

A man and a woman are dancing in a ballroom. The man is wearing a white shirt and dark trousers, and the woman is wearing a dark, sequined dress. They are holding hands and looking towards each other. The background features large windows with a view of a city at night.

# Exercise and Asthma

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# Do you recognize the man in the picture?

He is Rashad Johnson

- Former NFL running back
- “Dancing with the Stars” champion.
- Asthmatic since childhood

## Rashad Johnson: Living with Asthma

“I was 10 years old when I had my first asthma attack. I’ll never forget it—I was playing on the monkey bars with my friends, and I fell to the ground. I was dependent on an inhaler daily. And it prevented me from running and other activities. After my second major asthma attack, when I was 13, I was hospitalized and nearly died. I couldn’t breathe....

I strengthened my lungs little by little by running. I also improved my diet. For the past 10 years, I haven’t had any asthma symptoms. I haven’t had to use inhalers. I live a very healthy life.”

Rashad Johnson

A photograph of Jackie Joyner-Kersey, a track and field athlete, smiling and holding the American flag. She is wearing a white and red striped shirt. The background is blurred, showing a crowd of people.

# Jackie Joyner-Kersey

**Diagnosed with severe asthma, Jackie Joyner-Kersey won six Olympic medals in track.**

# Jackie Joyner-Kersey, Olympian Track & Field Star

- Jackie Joyner-Kersey won six Olympic Medals, including 3 Gold Medals
- She was voted Female Athlete of the 20th Century by Sports Illustrated for Women.
- ESPN considered her one of the 50 Great Athletes of All Time
- Her world record of 7,291 points in the women's heptathlon is still standing.
- Established JJK Foundation dedicated to ensuring that all children have access to high quality after-school programs, safe recreational places within their communities, and caring adults to help them achieve their dreams

# Jackie-Joyner Kersee: Control your Asthma

"I was always told as a young girl that if you had asthma there was no way you could run, jump, or do the things I was doing athletically.... It took me a while to even start taking my medication properly, to do the things that the doctor was asking me to do. I just didn't want to believe that I was an asthmatic. But once I stopped living in denial, I got my asthma under control, and I realized that it is a disease that can be controlled."

--Jackie Joyner-Kersee

**Kristi Yamaguchi**

Figure Skating Gold Medalist



# Kristi Yamaguchi, Figure Skating Champion

- Kristi Yamaguchi is an Olympian champion who won the gold medal in women's figure skating;
- She is the first Asian American woman to win a gold medal in figure skating.
- She is a “Dancing with the Stars” champion.
- She has had asthma since she was a child.
- She is a children's book author and founder of the Always Dream Foundation, empowering children to reach their dreams through education and inspiration.
- In 2011, Yamaguchi became a spokesperson for the American Lung Association as an advocate for those with chronic illnesses.



Amy Van Dyken



.Olympic swimming champion

# Amy Van Dyken, Olympian Swim Champion

As a young child, Amy Van Dyken was diagnosed with asthma. Her doctors suggested she take up a sport as a way to strengthen her lungs and prevent future asthma attacks. At 6 years old, Van Dyken decided she wanted to be a swimmer. It took her another 6 years to finally be able to swim the full length of the pool.

She learned to control her asthma and went on to win six gold medals in two Olympics!

She was named *Swimming World's* [American Swimmer of the Year](#) in 1995 and 1996.

# How Physically Fit are Americans?

- Only 1 in 4 adults and 1 in 5 adolescents in the United States meet physical activity guidelines for aerobic and muscle-strengthening activities.
- There have been significant increases in sedentary time, especially screen time, among youth.
- A recent urban study (Rota et al., 2017) found that children with asthma reported almost 10 more hours of “out of school screen time” per week compared to healthy controls (35hr/week compared to 26hr/week, respectively).

# Physical Activity Declined During COVID-19

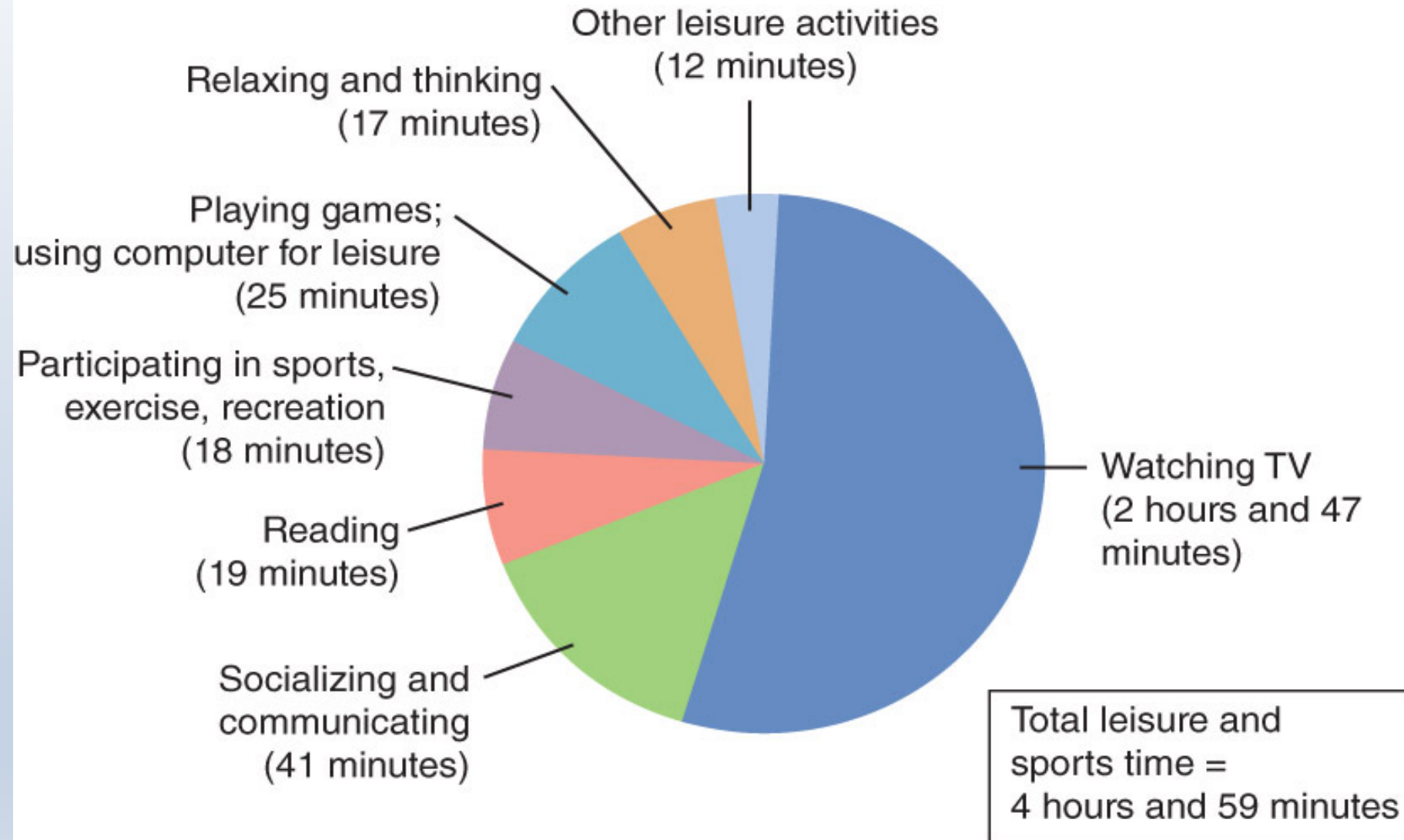
“Our study shows that the COVID-19 pandemic led to a decrease in physical activity and an increase in sedentary behavior by children and young adults, which in turn led to a decrease in cardiopulmonary exercise performance..., future studies should examine if exercise performance has returned to pre-pandemic values. This study has public health implications and demonstrates the importance of physical activity on overall cardiovascular health.”

-- Julia Roberts, MD, cardiologist, Children's Hospital of Philadelphia

# Physical Activity Guidelines for Americans, 2<sup>nd</sup> Ed

- Children aged 3 through 5 years should be physically active throughout the day to enhance growth and development.
- Children and adolescents ages 6 through 17 years should do 60 minutes or more of moderate-to-vigorous physical activity daily, primarily moderate or vigorous-intensity aerobic physical activity, as well as muscle-strengthening activity at least 3 times a week.
- Adults should do 150-300 minutes a week of moderate-intensity, or 75-150 minutes a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity; they should also do muscle-strengthening activities of moderate or vigorous intensity at least twice a week.
- Older adults should do balance training, aerobic exercise, and muscle-strengthening activity; they may need modifications such as remaining seated during the muscle-strengthening activity.

## Leisure time on an average day



# Barriers to Exercising with Asthma

- Adults with exercise-induced bronchospasm (EIB) or exercise-induced asthma may refrain from exercise, including sports, because of fear of triggering an exacerbation
- Parents of asthmatic children may be afraid to allow them to participate in sports.
- Adolescents may be reluctant to use pretreatment in front of their peers because of fear of looking “different” or admitting that they have a chronic disease.
- Poor urban neighborhoods may lack recreational facilities and green spaces for outdoor exercise; many schools in such areas do not have outdoor areas to exercise during recess.
- Lack of money can be a barrier for poor children participating in sports or dance classes, as equipment and training can be expensive.
- Transportation to athletic facilities, dance classes, hockey rinks and the like may be an issue for families who do not have a car or cannot afford to pay a sitter to take their child to practice.

# Benefits of Exercise for Individuals with Asthma

- Children who participate in exercise interventions show consistent improvements in fitness, asthma symptoms, and quality of life; some show improvements in lung function as well (Lu & Forno, 2020).
- Asthmatic adults who participate in aerobic exercise interventions show improvements in asthma control and lung function (Hansen et al., 2020).
- Aerobic exercise helps to prevent obesity, which is significantly associated with the development of asthma in children, and the worsening of asthma symptoms in adults.
- Aerobic exercise improves cardiorespiratory endurance (VO<sub>2</sub> max).
- Aerobic exercise and strength-training help to prevent sarcopenia, which is associated with reduced mobility and increased risk of falls and fractures (KNHANES, 2023).
- Exercise reduces the risk of developing chronic diseases such as CVD, diabetes 2, cancer, and osteoporosis.
- Exercise releases endorphins, neurotransmitters that promote a sense of well-being and satisfaction.
- Exercise improves posture and appearance, boosting self-esteem.
- Exercise improves quality of life throughout the lifespan, even among those in their 80s and 90s.



# Research Studies: Sarcopenia in Adults with Asthma

- Sarcopenia is the gradual loss of muscle mass, strength and function related to aging. It is one of the most common reasons for loss of mobility in elderly people and often leads to a significant decline in quality of life, increasing the risk of falls and fractured bones.
- The Korean National Health and Nutrition Survey (KNHANES) examined a geriatric community-dwelling population of 4,116 individuals for prevalence of asthma and sarcopenia. The study also looked at level of physical activity. The whole-body composition was measured using dual-energy x-ray absorptiometry. Physical activity was assessed using the International Physical Activity Questionnaire and *MET level of each activity × minutes of activity × times per week of activity* (Won et al. 2023).
- Asthmatics with sarcopenia had a lower FEV1, more obstructive patterns, and lower physical activity levels, as well as more asthma exacerbations and hospitalizations, than did those without sarcopenia (Won et al., 2023).
- The KNHANES findings suggest that decreased muscle mass and physical activity levels contribute to reduced lung function in elderly asthmatics.

# How to Reduce Risk of an Exercise-Induced Flareup:

## Step 1: See your Healthcare Provider

- First, see your healthcare provider and get a physical; go over your asthma action plan and talk to your provider about the type of exercise you are planning to undertake.
- Consider what type of exercise you want to do; sports that require short bursts of energy, such as sprinting, baseball, figure skating, or football, are easier on the lungs than are distance events. Hiking and brisk walking are good choices. Swimming may be a good choice because the air is warm and humid, provided that the airways are not irritated by chlorine byproducts.
- Ask your healthcare provider about pretreatment with medications to prevent EIB and exercise-induced asthma flareups. Make sure that your physician updates your asthma action plan to include his or her recommendations as to which medication is best for you, the correct dosage, and when to administer it.

# How to Reduce Risk of an Exercise-Induced Flareup: Step 2: Follow a Few Simple Rules When Exercising

- Do warm-up and cool-down exercises for 5 to 10 minutes before and after exercise.
- Wear workout clothes that “breathe” and absorb perspiration, such as cotton or spandex.
- Stay well-hydrated, particularly in warm weather.
- Wear a face covering when exercising in cold weather.
- Follow your healthcare provider’s pretreatment, as described in your asthma action plan.
- Talk to your healthcare provider about your symptoms if they persist when you exercise. They may be caused by non–asthma-related conditions, or you may need additional medication. (Patel et al., 2022)

# MET is a Measure of Energy

What is a MET? MET stands for Metabolic Equivalent. One MET is the amount of energy (calories) your body uses each minute while resting quietly. On average, a man sitting quietly burns 70 calories per hour, and a woman sitting quietly burns about 60 calories per hour.

The MET level is higher as the intensity of the activity increases. For example, 2.5 METs is the amount of energy used each minute to walk leisurely, but that goes up to 5 METs when walking very briskly at 4 mph.

# Three Levels of Activity

- Light activities (< 3 METs) such as slow walking or light gardening are good for elderly persons, those with physical limitations, or those recovering from an illness.
- Moderate activities (3-6 METs) such as brisk walking (3-4 mph) are suitable for most people who want to be moderately fit.
- Vigorous activities (> 6 METs) such as jogging and competitive sports require a higher energy output and are best for healthy adults who want to achieve a high fitness level.

# Light Activities (< 3 METS)

- Canoeing leisurely 2.5
- Croquet 2.5
- Dancing, ballroom, slow 2.9
- Fishing, standing 2.5
- Golf with a cart 2.5
- Housework, light 2.5
- Playing catch 2.5
- Playing a piano 2.5
- Sitting quietly 1.0
- Stretching exercises 2.5
- Walking, 2 mph 2.5



# Moderate Activities (3-6 METS)

Aerobic dance, low impact 5.0

Baseball or softball 5.0

Basketball, shooting baskets 4.5

Bicycling, leisurely 3.5

Bowling 3.0

Calisthenics, light to moderate 3.5

Dancing, modern, fast 4.8

Hiking cross country 6.0

Horseback riding 4.0

Ice skating 5.5

Kayaking 5.0



# Moderate Activities (3-6 METS)

Raking 4.0

Skateboarding 5.0

Skiing downhill, moderate 6.0

Swimming, moderate pace 4.5

Table tennis 4.0

Tai chi 4.0

Tennis, doubles 5.0

Trampoline 3.5

Volleyball, noncompetitive 3.0

Walking, 15 min/mile 5.0

Weight lifting, heavy workout 6.0

Wrestling 6.0





# Vigorous Activities (>6 METS)

Aerobic dance 6.5 moderate impact

Aerobic dance, 7.0 high impact

Basketball game 8.0

Bicycling, 12-13 mph 8.0

Bicycling, 20+ mph 16.0

Calisthenics, heavy, vigorous 8.0

Football, competitive 9.0

Frisbee, ultimate 8.0

Hockey, field or ice 8.0

Jogging, 12 min/mile 8.0

Judo/karate/tae kwan do 10

Lacrosse 8.0



# Vigorous Activities (>6 METS)

Racquetball 10.0

Rollerblading, fast 12.0

Rope skipping, slow 8.0, fast 12.0

Running, 10 min/mile 10.0, 9 min/mile 11.0, 8 min/mile 12.5, 7 min/mile 14.0

Skiing cross country, slow 7.0, moderate 8.0, racing uphill 16.5

Swimming laps, moderate 7.0 fast 10.0

Swimming laps, sidestroke 8.0

Soccer casual 7.0 competitive 10.0

Tennis 7.0

Volleyball, competitive, beach 8.0

Walking up stairs 8.0



# Components of Physical Fitness

- Cardiorespiratory (aerobic) fitness
- Muscular strength
- Muscular endurance
- Flexibility
- Body composition

# Cardiorespiratory Fitness

Cardiorespiratory fitness is the ability of the circulatory and respiratory systems to supply oxygen to the skeletal muscles during any sustained physical activity. (3-5 times/week)

Must be continuous and last at least 20 minutes

Examples: running, brisk walking, cycling, treadmill, elliptical, ice skating, rollerblading, dancing.

# Muscular Strength

Maximum force able to be exerted by single contraction of a muscle or muscle group (2-3 times/ week)

Tests used to measure muscular strength:

Bench press, leg press, arm curl, knee extension and knee curl.

# Muscular Endurance

Ability to perform high-intensity muscle contractions repeatedly without fatiguing (2-3 times/week)

Tests such used to measure how many repetitions of a movement a person can do before the muscles reach a state of fatigue and cannot continue the exercise: push ups, curl ups, squats, lat pulldown, leg extension, McGill's core endurance tests (trunk flexor endurance [seated incline], lateral endurance [side plank on forearm], trunk extensor endurance [face down upper trunk extended off table])

# Flexibility

Ability to move joints freely through their full range of motion (2-3 times/week)

Range of motion varies by joint, as well as with direction (raising leg front or side) and position (leg rotated versus parallel)

When recovering from an injury, PT's measure range of motion to assess healing process.

Tests to measure flexibility include: sit-and-reach, shoulder stretch ("back scratch"), trunk lift (in prone position)

# Body Composition

The percentages of lean mass and fat mass in the body.

Lean mass comprises the muscles, bones, blood, organs, connective tissue, skin

Fat mass is adipose tissue, which is found under the skin (subcutaneous) and internally.

Essential fat is 3% for men, 12% for women. In general, the total body fat percentage (essential plus storage fat) is between 12% and 15% for young men and between 25% and 28% for young women. Athletic individuals have a lower percentage of fat mass than do non-athletic individuals.



# Calculate your Percentage Body Fat

[Body Fat Calculator](#)

<b>Men's Norm Chart: Body Composition (body fat %) per ACSM</b>					
	<b>Age</b>				
<b>Percentile</b>	<b>20-29</b>	<b>30-39</b>	<b>40-49</b>	<b>50-59</b>	<b>60+</b>
<b>90 (Excellent)</b>	7.1	11.3	13.6	15.3	15.3
<b>80</b>	9.4	13.9	16.3	17.9	18.4
<b>70 (Above Average)</b>	11.8	15.9	18.1	19.8	20.3
<b>60</b>	14.1	17.5	19.6	21.3	22.0
<b>50 (Average)</b>	15.9	19.0	21.1	22.7	23.5
<b>40</b>	17.4	20.5	22.5	24.1	25.0
<b>30 (Below Average)</b>	19.5	22.3	24.1	25.7	26.7
<b>20</b>	22.4	24.2	26.1	27.5	28.5
<b>10 (Poor)</b>	25.9	27.3	28.9	30.3	31.2

<b>Women's Norm Chart: Body Composition (body fat %) per ACSM</b>					
	<b>Age</b>				
<b>Percentile</b>	<b>20-29</b>	<b>30-39</b>	<b>40-49</b>	<b>50-59</b>	<b>60+</b>
<b>90 (Excellent)</b>	14.5	15.5	18.5	21.6	21.1
<b>80</b>	17.1	18.0	21.3	25.0	25.1
<b>70 (Above Average)</b>	19.0	20.0	23.5	26.2	27.5
<b>60</b>	20.6	21.6	24.9	28.5	29.3
<b>50 (Average)</b>	22.1	23.1	26.4	30.1	30.9
<b>40</b>	23.7	24.9	28.1	31.6	32.5
<b>30 (Below Average)</b>	25.4	27.0	30.1	33.5	34.3
<b>20</b>	27.7	29.3	32.1	35.6	36.6
<b>10 (Poor)</b>	32.1	32.8	35.0	37.9	39.3

# Measuring Body Composition

- Skinfold test (with calipers)
- Hydrostatic (water displacement through submersion in water)
- DEXA scan (dual energy X-ray absorptiometry)
- Bioimpedance (using electrical current)
- BodPod (air displacement)

# Gauge Cardiorespiratory Exercise Intensity Using Your Heart Rate

1. Compute your maximum heart rate — the upper limit of what your cardiovascular system can handle during physical activity.

Maximal heart rate =  $220 - \text{your age}$

Example: for a 20-year-old, maximal heart rate  $220 - 20 = 200$

Second, you have to calculate your target heart rate zones.

2. Calculate your target heart rate by multiplying your maximal heart rate by 64% and 93%, as follows:

For a 20-year-old with a maximal heart rate of 200,

$200 (.64) = 128$  beats per minute

$200 (.93) = 186$  beats per minute

Your target heart rate range is 128bpm-186bpm.

# The Talk Test

To double check that you are working out in the moderate to vigorous range, use the “talk test.”

At a “moderate” level of exercise (heart rate at 64 to 76 percent of maximum) you should be able to converse.

At a vigorous level of exercise, you can talk but only in short fragments and not sentences.

If you are gasping for breath and cannot speak at all, you are overexerting yourself.

If you can laugh and sing, you probably are in the light activity level rather than moderate and need to bump up your intensity.

# Muscular Strength & Endurance: Frequency

Resistance (strength) training such as weight lifting and bands should be done 2 to 3 days per week, using enough sets and repetitions and resistance to maintain or improve muscular strength and endurance. It is advisable to work with a personal trainer to establish your baseline and set up a program that suits your needs.

Allow one or two days of rest in between strength workouts of the same muscle groups by alternating muscle groups (upper body workout alternating with lower body workout).

Core endurance workouts (crunches, plank, pushups) can be done daily.

# Flexibility: Frequency

Flexibility training should be done a minimum of 2 to 3 days per week. It can be done after the aerobic or strength training workout, when the muscles are warm.

Hold static (still) stretching positions at an individually determined point of tension. You should feel tension or mild discomfort in the muscle(s) stretched, but not pain. Use these stretches as part of your warm-up and cool-down. Hold each stretch for 10 to 30 seconds.

# Other Considerations

**Schedule**—Schedule your workouts so that they are part of your weekly routines.

**Budget**—find a workout routine that fits in your budget

**Attire**—wear appropriate workout clothes that allow your body to move freely and that “breathe” (cotton or spandex).

**Equipment**—there are many specialized pieces of equipment that enhance a workout, and some—exercise balls, yoga mats--are reasonably priced at retailers such as Walmart and Target.

**Shoes**—don’t skimp on athletic shoes. They should provide good support and be appropriate for the activity. For example, aerobic dance shoes are different than running shoes.



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