓ In the Pathways Study, lower levels of PA associate with **smaller benefits** for overall mortality and breast cancer progression.

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Walk. Run. Dance. Play. **What's your move?**

The infographic features icons for various activities: a person on a bicycle, a person swimming, a person walking a dog, a person in a wheelchair, a person playing tennis, a person doing yoga, and a person performing a plank.

The Takeaway Messages

- ✓ If you can't meet the current PAGs, **any amount of activity is better than inactivity.**
- ✓ There are no public health guidelines for steps per day, but aiming for **~7000-8000 total steps per day** will provide health benefits and decreased risks of mortality
- ✓ Brisk walking (≥ 3.0 mph) for **22 to 44 minutes per day** would be sufficient for meeting the PAGs of 150-300 moderate-intensity PA; however, this activity would only result in **2200 to 4400 purposeful steps** per day
- ✓ The “**move more, sit less**” recommendation aims to increase **incidental steps** throughout the day, beyond what is needed to meet the PAGs.

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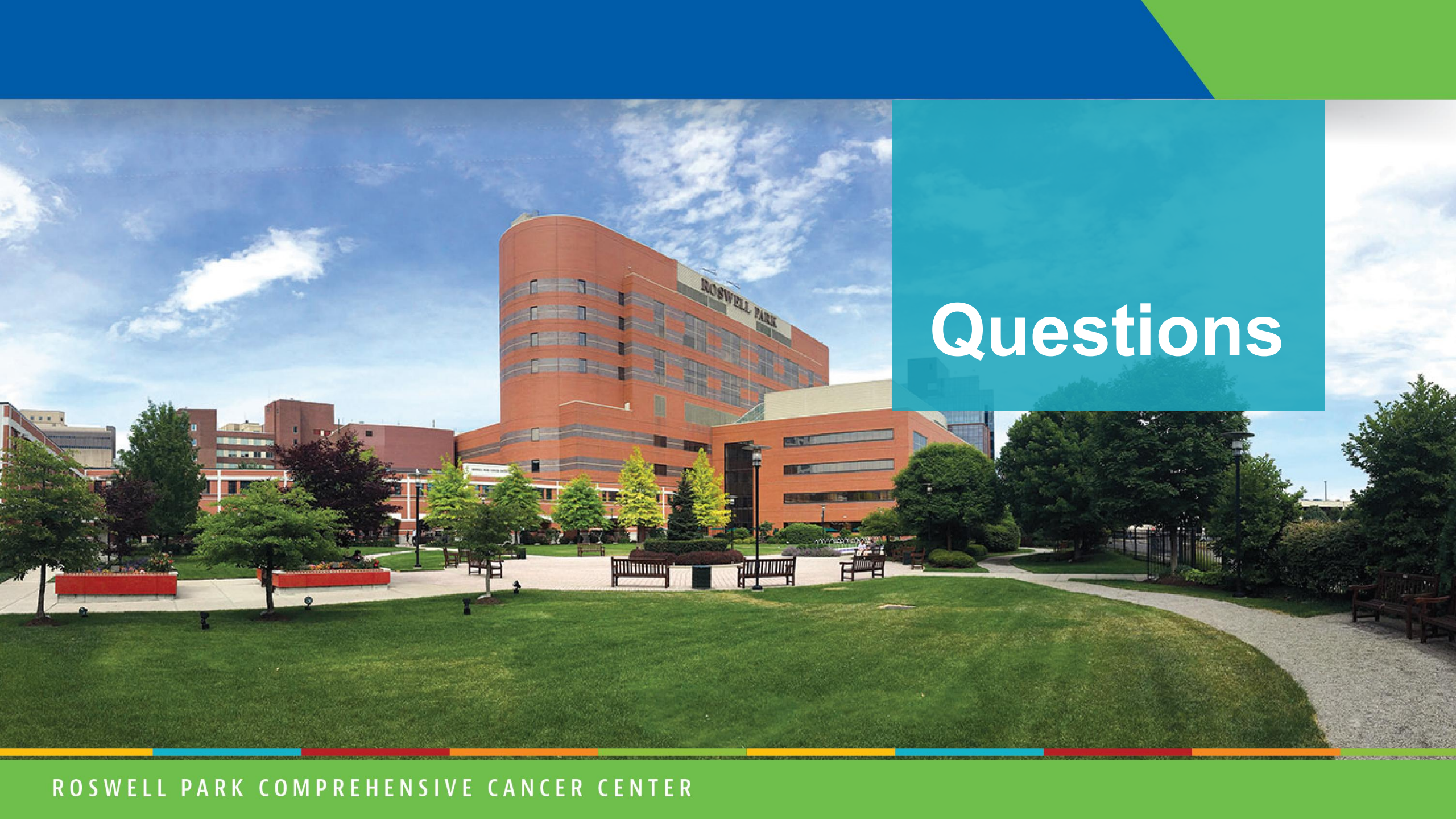
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Questions

ROSWELL PARK COMPREHENSIVE CANCER CENTER