

# Exercise

For Individuals with Lung Disease



## INTRODUCTION

Some Alphas with lung disease feel that they can't do any form of exercise because it makes them feel too short of breath. Others worry that exercising may not be safe, they're afraid they might injure themselves, or make their lung condition worse. While some argue that exercising does not change chronic pulmonary disease, many research studies have demonstrated that consistent exercise and pulmonary rehabilitation does improve the overall quality of life and the individuals' tolerance to exercise and activity. In fact, many believe that once the appropriate studies are finished, it is likely that such interventions as pulmonary rehabilitation will be shown to significantly improve survival in people with Alpha-1 lung disease.

This brochure offers Activity and Fitness Guidelines for individuals with moderate to severe Alpha-1 lung disease. Keep in mind, these instructions are not meant to be a substitute for obtaining an accurate medical assessment and exercise recommendations from your healthcare provider. Your healthcare providers are the best individuals to advise you about how much and how often you should exercise, and they can give you specific instructions about how to safely monitor your progress.

Throughout this brochure you'll find exercise illustrations with spaces to fill in. After consulting with your healthcare provider you can design a program using these illustrations as a guide. Or, you can ask your healthcare provider or exercise professional to assist you by "filling in the blanks." In this way, your program will be sure to meet your specific fitness needs.



**CROSS REFERENCE:** For detailed explanations of the various types of lung diseases, check out the brochure "Understanding Lung Disease."

## WHY SHOULD I EXERCISE?

Alphas with lung disease often find themselves doing fewer and fewer activities that involve physical exertion, often as a way to avoid the uncomfortable sensation of shortness of breath. Unfortunately, this lack of exercise further decreases their tolerance for exercise and ultimately can lead to a more advanced stage of physical disability. This disability is partially the result of what is known as "progressive deconditioning." Deconditioning, or losing fitness, occurs when you stop exercising. It becomes progressive because the less you do, the less you feel able to do! We've all heard the saying "use it or lose it." How quickly you lose fitness depends on several factors, including how fit you were to start with, how long you've been exercising, and how long ago you stopped exercising on a regular basis.



**GOOD NEWS:** The good news is that it's never too late to exercise. While you may need to proceed with caution there are many reasons to include physical fitness as part of your overall treatment plan.

## GETTING THE GREEN LIGHT FROM YOUR PHYSICIAN

The first step that an Alpha with lung disease should take before beginning any exercise program is to obtain a medical evaluation for cardiac risk and exercise capacity. Aside from the general health concerns you may have, obtaining a medical assessment is essential for individuals with compromised cardiopulmonary function, to ensure that their exercise plan is designed so as not to place an unacceptable level of stress on the heart and lungs.

Your healthcare provider may ask you to undergo a supervised Exercise Tolerance Test on a treadmill or stationary bicycle, to assess the amount of exercise that will be both safe and effective. These tests are generally performed with both a cardiac monitor and a pulse oximeter in place to measure heart function and oxygenation levels while you exercise.

Your physician may then offer you an "exercise prescription" that will detail the intensity, duration and frequency of exercise that is appropriate for you, or may refer you to a pulmonary rehabilitation program, if one is available in your area. You will read more details about pulmonary rehabilitation programs beginning on page 32.

In spite of the well-documented benefits of pulmonary rehabilitation for individuals with lung disease, many insurers provide little or no coverage for these important programs. Because of this, it may be difficult to find an institution with a formal pulmonary rehabilitation program in your area. If you have been referred to such a program, but have been denied medical insurance coverage for these services, there are several options that you may wish to consider.

- The first approach is to ask for reconsideration by your health insurance company, usually including a note from your physician regarding the medical necessity of such a program. Some insurers will pay for an initial evaluation and development of a treatment plan, and may also provide coverage for a specified number of follow-up visits.
- You'll need a pulmonary rehabilitation prescription. Once you have it, you can either follow these instructions on your own at home, or at a local health or fitness facility.
- Another approach for obtaining professional pulmonary rehabilitation is to obtain a referral from your doctor to a cardiac rehabilitation program. Many insurers will cover expenses for that type program. Although they may have less specific knowledge of your lung disease, a modified treatment plan for your lung condition can be developed.

## WHAT IS THE VALUE OF EXERCISE FOR ME?

You probably will not notice the benefits of exercise after just one day, however, when you participate in a fitness program on a regular basis; you will experience gradual and steady improvement in your overall health, including how you perceive your breathing ability.



BENEFITS OF EXERCISE	WHAT YOU SEE AND FEEL
Improves your heart's ability to pump blood and deliver oxygen to your body	Improved utilization of oxygen
Improves the circulation of blood to your body, and helps with the exchange of oxygen and carbon dioxide	This means you will become less short of breath
Improved energy level	Less fatigue with familiar activities
Increased muscle strength and endurance	You will be able to do more
Increases confidence in your body, i.e. weight management	Your body will become your best friend, as well as a tool
Improved sleep	Awaken refreshed
Helps your posture and helps you move more efficiently	You will lose less energy and become an energy saver
Makes you aware of your body and helps you recognize things that may make your symptoms worse	While exercising, you will be more aware of factors that make your symptoms worse and be able to control these factors
IT'S FUN! You can let go while exercising	It's an excellent way to control anxiety and improve your mood

### I can't exercise; I'm too short of breath!

Perhaps the single most important benefit of exercise for Alphas with lung disease is its positive effects on shortness of breath, or dyspnea. Dyspnea plagues almost all individuals with pulmonary disease, and the fear of dyspnea often inhibits exertion and can severely limit the ability to perform such day-to-day activities as shopping or housecleaning. The good news is you can teach yourself to coordinate your breathing with your activities, conserving energy and increasing your ability to be more active, without experiencing dyspnea.

## CAN EXERCISE REVERSE ALPHA-1 RELATED LUNG DISEASE?

Exercise cannot reverse lung disease, but it can change the way you feel and function. In individuals with moderate to severe lung disease, exercise can reduce disability by improving endurance, breathing efficiency, and dyspnea. Your initial program should start with light exercise, gradually increase over time, and then be followed consistently.



**IT'S A FACT :** Exercise cannot reverse Alpha-1 lung disease, but it can change the way you feel and function.

Exercise programs that take into account an Alpha's tolerance to exertion, can produce significant improvements in cardiovascular and pulmonary function. Regular exercise works toward the reversal of deconditioning, and may therefore improve your quality of life. Both healthy individuals, as well as those with moderate to severe lung disease, can reap the rewards of regular exercise.

## ENERGY MANAGEMENT TECHNIQUES FOR DAILY LIVING

“Rushing around” and “stressing out” are common realities in our world. Everyone looks for a quicker route, a faster answer, and more time to relax. One of the first goals for an Alpha with lung disease to consider is the development of a reasonable set of expectations for dealing with work, family, and health that will allow you to conserve the energy you need for the work of breathing. These realistic expectations, and how you apply them to your daily activities, are what we call Energy Management.

### Energy Management Tips

- **Pace yourself:** Give yourself adequate time to complete a task; avoid rushing. Take frequent, short breaks before you are really tired.
- **Make tasks easier:** Use tools, equipment, or postures that require less energy. It's not lazy, it's smart.
- **Space your activities:** Break big jobs into smaller steps. Plan rest breaks between more strenuous tasks. Plan your day. If you need to attend a meeting in the evening, avoid strenuous activities earlier in the day.
- **Eliminate unnecessary tasks:** Eliminate extra trips by planning ahead and assembling supplies. Use disposable dishes.
- **Avoid strenuous movements:** Rapid, jerky arm movements can produce shortness of breath and fatigue. Working with the arms overhead causes strain. Keep motions small, smooth and flowing.
- **Sit to work:** For tasks that take time, use a stool or chair to minimize fatigue.
- **Adjust work height:** Eliminate excessive or unnecessary bending, lifting, stooping or reaching. Improper work height may cause back strain and overall fatigue. Poor posture also restricts breathing. The best working height for standing at a table is 2 inches below the crease in your elbow.
- **Organize storage/work areas:** Keep items that are used often within easy reach. Store items in the area where they are used most.



- **Keep cool:** Working in a room that is too warm is less efficient for your body than working in a cool place because extra energy must be expended by the heart and lungs to cool the body. Do more stressful activities in the cool part of the day. If your work area is too warm, invest in a personal fan or air conditioner.
- **Learn to relax:** Emotions and tension take energy out of the "bank." Minimize anxiety by planning ahead, leaving time enough to complete the task, and to rest afterwards.

## THE ART AND WORK OF BREATHING

Breathing is something that we all take for granted. It is an activity that is performed at an unconscious level; it occurs automatically. Nevertheless, for a person with chronic lung disease, successful participation in daily activities and exercise requires that you coordinate your breathing with the pattern of your movements so that you can perform these activities without experiencing breathlessness.

When you're short of breath, it feels as if you just can't get enough oxygen in your lungs. This often makes you want to breathe more rapidly in an attempt to get the oxygen you feel you need. In reality, in contrast to your instincts, it is prolonged exhalation that is needed, not more breaths. In a person with obstructive lung disease, increasing your breathing rate results in an inability to adequately empty the lungs of air before the next breath and increases breathlessness. This phenomenon is called "breath stacking" and leads to air trapping, a condition that can be modified by pursed lip breathing and changing the pattern of your breathing during activities.

### What aspects of breathing can you control?

#### 1. Depth of the breath

Sometimes people breathe with only the upper part of their chest not using the diaphragm at all. This means that air doesn't get into the lower lobes of your lungs, where more gas exchange will take place.

#### 2. Pace of breath

You can control how fast you breathe. Sometimes you may take short, shallow pants, inhaling and exhaling so fast that the gas never gets into the lower lobes of the lungs.

### 3. Tension in the respiratory muscles

Holding your shoulders very tight and tightening your abdomen makes it harder to breathe. You can learn to relax these muscles by breathing deeply and evenly, in a more relaxed fashion.

### TECHNIQUES FOR COORDINATED BREATHING

The use of coordinated breathing minimizes shortness of breath and assists in delivering adequate oxygen and eliminating carbon dioxide from the working muscles. Mastering coordinated breathing takes time, effort, and practice. Understanding how, why, and when to apply pursed-lip breathing will enhance your success and desire to master the process.

Pursed-lip breathing is putting your lips into a position much like puckering for a kiss and then exhaling through your puckered lips to increase the back-pressure required in exhaling. This technique forces the airways to stay open during the entire length of exhalation, and allows a more complete emptying of the air in the lungs. Here are some instructions that you can practice on your own.

#### Pursed-lip breathing

##### Why?

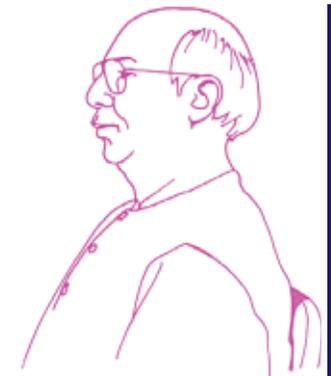
- Decreases respiratory rate
- Keeps airway open longer during exhalation
- Increases tidal volume
- Improves gas exchange
- Reduces the work of breathing (decreases the use of accessory muscles)
- Increases exercise tolerance

##### How?

- Inhale through the nostrils (if possible)
- Exhale slowly (do not force the air out)
- Exhale through slightly pursed lips (as if to whistle or blow out a candle)
- Exhale two to three times longer than inhalation

##### When?

Pursed-lipped breathing should be utilized during and following exercise, and with any activity that causes you to experience breathlessness



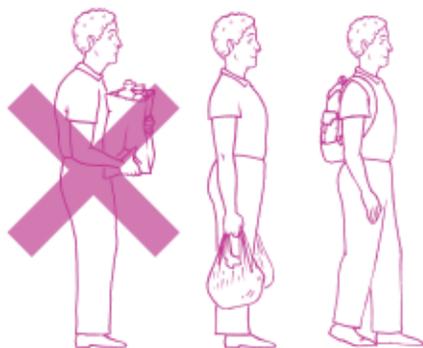
## COORDINATED BREATHING WITH ACTIVITIES OF DAILY LIVING

Many common activities and daily tasks may increase your breathlessness and pose a challenge to you at home. By practicing a few simple techniques that coordinate your breathing to the task, you can significantly impact your ability to live and work with less breathlessness.

- Avoid prolonged constriction of the abdominal muscles
- Avoid bending positions that make breathing more difficult

### Carrying:

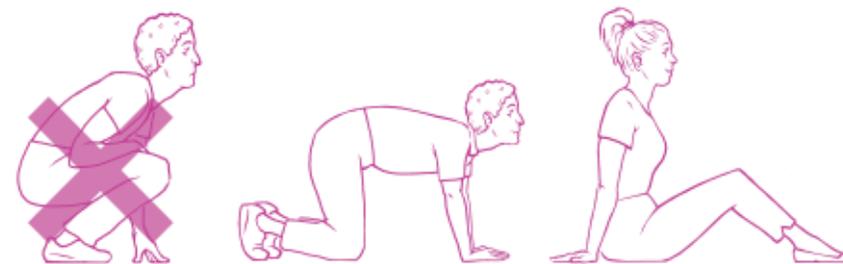
- Try to avoid carrying things next to your chest
- Use plastic grocery sacks that allow your shoulders to absorb the weight
- Consider using a cart or a luggage carrier
- If you don't have back problems, use a backpack



**Bending** will put pressure on your diaphragm, causing you to feel more short of breath. Keep objects that you use frequently within easy reach. When bending, keep your back straight and lower yourself with your legs. Exhale while you are doing it.



**Crouching** also presents a problem because it restricts the movement of your diaphragm. Your legs push against your chest, making breathing more difficult. Try to avoid this position. It is better to sit down, or use an "all fours" position, if the task you are performing is for a prolonged period of time.



**Leaning forward while sitting** is very different from crouching. Crouching interferes with your breathing by pushing your legs against your chest. Leaning forward assists with your breathing, because it places your diaphragm on a diagonal stretch between your ribs and spine. This gives it a bit more elasticity for breathing. This is a recommended posture when you need to recover from a severe episode of dyspnea.

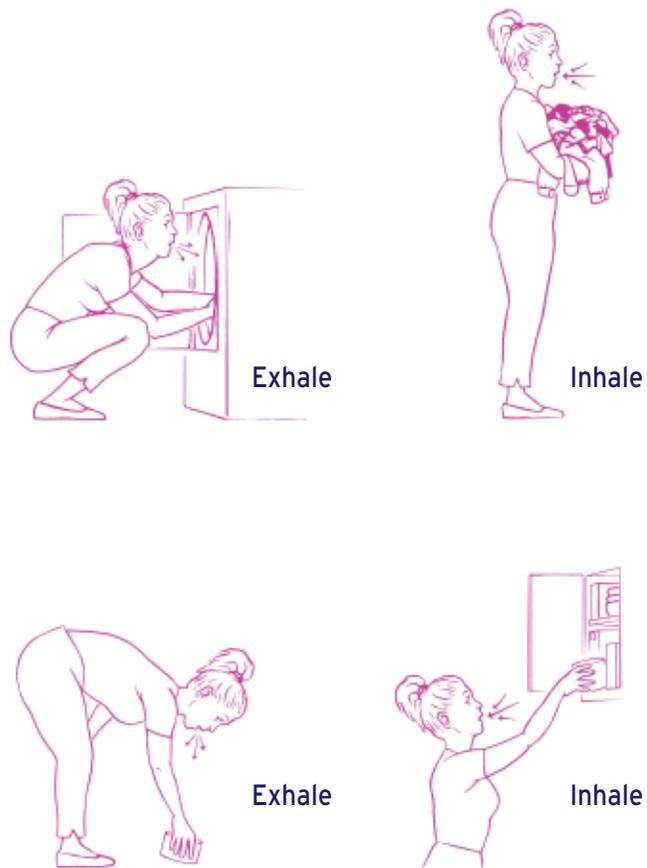


**Climbing stairs** is a demanding activity that may cause shortness of breath. Slowly pace yourself resting every few steps, or every step, as needed. Breathe out when you take a step up, inhale at rest. Try to breathe evenly and smoothly. Find a pattern that is comfortable for you.



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**Stooping and reaching:** As you lean forward, exhale. As you straighten up, inhale. Set up an even rhythm of leaning and standing as you breathe evenly. You may also want to consider a long-handled "reacher" for use in tasks that involve bending, stooping, and crouching. These devices are available in pharmacies and medical supply stores, and serve as an energy-saving device. They can be used while doing laundry, in the kitchen, in the garage, or in the yard.



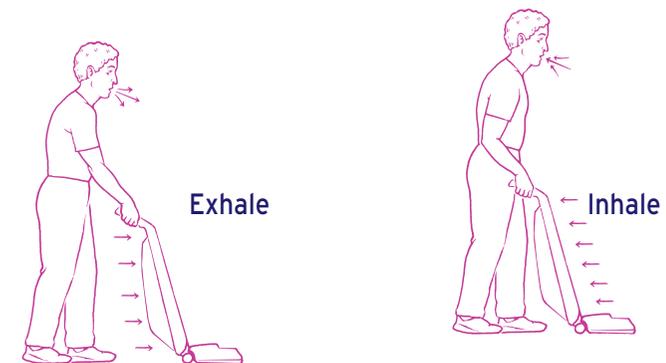
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**Lifting:** Exhale on exertion; exhale as you lift. Avoid holding your breath. Divide the load into smaller portions, and use the stronger leg muscles while lifting to avoid straining your back.



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**Pushing and pulling:** Coordinate your breathing with your movements. For example, when vacuuming, exhale as you push, then inhale as you pull.



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**Using the arms and hands vigorously:** Stabilize the trunk of your body against a wall, or in a chair with a back you can lean against. This allows you to relax the accessory breathing muscles while using your arms. Support your elbows on the table or desk edge while using your arms.



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### Recovery breathing:

If you notice that you are breathing fast or shallow, STOP and concentrate on getting your breathing back to a comfortable pattern before continuing.

### WHEN ON THE BRINK THINK! S.O.S FOR S.O.B\*

- Stop and rest in a comfortable position
- Get your head down
- Get your shoulders down
- Breathe in through your mouth
- Blow out through your mouth
- Breathe in and blow out as fast as is necessary
- Begin to blow out longer but not forcibly
- Begin to slow your breathing
- Begin to breathe through your nose
- Begin diaphragmatic (deep) breathing
- Stay in position for 5 minutes or longer

\*Used by permission: [www.lung.ca/copd/management/coping/sos.html](http://www.lung.ca/copd/management/coping/sos.html)

## GETTING STARTED - GENERAL EXERCISE GUIDELINES

Once you have made a decision to commit to a fitness program, whether an independent program or a formal Pulmonary Rehabilitation Program, it is important that you follow some basic principles or guidelines. For exercise to be beneficial, you must develop safe exercise habits.

### "What should I wear?"

While you don't need to stop at the nearest sporting goods store for exercise clothing, it is important that you wear clothing that allows you to move freely. Footwear should be in good repair, and appropriate for the activity you have selected.

### "How do I know if I need to use oxygen with exercise?"

Oxygen contributes to the production of energy so that the muscles can perform work. When oxygen blood levels are low, the lungs react by constricting the blood vessels of the lungs and then the heart must work harder to pump blood through those blood vessels. This can result in a strain to your heart. Typically, your physician will recommend one flow rate for resting, and another flow rate for activity or exercise.

During exercise you will need to use your oxygen at a prescribed activity flow rate. You should adjust your normal flow rate to the activity flow rate approximately five minutes prior to initiating your exercise program. This will prevent oxygen desaturation from occurring when you start your exercise routine.

If you're exercising in a supervised exercise program, the professional staff will monitor your oxygen saturation in order to adjust your oxygen appropriately. If you're exercising independently, discuss with your physician if it's appropriate for you to make adjustments to your oxygen flow rate using the Borg Scale for Rating Perceived Dyspnea. You will learn how to use the Borg Scale for Rating Perceived Dyspnea and the Borg Scale for Rating Perceived Exertion in following sections of this brochure.



More oxygen is not always better — your shortness of breath may not be due to decreased oxygen — you may just need to slow down. Do not increase or modify your oxygen prescription without speaking with your physician. Oxygen is a "drug" in the management of chronic lung disease; utilization of oxygen at an inappropriate flow rate may lead to respiratory complications.



**KEY LEARNING :** Do not increase or modify your oxygen prescription without speaking with your physician.

**"Is there ever a time that I should not exercise?"**

You will probably experience times when you are unable to perform your exercise program due to illness or personal changes. When this occurs, you may require a return visit to your physician for re-evaluation, or referral to a formal rehabilitation program to re-establish safe performance levels. The basic rules of thumb for exercising during an illness or infection are as follows:

- When you are seriously ill, a very low level of activity may be all that is appropriate. This would include self-care, sitting in a chair for meals, and minimal walking.
- When you have had a recent hospitalization or setback, restart your exercise program slowly and increase the pace and resistance as it is defined as safe by your physician or therapist. Recent evidence suggests that an early return to your exercise program can be beneficial to your recovery.
- When you are experiencing unusual symptoms, decrease your intensity of exercise to a perceived level of 1 to 2, using the Borg Scale for Rating Perceived Exertion. Call your doctor and wait to increase the intensity until it is defined as safe to progress. (See "Monitoring Your Exercise Program.")

The following chart indicates when it is safe to exercise, and when you should not.

YES: SAFE TO EXERCISE	NO: NOT SAFE TO EXERCISE
I feel tired.	I feel nauseated.
I feel shaky.	I am experiencing leg pain that I cannot explain.
I have a headache.	I am experiencing chest pain.
I am coming down from a steroid burst.	I am out of oxygen.
I am having a bad day.	I have a fever or strep throat.
I have a headache.	
I am too busy.	
I am bored and feeling lazy today.	

**"Should I exercise indoors or outdoors?"**

Whether you exercise indoors or outdoors is a matter of personal preference. One consideration to bear in mind is the advantage of controlling environmental factors such as temperature, humidity, air flow (ventilation), and lighting when you exercise indoors. Since it's normal to experience an increased heart rate, rate of breathing, and perspiration when you exercise, exercising indoors may be less taxing for you as it allows you to more easily monitor your response to the exercise being performed without adjusting body functions to the environment.

When exercising outdoors, your body will be responding to the air temperature and humidity. When it is too cold, you may become chilled while performing your warm-up phase, and when it is too hot, you may become overheated and unable to complete your training phase.

Be aware of how changes in temperature and humidity affect you in your daily activities. If humidity increases your symptoms, consider exercising in a controlled climate setting. If you do choose to exercise outdoors, remember that the changes you experience in your heart rate, breathing rate, and perspiration, may be more pronounced than those you experience with exercise performed indoors.



### "Should I change my exercise program when I travel?"

A primary concern regarding exercise when traveling is access and altitude. If facilities and equipment are not available where you're staying, a walking program can be substituted. Walking can be done anytime and anywhere. To determine a good walking speed, consider the number of steps you take in a 60-second period in the following manner. Using a stopwatch or the second hand on your watch, count the number of steps you take in 15 seconds at a moderate pace, and multiply by four. For a quick reference, refer to the table below.

#### HOW TO CALCULATE WALKING SPEED

Steps per Minute		Miles per Hour
75	=	2.5
100	=	3.0
115	=	3.3
125	=	3.5
135	=	4.0

**Travel to higher altitude.** High altitude locations present a different challenge. The air we breathe becomes less dense at higher altitudes. If you'll be staying in a city at a higher altitude than what you're used to, be aware that your shortness of breath and other symptoms may be increased. Monitoring your perceived dyspnea will allow you to exercise in the range that is safe for you. Remember that exercising at moderate levels is adequate for maintaining fitness. If you have an oximeter, you may wish to use it to determine if your oxygen saturation has changed at the new altitude. You can then adjust your effort to meet your exercise prescription and your oxygen needs.

### "Does it matter when I take my medications?"

Your beta-agonist, or rescue inhaler, may be particularly helpful when used as a pre-treatment to exercise. You should use your inhaler 15 to 30 minutes before exercising.

### "Does it matter when I eat?"

Ideally, you should not eat a heavy meal immediately before exercising. Wait at least 30 minutes, or better yet, time your meals so that you have the energy to exercise before eating a meal. If weight management is your goal, you will find that you will eat less after you have completed an exercise session.

## MONITORING YOUR EXERCISE SESSIONS

The following section will outline methods for monitoring your exercise sessions. Monitoring during exercise is critical for anyone beginning a program but even more so for individuals with Alpha-1 lung disease. Monitoring your level of exertion and breathlessness will allow you to achieve the maximum benefit from your program by allowing you to increase or decrease the intensity of your exercise in a safe and comfortable manner.

As you improve your fitness level, you will notice that the activities that once were difficult for you require less time and effort. If you reach a point where you are not feeling challenged, use of the following monitoring tools will help to make decisions about the progression of your program. In a supervised setting, the healthcare professionals will help you determine how and when to progress your program.

Many individuals without pulmonary disease are often advised to use Target Heart Rate measurements for calculating the desirable level of intensity of their exercise program. Because people with lung disease have compromised respiratory function, Target Heart Rate assessments are not recommended as a safe method for monitoring exercise tolerance. Instead, Alphas with moderate to severe lung disease are advised to use the Borg Scale for Rating Perceived Exertion and the Borg Scale for Rating Perceived Dyspnea to safely monitor their exercise program.



**KEY LEARNING :** Target Heart Rate assessment is not recommended as a safe method for monitoring exercise tolerance.

## THE BORG SCALE FOR RATING PERCEIVED EXERTION (RPE)

A useful method of monitoring the intensity of your exercise program is using the Borg Scale for Rating Perceived Exertion or RPE. In addition to providing awareness of exercise intensity, it is also an important skill when learning to manage daily activities.

By using the RPE, you can learn to monitor your performance intensity, and pace your effort to maintain a moderate level of exertion. Exercising at moderate levels will allow you to make progress towards your goal of increasing your exercise tolerance and improving your respiratory function. The RPE helps you recognize when you are exercising at a level that may put you at risk for injury. Learning to use the RPE does not take any special skills or equipment and allows you to maintain your exercise pace.

### How to use RPE

Perceived exertion is assessed by use of a 0-10 chart to rate the feelings caused by your exertion. As examples, quietly sitting in a chair may have a rating of 0. Adding a gentle waving of your arms might increase the exertion rating to 0.5. Walking at a pace that you feel is moderate would be given a rating of 3. Remember, the rating of your exertion should be completely independent of the pace you think you are working; it is dependent solely on the feelings caused by the exertion. Increase the pace to a run and add a hill and you could work your way up to a 10 on the scale. The recommended RPE range for most people with Alpha-1 related lung disease is between 3 (moderate) and 4 (somewhat strong).

If you feel that you cannot coordinate your breathing to minimize shortness of breath, or if you experience aches and pains that last longer than 20 to 30 minutes following your exercise session, you will need to reduce the intensity of your exercise until you perceive that you are exercising just hard enough to score 1 or 2 on the scale. The intensity can then be increased as your fitness increases until you can achieve a rating of between 3 and 4.

## BORG SCALE FOR RATING PERCEIVED EXERTION

0	Nothing at all (didn't even know I was exercising)
0.5	Very, very weak (just noticeable)
1	Very weak (a very small amount of work)
2	Weak (light)
3	Moderate
4	Somewhat strong
5	Strong (heavy)
6	
7	Very Strong
8	
9	
10	Maximal

## MODIFIED BORG SCALE FOR RATING PERCEIVED DYSPNEA (RPD)

The Borg Scale for Rating Perceived Dyspnea (breathlessness) or RPD is used during exercise or daily tasks to determine the amount of shortness of breath you are experiencing. You determine how hard you are breathing on a scale of 0 (no shortness of breath), to 10 (so much shortness of breath that you have to stop the activity).

Using RPD will allow you to assess your perception of breathlessness in relation to the performance of activities (RPE). Using the RPD and the RPE in combination will allow you to successfully monitor both aspects of your exercise program and adjust the program accordingly. As your strength and endurance improve with exercise, you will note that your sensation of breathlessness will decrease when exercising at the same exercise level. In addition, you will note that all daily activities require less energy, and are not as limited by breathlessness.

## MODIFIED BORG SCALE FOR RATING PERCEIVED DYSPNEA

0	Nothing at all
0.5	Very very slight shortness of breath
1	Very mild shortness of breath
2	Mild shortness of breath
3	Moderate shortness of breath or breathing difficulty
4	Somewhat severe
5	Strong or hard breathing
6	
7	Severe shortness of breath or very hard breathing
8	
9	Extremely severe
10	Shortness of breath so severe you need to stop

## DESIGNING YOUR PERSONAL EXERCISE PROGRAM

Now that you know how to monitor your exercises, you must choose what type or mode of exercise you will perform. In choosing your exercises, select something that appeals to you — something you enjoy and have easy access to. Choose activities that are suitable to your abilities, satisfying and challenging, but most of all, safe. The possibilities are endless.

Muscle fatigue is a common problem for Alphas, and many cite it as the limiting factor to their exercise capacity. Exercising the arms, legs and trunk to improve fitness will allow you to accomplish routine tasks with greater endurance and comfort.

The following "Exercise Program Recommendations" are just that — recommendations. Each one of you is at a different stage in your life and disease process. The frequency, duration, and intensity guidelines are designed to help you achieve an improved, more active lifestyle. You may need to decrease or increase one or all of these areas based upon where your health and fitness level is at any given point in time. Monitoring your level of exertion and breathlessness during exercise is vital and will provide you with the information you need to make exercise program adjustments and progressions.

## A good exercise program consists of three parts:

Warm-up and stretching (Flexibility Training)

- Prepares you for physical exertion
- Improves your flexibility and coordination
- Improves postural muscles for the work of breathing

Muscle strengthening (Strength Training)

- Also called Repetitious resistance or Weight training
- Improves muscle endurance to improve your ability to work (and play!) without fatigue

Cardiovascular exercise (Endurance Training)

- Strenuous activity that increases circulation
- Improves heart and respiratory function
- Activities examples: walking, cycling, rowing, swimming, playing sports

Generally, if you are exercising independently, it is best to increase duration (the amount of time you spend exercising) and frequency (the number of days per week that you exercise) **before** progressing to a higher intensity level (your score using the RPE). If you have unusual symptoms or feel very uncomfortable with exercise, decrease the intensity (speed, tension, or weight), to a level that does not cause these symptoms.

Significant health benefits can be obtained by including a moderate amount of physical activity on most, if not all, days of the week.

## EXERCISE PROGRAM RECOMMENDATIONS

### Warm up and Stretching (Flexibility Training)

**Frequency:** Usually 5 times per week, or daily, if for postural correction/awareness

**Duration:** Hold each stretch for 10 to 30 seconds

**Intensity:** 3 to 5 repetitions per stretch

### Muscle Strengthening (Strength training)

**Frequency:** 3 times per week

**Intensity:** One set of 10 repetitions

**Progression:** Increase to one set of 20 repetitions (as monitored by RPE and RPD)



Once you are able to perform two sets of 20 repetitions for two consecutive exercise sessions increase resistance as outlined below. This is known as the 2 x 2 rule of strength training.

- Next stronger resistance of resistive-band
- One pound in free weights
- One plate on weight machines

### Cardiopulmonary Training (Endurance Training)

**Frequency:** 3 to 5 times per week

**Duration:** Individualized based upon medical assessment and progressed to achieve a 20-30 minute program

**Intensity:** Your target level of performance should be to work at a level of 3 to 4 on the RPE and progressed using the RPD

## WARM-UP AND STRETCHING EXERCISES (FLEXIBILITY TRAINING)

Warm-up and stretching exercises should always be completed prior to beginning more strenuous activities to reduce the risk of injury. It's also important to stretch after completing your exercise session to releases muscle tension and soreness.

Some people are naturally more flexible. Flexibility is primarily due to one's genetics, gender, age and level of physical activity. As we grow older, we tend to lose flexibility, usually as a result of inactivity rather than the aging process itself. The less active we are, the less flexible we are likely to be. As with cardiovascular endurance and muscle strength, flexibility will improve with regular training.

### Stretch for success

Before stretching; take a few minutes to warm up, as stretching cold muscles can cause injury. Begin with a simple, low-intensity warm-up, such as brisk walking in place for 10 minutes. Spend at least 5-10 minutes warming up prior to stretching. Stretch all of the major muscle groups.



**GOOD NEWS :** As with cardiovascular endurance and muscle strength, flexibility will improve with regular training.

### When performing any stretch:

- Start each stretch slowly, inhaling at the beginning of the stretch and exhaling as you gently stretch the muscle
- Stretch to the point of mild discomfort. Hold each stretch for at least 10 seconds – slowly release – repeat 3 times

Avoid these stretching mistakes:

- Do not bounce a stretch — holding a stretch is more effective and there is less risk of injury
- Do not stretch a muscle that is not warmed up
- Do not strain or push a muscle too far — if a stretch hurts, ease up
- Do not hold your breath
- Do not stretch right after a meal

### Specific Recommendations for Warm-up and Stretching (Flexibility Training)

**Frequency:** Usually 5 times per week, or daily, if for postural correction/awareness

**Duration:** Hold each stretch for 10 to 30 seconds

**Intensity:** 3 to 5 repetitions per stretch

**Calf stretch:** With right foot in front, left foot behind, lean forward, keeping right heel touching. Hold 30 seconds while counting out loud.



Repeat \_\_\_\_ times. Do \_\_\_\_ times per day.

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**Quadriceps stretch:** While holding support grasp right/left ankle. Gently pull foot toward buttocks until a stretch is felt on the upper part of the leg.



Hold \_\_\_\_ seconds.

Repeat \_\_\_\_ times. Do \_\_\_\_ times per day.

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**Hip stretch:** With feet parallel, bend front leg, keeping knee in line with ankle. Now lean into the stretch, keeping back leg straight. Push hips forward slightly. Hold 5 seconds. Repeat on the other side.



Repeat \_\_\_\_ times. Do \_\_\_\_ times per day.

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**Hamstring stretch:** With opposite leg bent foot flat, grasp right/left leg and slowly try to straighten knee.



Hold \_\_\_\_ seconds.

Repeat \_\_\_\_ times. Do \_\_\_\_ times per day.

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## MUSCLE STRENGTHENING EXERCISES (STRENGTH TRAINING)

### LOWER EXTREMITY STRENGTH TRAINING

Lower extremity training targets the large muscles of the lower body in order to combat the muscle weakness that contributes to activity limitations such as in walking. Enhanced strength and therefore endurance of these major muscles, decreases the perception of dyspnea and increases the overall health and fitness of individuals with lung disease. Lower extremity strength training is considered a cornerstone of any exercise program.

### Specific Recommendations for Lower Extremity Muscle Strengthening (Strength Training)

**Frequency:** 3 times per week

**Intensity:** One set of 10 repetitions

**Progression:** Increase to one set of 20 repetitions (as monitored by RPE and RPD),

Once you are able to perform two sets of 20 repetitions for two consecutive exercise sessions increase resistance as outlined below. This is known as the 2 x 2 rule of strength training.

- Next stronger resistance of resistive-band
- One pound in free weights
- One plate on weight machines

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**Straight leg raises:** Bend one leg. Raise other leg 6-8 inches with knee locked. Exhale and tighten thigh muscles while raising leg. Repeat using other leg.



Repeat \_\_\_\_ times. Do \_\_\_\_ times per day.

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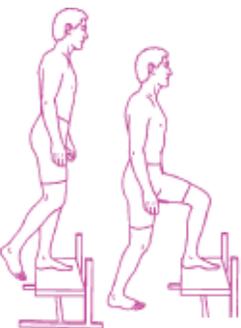
**Hip side kicks:** Holding a chair for balance; keep legs shoulder width apart and toes pointed forward. Kick one leg out to side, keeping knee straight. Do not lean. Repeat using other leg to complete set.



Repeat \_\_\_ times. Do \_\_\_ times per day.

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**One-step stairs:** Using stair or stool, step up then down with same leg 5 times. Repeat using other leg to complete set of 10 step-ups.



Hold \_\_\_ seconds.

Repeat \_\_\_ times. Do \_\_\_ times per day.

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**Modified knee bends:** Stand up from a sitting position. Once standing, keep your back straight. Do not bend at the waist or slump. Sit down slowly.



Repeat \_\_\_ times. Do \_\_\_ times per day.

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**Bridging:** Lie on back with feet shoulder width apart. Lift hips toward the ceiling.



Hold \_\_\_ seconds.

Repeat \_\_\_ times. Do \_\_\_ times per day.

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**Bridging (single leg):** Lie on back with feet shoulder width apart and one leg straight. Lift hips toward the ceiling while keeping leg straight.



Repeat \_\_\_ times. Do \_\_\_ times per day.

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**Crunch-up:** Lie on back with knees bent and fingertips touching ears. While breathing out, slowly try to lift shoulders about 4 inches off the floor. Keep small of back against floor. Breathe in while returning to floor.



Repeat \_\_\_ times. Do \_\_\_ times per day.

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## UPPER EXTREMITY STRENGTH TRAINING

Lower extremity strength training improves overall endurance for walking but it does not adequately address the training needed to improve performance of daily living activities that require the use of the arms and shoulders (upper extremities).

Alphas with pulmonary problems frequently use the muscles of the arms and shoulders for breathing. As a result, when performing tasks that involve the arms and shoulders (especially activities such as dressing, showering, and housekeeping); you may experience increased dyspnea or breathlessness. Strength training the muscles of upper extremities will positively impact your ability to do activities at and above shoulder height and can diminish the use of the neck and upper chest while breathing. Upper extremity strength training activities include exercises using the arms in a variety of motions, and specific training exercises for those muscles that assist with good posture. Good posture is important because correct posture aligns the body correctly thereby assisting in ease of breathing.

**TIPS FOR BETTER POSTURE**

- DO:**
- Stand tall and erect
  - Keep chin tucked in
  - Keep head and shoulders in alignment
  - Check posture regularly in mirror or large window

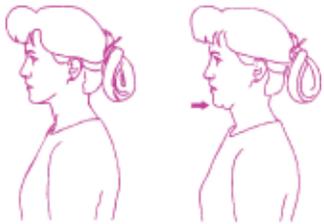
- DON'T:**
- Slouch or slump while watch TV or reading.
  - Sit, stand or lie in one position for too long.
  - Hold your breath while you stretch
  - Stretch without warming up

**Specific Recommendations for Upper Extremity Strength Training**

- Frequency:** Three times per week
- Duration:** Increase in two-minute intervals with one-minute rest periods until you can perform the exercise for a total of 15 minutes without resting.
- Intensity:** Work at a perceived exertion of 3-4 on the RPE and adjust using the RPD
- Progression:** Add a .5 pound cuff weight to each wrist to a maximum of 1.5 pounds on each wrist as tolerated.

**Chin tuck:**

Gently pull chin in while lengthening back of neck.



Hold this position for \_\_\_ seconds.  
Repeat \_\_\_ times. Do \_\_\_ times per day.

**Shoulder shrugs:** Bring shoulders up toward ears.



Hold this position for \_\_\_ seconds. Relax.  
Repeat \_\_\_ times. Do \_\_\_ times per day.

**Shoulder circle shrugs:** Bring shoulders up and rotate around backwards.



Repeat \_\_\_ times. Do \_\_\_ times per day.

**Shoulder pinches:** Pinch shoulder blades together. Hold 10 seconds while counting out loud.



Repeat \_\_\_ times. Do \_\_\_ times per day.

**Dowel exercise:** Seated in a chair, with arms slightly bent, raise and lower a dowel. Inhale for one count (1 second) lifting dowel; exhale two counts while lowering dowel. At this rate you will lift and lower the dowel 20 times per minutes (use a clock with a second hand to monitor rate.) Work for up to 15 minutes, and then add ½ pound weight to each wrist.

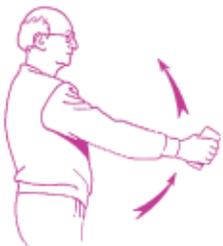


Repeat \_\_\_ times. Do \_\_\_ times per day.



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**Weighted arm raises:** Sitting or standing, hold weight in one hand. Keeping elbow straight, raise arm above head. Very slowly, return arm to side. Repeat with opposite arm.



Repeat \_\_\_\_ times. Do \_\_\_\_ times per day.

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**Standing arcs: Abduction (180 degrees):** Sit or stand arms at side, holding \_\_\_\_ lb weights. Lift arms out to side and up as far as possible.



Repeat \_\_\_\_ times. Do \_\_\_\_ times per day.

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**Resistive band rowing:** With resistive band in door, grasp both ends. Elbows bent, pull back squeezing shoulder blades together.



Hold \_\_\_\_ seconds.

Repeat \_\_\_\_ times. Do \_\_\_\_ times per day.



**IT'S A FACT :** Resistive bands are elastic bands that can be cut with scissors to any length. They are available in a variety of strengths and can be purchased at any store selling medical supplies as well as many rehab centers and drugstores.

## CARDIOPULMONARY TRAINING (ENDURANCE TRAINING)

Cardiopulmonary training, sometimes called Endurance Training, is a primary component of any exercise therapy program. These types of exercises can be accomplished by a number of means, including using a stationary bike, treadmill, Stairmaster, or by taking brisk walks. Unless otherwise advised by your healthcare provider, your training sessions should be approximately 20 to 30 minutes in duration. If weight loss or weight management is your goal, a longer duration of time for these sessions is generally recommended. The frequency of your program should be three times per week to maintain fitness, and five times per week to improve your fitness level.

Which type of exercises you choose is based on your ability, interest, and access to exercise equipment. If you don't have ready access to exercise equipment, walking programs are equally effective. If you enjoy exercising with others, many malls have designated hours for walking indoors. These programs provide a safe, climate-controlled environment, friendship, and year-round accessibility.

To reap the most cardiopulmonary benefits from your workout, it is necessary to exercise within a recommended intensity range. As starting point, your target level of performance should be at a level of 3-4 on the Borg Scale for Rating Perceived Exertion (RPE) and progressed by determining your tolerance for the exercise based on your perceived breathlessness using the Borg Scale for Rating Perceived Dyspnea (RPD).

An increase in exercise intensity is directly related to elevation in exercise heart rate and other metabolic processes. Therefore, monitoring your exercise session is vital not only for your safety while exercising but for adjusting the intensity of your cardiopulmonary work out. As discussed earlier, Target Heart Rate assessments are not recommended as a safe method for monitoring exercise intensity in individuals with lung disease. Instead, individuals with moderate to severe lung disease are strongly advised to use the Borg Scale for Rating Perceived Exertion (RPE) and Borg Scale Rating for Perceived Dyspnea (RPD) as their monitoring tools.

### Specific Recommendations for Cardiopulmonary Training

**Frequency:** One time per day, 3 to 5 times per week

**Duration:** Warm-up and cool down 3 minutes each at a level approximately half as hard as your actual exercise intensity.

Exercise for up to 30 minutes continuously

**Intensity:** Work at a level of 3 to 4 on the RPE and adjust based on your tolerance (perceived breathless) using the RPD.

**Progression:** Increase duration to a tolerance of 30 minutes, Increases in intensity and/or duration should be based on the symptoms you experience and as monitored by the RPD and RPE scales

## WHAT IS A PULMONARY REHABILITATION PROGRAM?

Some will find that an independent exercise program is not for them. Instead, your physician may recommend a pulmonary rehabilitation program. This type of program is indicated for the individual who has not participated in a regular exercise program, or for someone who is having a great deal of difficulty performing activities of daily living at home and work due to breathlessness and fatigue. Referral to a pulmonary rehabilitation program will assist in starting, re-starting, or upgrading your exercise program. A pulmonary rehabilitation program is a structured program with facilities that can often look much like a regular gym but with a significant difference in the type of staff. Pulmonary rehabilitation programs can provide you with nurses, physicians, physical therapists, respiratory care practitioners, personal trainers, coaches, teammates and others to help you achieve your activity goals.



**EASY AS PIE:** Referral to a pulmonary rehabilitation program will assist in starting, re-starting, or upgrading your exercise program.

### "How Do I Choose a Program?"

Your healthcare providers may have a program that they work with on a regular basis. If not, you can locate a pulmonary rehabilitation program by contacting local hospitals and clinics in your area. Do not be afraid to call and arrange a visit with the clinic to determine if the equipment and staff understands your needs and medical problems. Additionally, your insurance company may dictate which, if any, pulmonary rehabilitation program you can select based on your coverage. Cardiac rehabilitation programs are more common than pulmonary rehabilitation programs but they may not understand the management of your pulmonary problem as well. In selecting a program, there are some considerations that you will need to keep in mind.

### Components of a Pulmonary Rehabilitation Program

A pulmonary rehabilitation program has three basic elements:

1. Evaluation or assessment of your current functional ability.
2. Development of a goal-oriented treatment plan specific to your defined limitations and needs.
3. Implementation of the treatment plan.

### The assessment

A formal pulmonary rehabilitation team assessment includes evaluations of muscle strength and endurance, functional task tolerance, and cardiopulmonary exercise tolerance. Physical therapists, occupational therapists, exercise specialists, and recreational therapists typically perform these evaluations. Special consideration will be given to oxygen therapy needs during exercise and other health conditions.

Your physical assessment will include a review of posture, muscle strength, muscle endurance, balance, ambulation patterns, joint stability and cardiopulmonary endurance. It is important to assess all areas in order to design a specific exercise program that addresses your individual needs. The cardiopulmonary endurance evaluation can be accomplished by completing a sub-maximal stationary bicycle or treadmill test, a 6-minute walk test, or a 12-minute walk test.



When available to the rehabilitation staff, the results of a formal maximal exercise test can also be used to determine a starting point for training. While you are being tested, the evaluator will be measuring heart rate, blood pressure, perceived breathlessness, perceived exertion, and oxygen saturation. When indicated, cardiac monitoring may be included. As you continue with your prescribed exercise program, re-evaluations to determine your progress will utilize the same tests and measures.

A functional task assessment, based on activities of daily living, is usually performed by an occupational therapist. Activities that might be assessed include dressing, bathing, meal preparation, eating, social activities, household tasks (laundry, cleaning), and work tasks. Utilizing a Functional Independence Measure (FIM) scoring system, you define the degree of assistance required to complete tasks. When addressing self-defined limitations experienced at work, a number of standardized evaluation tools that address worker productivity and tolerance to specific work demands, such as lifting capacity, standing, kneeling, and other postures, are available.

A major factor during the assessment process is your personal goal and motivations. Your personal motivations and exercise preference will assist the care team in selecting and designing the exercise regime that will work for you.



**DIG IN :** A formal pulmonary rehabilitation team assessment includes evaluations of muscle strength and endurance, functional task tolerance, and cardiopulmonary exercise tolerance.

### Advantages of a Pulmonary Rehabilitation Program

There are a number of benefits to participating in a pulmonary rehabilitation program that you may not experience if you simply perform your fitness program at home. The pulmonary rehabilitation staff can monitor how you are performing your exercises, and can offer tips for improving how safely and effectively you are exercising. In addition, you can receive support from other people in the program who have medical conditions similar to your own. This can be particularly encouraging if you are wondering if you are doing your exercises correctly, and are improving fast enough.

## STAYING ACTIVE

Whether or not you start a fitness program at home or at a rehabilitation center, the trick is to sustain the program over time. Maintaining your fitness is a life-long activity that takes dedication and commitment. The benefits are well known. With time, you should see measurable improvement in your ability to perform day-to-day activities with less fatigue and shortness of breath. You can take charge of your activity and fitness levels and make a significant impact on your overall quality of life. Talk with your doctor, and begin exercising safely.



