

# Non-Alcoholic Fatty Liver Disease: A Patient's Guide

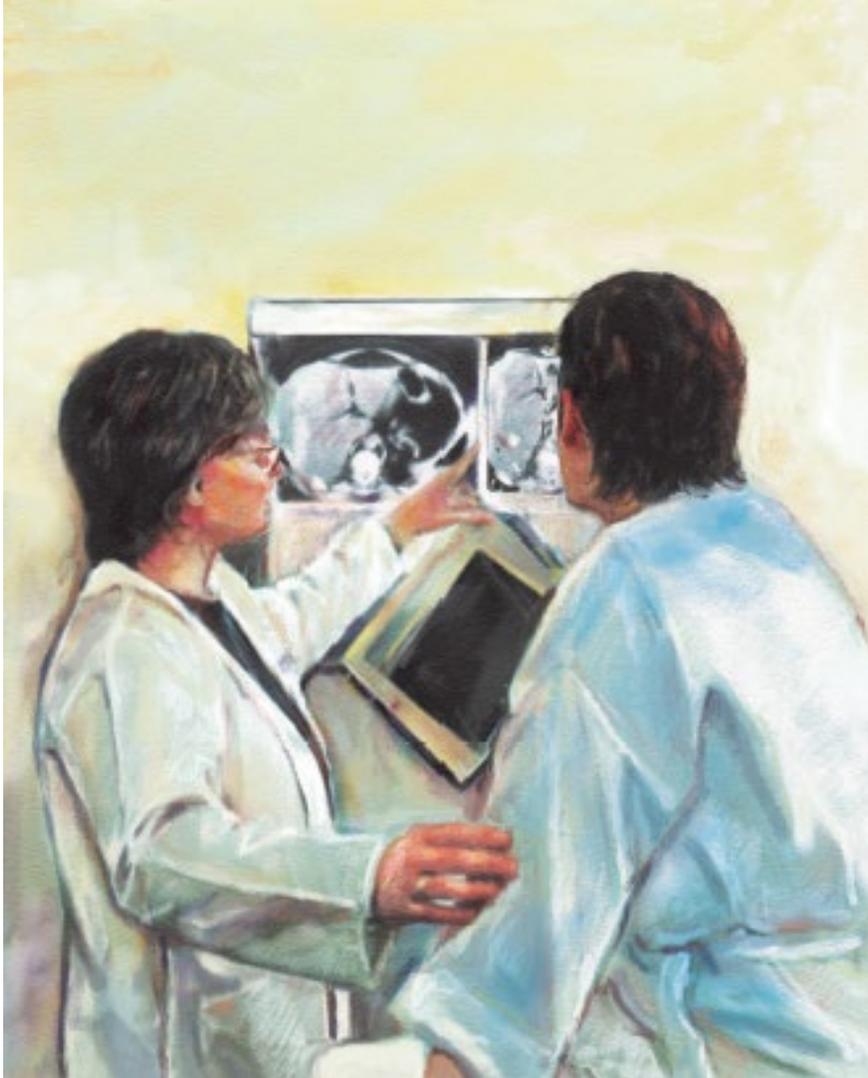


Image: National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health

## Version 2 (2019)

HIV, Hepatitis, and Related Conditions Programs  
Veterans Health Administration  
U.S. Department of Veterans Affairs

*This document is not copyrighted, and users are encouraged to print and distribute as many copies as they need.*

## Contents

To our patients.....	3
The liver.....	4
What is the liver? .....	4
What does the liver do?.....	4
A sick liver?.....	4
Other things that can affect the liver.....	4
Lab tests for your liver .....	5
Names of the tests .....	5
The ALT/SGPT Test .....	5
The AST/SGOT test.....	5
The T. Bili. test.....	5
The Albumin test.....	5
The PT/INR test .....	5
Other lab tests.....	5
Non-alcoholic Fatty Liver Disease (NAFLD) .....	6
What is NAFLD?.....	6
What happens when you have NAFLD?.....	6
Who gets NAFLD? .....	7
How do I know if I have NAFLD? .....	7
What is a Liver Biopsy? .....	7
What are the symptoms of NAFLD?.....	7
What are my risk factors for NAFLD?.....	8
Liver cancer screening.....	8
Treatment/Prevention .....	9
How is NAFLD/NASH treated? .....	9
Physical Activity (Aerobic and Resistance).....	9
Diet changes.....	9
What diet changes can I make? .....	9
Weight loss.....	10
Medications to treat NAFLD.....	11
Controlling diabetes.....	11
Controlling cholesterol and fats.....	11

Take care of your liver.....	11
Herbs to avoid .....	11
Making Smart Goals.....	12
Definitions.....	14
Resources.....	15
Contributers.....	15

## **To our patients**

Obesity is one of the leading causes of death world-wide and with this disease comes a series of medical conditions. Non- Alcoholic Fatty Liver Disease (NAFLD) is one of the diseases associated with obesity. Currently, the goal of treatment is to reduce the risk factors associated with NAFLD. Awareness of this condition and lifestyle changes is key to changing the progression of the disease.

Let the handbook guide you to ask your health care provider for more information about your situation. Sometimes the information provided during a clinic visit is much more than you can absorb right away. You may forget to ask what is most important to you or you may think of a question later.

We hope you will read this handbook and share it with family, friends and your other health care providers.

## The liver

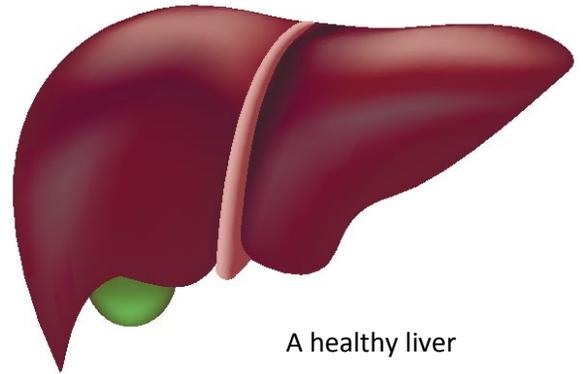
### What is the liver?

Your liver is one of the largest organs in your body. Your liver is located in the upper right-hand part of your abdomen and is protected by your ribs. A healthy liver is reddish-brown in color.

### What does the liver do?

Your liver works behind the scenes performing over 500 functions! The liver acts like a factory and a filter in the following ways:

- Processes and stores vitamins, sugars, fats and other nutrients from the food you eat
- Makes substances that your body needs to stay healthy
  - Albumin: protein made by liver
  - Bile: digestive juice which helps the body absorb fat from the gut to the bloodstream
- Breaks down harmful products, such as alcohol and toxins
- Removes some wastes from your blood
- Changes extra glucose (energy) into glycogen (energy storage). Glycogen can be changed back to glucose when your body needs extra energy
- Helps with blood clotting

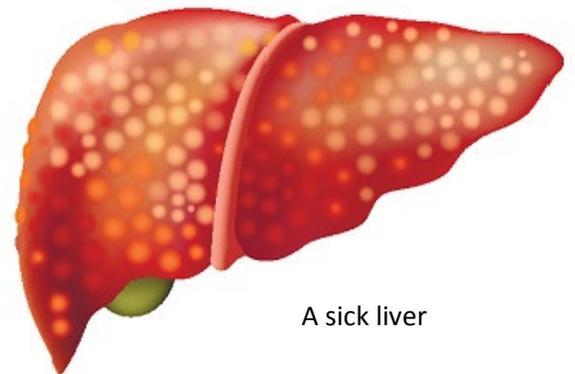


A healthy liver

### A sick liver?

When the liver does not work well, you can get very sick, or even die if your liver stops working.

When the liver does get injured, one of the earliest ways we can tell is by blood tests that show high levels of liver enzymes in the blood, and sometimes by yellowing of the skin, known as jaundice.



A sick liver

### Other things that can affect the liver

- Virus (hepatitis A, B, C, D)
- Alcohol
- Liver Cancer
- Obesity
- Prescription Drugs
- Street Drugs
- Tobacco
- Over-the-counter drugs

## Lab tests for your liver

When trying to determine the health of your liver, your health care provider will order lab tests that can give information about whether your liver has been damaged.

### Names of the tests

The most common tests that are used to check how well your liver is working are called the Liver Function Tests (LFTs) and Liver Enzymes.

The most common tests are:

- Alanine Aminotransferase (ALT/SGPT)
- Aspartate Aminotransferase (AST/SGOT)
- Total Bilirubin (T.Bili)
- Albumin
- Prothrombin Time/ International Normalized Ratio (PT/INR)

### The ALT/SGPT Test

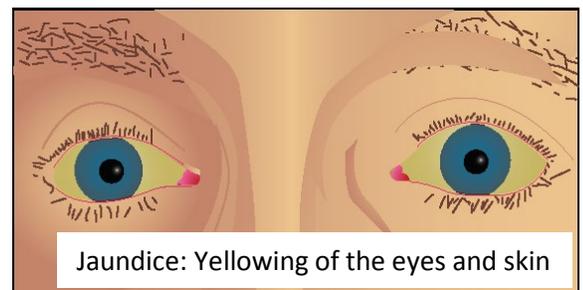
This is an enzyme made in liver cells. If the cells in the liver are damaged, ALT enzymes are released into the bloodstream and result in higher ALT levels. ALT levels can vary and do NOT always reflect the degree of liver cell damage nor do they assess actual function of the liver.

### The AST/SGOT test

This enzyme, much like ALT is made in liver cells. High levels of AST can indicate liver injury. However, factors not related to liver disease can cause higher AST levels, such as other illnesses, muscle or heart injury or certain medications.

### The T. Bili. test

Bilirubin is the yellow breakdown product of heme which is found in hemoglobin. Bilirubin is removed from the blood by the liver, but when the liver is not working well, bilirubin levels can rise. High levels of bilirubin suggest the liver is not working well. Signs of high levels of bilirubin include yellowing of the skin and whites of the eyes (called **jaundice**).



### The Albumin test

Albumin is a protein made only in the liver. If the amount of albumin is low, it suggests that the liver may not be working well.

### The PT/INR test

This test measures how well your blood clots. If the prothrombin time is high, it may mean that the liver cannot produce enough of the clotting proteins.

### Other lab tests

Your provider may order other tests. It is important to keep in mind that just because you may have abnormal levels of an enzyme on a test, it does not mean your liver is failing. Also, liver enzymes may be normal sometimes in patients who have liver disease. Your provider will interpret these tests and work with you.

## Non-alcoholic Fatty Liver Disease (NAFLD)

### What is NAFLD?

NAFLD is the most common cause of chronic liver disease in the U.S.

It is due to the buildup of fat in the liver not caused by an overuse of alcohol. Fatty liver (steatosis) occurs when the liver has more than 5-10% of its weight in fat. NAFLD is related to obesity, diabetes and often abnormal levels of fat in the blood and high blood pressure.

Fatty liver in isolation does not damage the liver, however **nonalcoholic steatohepatitis (NASH)** which is a severe form of NAFLD can cause inflammation and damage to the liver.

This can progress to scarring or fibrosis in the liver and, in some patients, cirrhosis where hard scar tissue develops in the entire liver. This process usually takes several years or even decades to develop.

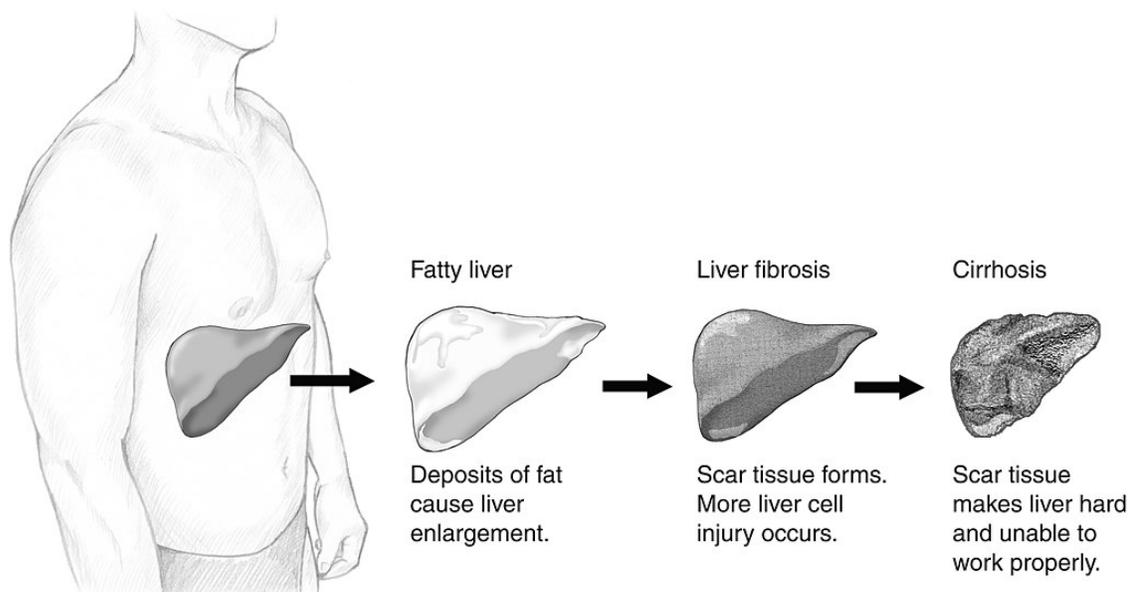


Image: National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health

### What happens when you have NAFLD?

**Fatty Liver:** Fat enters the liver cell. Next the cell swells and changes which causes liver injury.

**NASH:** A bad case of liver injury which has inflammation and swelling of liver cells and can progress to cirrhosis or severe scarring of the liver. Not everyone with NASH will develop cirrhosis.

**Cirrhosis:** A scarred liver from years of damage.

## **Who gets NAFLD?**

- 20-30% of Americans have NAFLD
- 2-5% of Americans have NASH
- Occurs in both males and females
- Adults and children (less common in children)
- All ethnic groups (commonest in Hispanics)
- Found in 80% of obese individuals, particularly those with large waist sizes
- Increased in individuals with type 2 diabetes
- Increased in individuals with high blood pressure
- Increase in individuals with high amount of fats called triglycerides in the blood or low levels of good cholesterol called HDL
- Increased in individuals with obstructive sleep apnea

## **How do I know if I have NAFLD?**

Routine blood tests your health care provider (increased levels of liver enzymes) ordered may lead to testing that shows fatty liver disease.

Fatty liver can also be seen sometimes on X rays (ultrasounds, CT or MRI) of your abdomen where the radiologist notices fat in the liver.

Additional testing may be required to eliminate other possible causes of the high blood tests and abnormal X-rays.

Some individuals who have fatty liver seen on X-rays may have completely normal liver enzymes.

Your health care provider may order more accurate ultrasound, computed tomography (CT) scan or magnetic resonance imaging (MRI) scans which can show a presence of fat in the liver or fatty liver.

A new type of ultrasound based test called elastography (Fibroscan) may be ordered to look for scarring in the liver.

The diagnosis of fatty liver versus NASH is often done by liver biopsy.

## **What is a Liver Biopsy?**

A liver biopsy is a simple procedure where a doctor places a needle through your skin into the liver to get some cells. The cells are then sent to the lab to be looked at under a microscope.

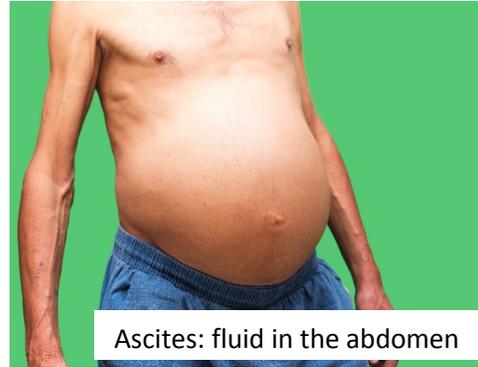
## **What are the symptoms of NAFLD?**

Non-alcoholic Fatty Liver Disease can be considered a silent disease in which the person may not notice any symptoms.

Symptoms may be divided in the following categories:

- Early Symptoms:
  - None

- Feeling tired / Fatigue
- Pain in right upper abdomen
- Late Symptoms:
  - Weight loss
  - Fluid in the abdomen (Ascites)
  - Yellowing of skin (Jaundice)
  - Itchiness
- Other Symptoms:
  - Enlarged liver
  - Obesity



### What are my risk factors for NAFLD?

The cause of NAFLD is not completely known, however NAFLD can take years to develop. NAFLD occurs most often in people with the following:

- Central obesity (around your abdomen)
- Non-insulin dependent diabetes
- Insulin resistance (cells in the body do not respond to insulin)
- Dyslipidemia (fats found in blood which are needed for health, but sometimes become abnormal)
  - High triglycerides (a fatty substance in the blood)
  - High LDL (bad cholesterol)
  - Low HDL (good cholesterol)

If more than one of the above risk factors are present than you may have metabolic syndrome. Metabolic syndrome is associated with a higher risk of developing NAFLD.

Less common risk factors:

- Rapid and excessive weight loss
- Poor diet and exercise habits
- Middle age (but can be found in children)
- Family or personal history
- Polycystic Ovary Syndrome (PCOS) is a health problem that can affect a woman's menstrual cycle, ability to have children, hormones, heart, blood vessels, and appearance
- Obstructive sleep apnea
- Growth hormone deficiency

### Liver cancer screening

People with cirrhosis are considered to be at increased risk of liver cancer (hepatocellular carcinoma or HCC). In the setting of cirrhosis, screening for liver cancer is generally recommended. A common recommendation is to perform an ultrasound of the liver and a blood test called Alpha-fetoprotein (AFP) for screening every 6 months.

In patient with cirrhosis due to NAFLD, screening for liver cancer is recommended as well. If you have cirrhosis please discuss screening for liver cancer with your health care provider.

## Treatment/Prevention

### How is NAFLD/NASH treated?

The most important treatment for NAFLD/NASH is weight loss done gradually and through a combination of healthy diet changes and regular exercise.

The amount of weight loss that can reverse NAFLD is around 7-10% of total body weight. The goal is to lose weight slowly and gradually (1-2 lbs. per week) to achieve this goal over a year.

Lifestyle Changes: Key factor in treatment

- Physical Activity (Aerobic and Resistance)
- Diet Changes
- Weight Loss (MOVE! Program)

### Physical Activity (Aerobic and Resistance)

Increasing physical activity through aerobic and resistance type activities reduce risk factors. Always check with your provider before beginning an exercise routine.

If you aren't used to exercising start small and increase as tolerated.

Goal: 30 minutes of exercise 5 days per week

Find ways to add more activity in your day:

- Take the stairs instead of the elevator
- Park further away at the grocery store
- Keep an exercise journal to track your progress

### Diet changes

Good nutrition is part of an effective treatment for NAFLD.

### What diet changes can I make?

- Eat breakfast daily
  - Breakfast gives you energy to start the day
  - A healthy breakfast is important for everyone
- Watch portion sizes to manage your calorie intake
  - Using smaller plates, bowls and glasses can help you keep your portions under control
- Eat a diet rich in fruits and vegetables
  - Make fruits and vegetables cover at least half of your plate
  - Add fruits and vegetables to snacks
  - Aim for 2 1/2 cups of vegetables and 2 cups of fruit daily
  - Reduce the amount of sugar and starch in your diet
    - Reduce the amount of white bread, pasta, potatoes, rice
    - Reduce or eliminate sugary beverages including sodas, juices and by not sweetening tea or coffee



- Reduce the amount of saturated fat in your diet
  - Select lean cuts of meat and low-fat dairy products
  - Switch to oils when preparing food
  - Select healthy unsaturated fats, such as those found in fish, olive oil and nuts
- Make at least half your grain servings whole grains
  - Choose whole grain breads and cereals, brown rice and whole wheat pasta
- Keep a food journal to track your progress

## **Weight loss**

Weight loss is important in the treatment of NAFLD. However, too rapid of a loss can lead to worsening liver function. It is recommended that you aim for 7-10% loss of body weight over 6 to 12 months of gradual weight loss not exceeding 2 pounds/week. Rapid weight loss may place you at risk for progression of liver disease and liver scarring.

### ***MOVE! Weight Management Program***

MOVE! Weight Management Program is a national VA program designed by the VA National Center for Health Promotion and Disease Prevention (NCP). MOVE! has helped thousands of Veterans lose weight. All VA Medical Centers and many VA Community-based Outpatient Clinics (CBOCs) offer MOVE!. Contact the nearest VA facility to inquire about program availability. Veterans receiving care from VA can enroll in the MOVE! Program. However, the [MOVE!11 questionnaire](#) can be taken by anyone. MOVE! options of care for Veterans includes:

- MOVE! Group Sessions has the greatest evidence for success and is the most common way Veterans participate in MOVE! Time-limited, clinician-led groups meet regularly and follow a structured format for weight loss. To enable more Veterans to participate, many medical centers provide video conferencing to community-based outpatient facilities (CBOCs), as well as long-term groups for weight maintenance.
- MOVE! Telephone Lifestyle Coaching is for Veterans who prefer one-on-one contact via telephone with a designated weight management coach.
- [TeleMOVE!](#) is for Veterans who may benefit from frequent reminders to stay on track with their weight management goals. This includes daily interaction with in-home messaging technologies and clinician contact as needed.
- [MOVE! Coach](#) is a mobile app for Veterans who prefer to manage their weight on their own. Brief check-ins with a MOVE! clinician may be available at VA facilities that offer MOVE! Coach with Care. Simply go to the App Store on any iOS device (version 6.0 or higher) and download the app now! Development of an Android version of MOVE! Coach is underway.
- Weight Loss Medications and Bariatric Surgery are treatment options that may be offered to Veterans who have tried MOVE! but continue to struggle with overweight or weight-related issues.

Get started with MOVE!

1. Let your VA Primary Care team know that you are interested in MOVE!
2. Complete the [MOVE!11 Getting Started Questionnaire](#) at your local VA or online.

3. Print and review your [MOVE!11 Getting Started Questionnaire](#) report with your team who will help you set some initial goals. This report will also recommend [MOVE! Handouts](#) specific to your needs.
4. With your team's guidance, choose from the [MOVE! Treatment Options](#) available at your facility.

### **Medications to treat NAFLD**

Currently there are no medications that are approved by the FDA specifically to treat NAFLD/NASH although there are many medications that are being tested in research studies for NASH.

Medications which have been shown in small studies to help some patients with NASH include:

Vitamin E. This is an anti-oxidant that in a small study showed improvement in liver inflammation and liver cell swelling due to NASH. This medication has potential side effects and is not for everyone. Your liver specialist may perform a liver biopsy to show that you have NASH if they are considering using this medication and they will also evaluate your risk for side effects.

### **Controlling diabetes**

Monitoring blood sugar, following a healthy diet and working with your provider if you need medications to control diabetes will help keep your liver healthy.

### **Controlling cholesterol and fats**

Limit your intake of saturated fats, (red meat, fried/oily food, butter, shortening, milk and dairy products (except fat-free versions).

Replace them with monounsaturated fats (olive, canola, oil) and polyunsaturated fat found in oily fish such as salmon, flaxseed oil, and walnuts.

Healthy eating combined with exercise – and taking cholesterol-lowering medications if prescribed by your provider – will help keep your cholesterol and (fat) triglyceride levels where they need to be.

## **Take care of your liver**

Do not drink alcohol if you have NASH, abnormal liver enzymes or have hepatitis B or C.

Before taking any medications including over the counter and herbal medications discuss with your health care provider.

Physical activity is important in treating fatty liver.

Eat a balanced diet low in saturated fats and high in fiber.

Keep your cholesterol, blood pressure and blood sugar under control.

If you have a question, ASK!

### **Herbs to avoid**

If you are curious about alternative and complementary therapies, then you should ask your health care provider whether it would be safe for you to try them.

The herbs listed below are known to be dangerous, which means that they are bad for your liver, especially since you have liver disease.



- Artemisia
- Atractylis gummifera
- Bush tea
- Callilepis laureola
- Chaparral leaf (creosote bush, greasewood)
- Comfrey (*Symphytum officinale*)
- Crotalaria
- Germander
- Gordolobo yerba tea
- Green tea extract
- Heliotropium
- Jin-Bu-Huang
- Kava
- Kombucha mushroom (tea)
- Ma-Huang (*Ephedra sinica*)
- Margosa oil
- Mistletoe
- Pennyroyal (squaw mint oil)
- Tansy Ragwort (variation of Ragwort)
- Sassafras
- Senecio aureus
- Senna
- Skullcap
- Symphytum
- Valerian root

## Making Smart Goals

A healthy living goal is something YOU want to do to improve your health or well-being. Chances are you have set and met many goals in life already.

Setting clearly defined goals can be helpful in making a difficult lifestyle change, such as quitting drinking or losing weight. Try the steps below:

- My goal for next week is: (Be specific: what, where, how much, and how often) Example: I will walk at least 3 times this week for 15 minutes after I get home from work.
- Things that might get in my way: (Examples: weather, pain, time)
- What I can do to overcome these things: (Examples: exercise indoors, walk with a friend)
- I believe that I can reach my goal: (Circle the number that matches how confident you feel).

1	2	3	4	5	6	7	8	9	10
Not at all Sure			Somewhat Sure				Very Sure		

Keep Track of your progress and let us know how you are doing:

If you met your goal, terrific!

If you had trouble, re-work your goal so you can succeed

## Definitions

**Aerobic Exercise:** Type of exercise that requires oxygen and gets your heart pumping.

**Ascites:** Fluid in the belly.

**Cholesterol:** A fat substance that is found in the bodies of people and animals. Too much cholesterol in your body may cause heart disease.

**Cirrhosis:** Scarring of the whole liver which makes the liver shrunken and hard. Cirrhosis is the result of something that damages the liver for a long time.

**CT Scan (CAT Scan):** A type of X-ray that takes pictures of parts of your body from many angles. Often a dye is used to make the target body part easier to see.

**Enzymes:** A chemical substance in animals and plants that helps to cause natural processes (such as digestion). Helps chemical changes to take place in the plant or animals.

**Glucose:** The main type of sugar in the blood and is the major source of energy for the body's cells. Glucose comes from the foods we eat or the body can make it.

**Glycogen:** Energy stored in the liver and muscle. The body uses this energy when needed.

**HDL (Good Cholesterol):** A type of cholesterol that carries bad cholesterol (LDL) away from your arteries and back to your liver, helping to protect you against heart disease.

**Hormones:** A natural substance that is produced in the body and that influences the way the body grows or develops. A chemical substance produced by your body that influences its growth, development, and condition.

**Inflammation:** A condition in which a part of your body becomes red, swollen, painful and feels hot.

**Insulin:** A hormone released by the pancreas whose job is to help use or store glucose as glycogen.

**Jaundice:** When your eyes and skin turn yellow. It is a sign that the liver is not working well. You can also become jaundiced if your bile ducts are blocked.

**LDL (Bad Cholesterol):** A type of cholesterol that can turn into a hard substance which can stop your blood flowing properly and can eventually cause heart disease.

**Metabolic Syndrome:** A medical condition characterized by obesity, insulin resistance, hypertension and dyslipidemia.

**MRI:** A test that takes pictures of a body part using a magnet, radio waves and a computer.

**Pancreas:** A large gland of the body that is near the stomach and that produces insulin and other substances that help the body digest food.

**PCOS:** Polycystic Ovary Syndrome (PCOS) is a health problem that can affect a woman's menstrual cycle, ability to have children, hormones, heart, blood vessels, and appearance.

**Resistance Exercise:** Type of exercise which includes weight lifting.

**Saturated Fats:** A type of fat commonly found in animal products that is thought to be less healthy than other kinds of fat from vegetable oils or fish.

**Steatosis:** Abnormal buildup of fat in the liver.

**Steatohepatitis:** A form of inflammation in the liver in which there is a buildup of fat in the liver.

**Symptoms:** A change in the body or mind which could show that a disease is present.

**Treatment:** Something that is done to help someone who is injured or ill.

**Triglycerides:** One of the main fatty substances in the blood that can clog arteries.

**Ultrasound (U/S):** A type of test that uses sound waves to take pictures of parts of the body.

**Unsaturated Fats:** A type of fat found in food such as nuts, seeds, avocados, and fish.

## Resources

MOVE! website: [www.move.va.gov](http://www.move.va.gov)

Healthy eating tips: [www.choosemyplate.gov](http://www.choosemyplate.gov)

American Liver Foundation: [www.liverfoundation.org](http://www.liverfoundation.org)

Diabetes website: [www.diabetes.org](http://www.diabetes.org)

VHA National Center for Health Promotion and Disease Prevention: [www.prevention.va.gov](http://www.prevention.va.gov)

Healthfinder: [www.healthfinder.gov](http://www.healthfinder.gov)

VA's Viral Hepatitis Program [www.hepatitis.va.gov](http://www.hepatitis.va.gov) (Other handouts found on this website):

- [NAFLD Fact Sheet](#)
- [Cirrhosis: A Patient Guide](#)
- [Liver Transplant Guide](#)
- [Liver Cancer Guide](#)

## Contributors

Updated Version: Adnan Said, MD, MS; Heather McCurdy, MSN, NP-C

Original Version: The William S. Middleton Memorial Veterans Hospital: Adnan Said, MD, MS, Chief of Gastroenterology and Hepatology; Michelle Lisowski, DNP, RN, APNP (Gastroenterology/Hepatology); Heidi Bolling, MS, RN, APN-C (Chief Ambulatory Care Nursing); Kathy Keckeisen, MS, RN, APNP (Health Promotion Disease Prevention Manager); Kristen McCaskey, RD, CD (Clinical Dietitian, MOVE! Program Coordinator)