Nonalcoholic fatty liver disease (NAFLD) is the result of fat buildup in the liver that is not related to alcohol use. It is normal to have some fat in the liver. When it is more than 5 to 10 percent of the liver’s weight, it is called a fatty liver, also known as steatosis. If the liver is fatty, and there is inflammation or swelling, it is called nonalcoholic steatohepatitis (NASH).

These conditions can be reversed if stopped before liver scarring occurs. If there is scarring, it can damage the liver causing cirrhosis. Over time, the damage can cause liver failure.

The goal of treatment is to prevent the disease from causing damage to the liver. This may include:

- Weight management
- Diet changes
- Exercise

**About the liver**

The adult liver weighs about 2 to 4 pounds. It lies in the right side of the upper abdomen next to the stomach. The rib cage covers most of the liver except the area just below the breast bone. Underneath the liver sits the stomach, large intestine, the right kidney, and the gallbladder.
The liver works to:

- Fight infections by destroying germs, called bacteria, in the blood
- Remove or change hormones, drugs, chemicals, and toxins (ammonia) that enter or are already in your body
- Store and use vitamins, including A, D, E, K, and B12
- Make and store substances that help clot blood
- Store nutrients until the body needs them for energy
- Produce bile, which helps digest food

Who gets NAFLD?

About 1 in every 4 people have this disease. It tends to be more common in people who:

- Are overweight
- Have diabetes
- Have high cholesterol or high triglycerides
- Have had rapid weight loss
- Have poor eating habits

People can have this disease without any of these factors.

Doctors are not sure what causes this disease.

Symptoms

Most often, people do not have any symptoms. Some people have had:

- Weight loss
- Tiredness or weakness
- Pain in the upper right abdomen
- Nausea or loss of appetite
- Skin changes, such as itching or yellowing

Testing

Your doctor may order tests to check for liver disease. These may include:

- Blood tests to check liver enzymes, such as bilirubin, AST, ALT, and alkaline phosphatase
- Imaging of liver, such as CT (computed tomography) scan with ultrasound or MRI (magnetic resonance imaging)
- Liver biopsy where a needle is used to remove samples of tissue from the liver for testing in the lab
Treatment

There is no specific medical treatment for this disease, but changes to diet and exercise have been shown to help prevent damage to the liver.

- See a doctor who specializes in liver disease and talk about what you can do to improve your liver health.
- Control your diabetes if you have diabetes.
- Lower your cholesterol and triglycerides if they are high.

10 things you can do

Changes to your diet and exercise habits can help you control this disease. Talk to your doctor or others on your health care team if you have questions or if you need help to get started.

1. **Lose weight** if you are overweight. Try to lose 1 to 1 1/2 pounds a week. Avoid weight loss of more than 3 1/2 pounds a week. Weight loss of 10 to 15 pounds can make a difference in your health.

2. **Get moving.** Increase your physical activity to at least 150 minutes per week. Include both aerobic exercise and strength training.

3. **Avoid added sugars,** such as sugar, high fructose corn syrup (HFCS), fructose, and sucrose, in foods and drinks. Added sugars are sugars and syrups that are added to foods and drinks when they are processed or prepared. Current Nutrition Facts labels do not list “added sugars”, but you can read ingredient lists on food products to help you to identify added sugars in a food product. Soft drinks, fruit drinks, some breads and cereals, condiments, and yogurts are some products that may contain added sugars.

INGREDIENTS: TOMATO CONCENTRATE FROM RED RIPE TOMATOES, DISTILLED VINEGAR, HIGH FRUCTOSE CORN SYRUP, CORN SYRUP, SALT, SPICE, ONION POWDER, NATURAL FLAVORING

Heinz Ketchup’s ingredient list with added sugars in bold font

A Nutrition Facts label showing 5 g (grams) of sugars in a serving of a food product. Choose foods with **10 g of sugar or less per serving** to reduce added sugars in your diet.
4. **Eat at least 3 ounces of whole grains each day.** An ounce of whole grain is equal to 1 slice of whole wheat bread, 1 cup of whole grain cereal, or 1/2 cup of whole grain pasta, brown rice, or wild rice.

5. **Eat 2 1/2 cups of vegetables each day.** Choose vegetables with different colors to get the full range of nutrients in your diet.
   - Eat green vegetables, like spinach, broccoli, and kale.
   - Eat orange vegetables, like carrots, sweet potatoes, and yams.
   - Dried beans, lentils, and peas are also good choices.

6. **Eat 2 cups of fresh or frozen fruit each day.** Include a variety of fruits and get creative. Have fruit as a snack, with breakfast, or as dessert.

7. **Choose lean meats, fish, and other protein foods, like soy and beans, that are low in fat.** Limit red meat to 1, 3-ounce serving, 3 times each week.

8. **Choose foods low in sodium, and do not add salt to your food.** Read food labels and choose foods with less than 250 mg of sodium per serving.

9. **Choose fats wisely.**
   - Include mostly monounsaturated fats and omega-3 fatty acids, such as nuts (except cashews and macadamia nuts), extra virgin olive oil, avocados, flaxseed, and fish, such as trout, herring, and salmon.
   - Remember all types of fats are high in calories. Choose low fat cheeses and fat free or low fat milk products.
   - Avoid hydrogenated oil and trans fats. These are found in many packaged and fried foods. Keep in mind that a food with less than 1 gram of trans fat per serving can be labeled as “zero grams of trans fat.” Check the ingredient list on the food label for “partially hydrogenated” oils.

10. **Avoid processed carbohydrates and simple sugars.** These include white flour, foods made with white flour, sucrose, sugar, honey, jam, raw sugar, molasses, brown sugar, and agave. Ask your doctor about meeting with a dietitian to get more specific guidelines for your diet and health needs.

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**Eating guidelines by food group**

**Meat and other protein foods**

Prepare all meat by broiling, baking, or grilling. AVOID all fried foods.

- Fish, especially those that are high in omega-3-fatty acids, such as salmon, albacore tuna, and mackerel.
- Poultry without skin and injected broth.
- Lean pork and beef - Choose lean cuts, such as sirloin, loin, tenderloin, and round.
• Meat alternatives made with soy protein or textured vegetable protein, such as tofu and veggie burgers.
• Dried beans and peas, such as black beans, pinto, lentils, and split peas.
• Unsalted nut butters, nuts, and seeds - Flax seeds, chia seeds, walnuts, pecans, and pine nuts have the highest healthy fats.
• Eggs.

**Milk and milk products**

• Fat free or 1% low fat milk.
• Low fat cheeses - Cheese can be high in sodium. Choose those with the least amount of sodium, such as Swiss cheese and fresh mozzarella.
• Nonfat or low-fat yogurt - Choose yogurt high in protein and low in sugar, like Greek yogurt.

**Foods to AVOID:**

• 2% and whole milk
• Buttermilk, chocolate milk, and cocoa made from whole milk
• Instant cocoa mixes with palm oil, coconut oil, and butterfat added
• Yogurt made with whole milk
• Cream, half and half, sour cream, whipped cream, non-dairy, and frozen whipped toppings
• Processed cheeses and cheese foods that have more than 5 grams fat per serving
• Natural cheese made with whole milk or cream

**Whole grains**

Eat at least 3 ounces each day. Choose whole grain foods that have 5 grams or more fiber per serving.

• High fiber breads
• Oatmeal and oat products
• Barley, quinoa, and couscous
• Brown rice
• Whole grain breakfast cereals
• Whole grain pasta and noodles

**Foods to AVOID:**

• Processed or refined foods, which have been stripped of fiber and other nutrients, such as white bread, white rice, biscuits, muffins, pancakes, waffles, cornbread, donuts, sweet rolls, coffee cakes, packaged nut breads, cakes, pies, and cookies
• Egg noodles, packaged breading and stuffing mixes, seasoned rice mixes, soy meat extenders, and any mix that comes out of a box. These are often very high in sodium.
• Salted crackers, corn chips, potato chips, and pretzels
Vegetables

Eat 2 1/2 cups each day.
- Fresh, frozen, or canned without salt

Fruits

Eat 2 cups each day.
- Fresh, frozen, or canned without added sugar
- The healthiest choices are whole fruits
- Limit fruit juice to 1/2 cup per day

Fats and oils

Limit all added fat to no more than 8 teaspoons a day.
- Extra virgin olive oil, flaxseed oil, or canola oil.
- Avocados are especially high in healthy monounsaturated fats.

Beverages

- Water, tea, coffee, and unsweetened drinks. Coffee may provide additional benefit for liver health.
- AVOID all alcoholic beverages.

Seasonings

- Use all herbs and spices except those with added salt.
- Limit all added salt and mixed seasonings with salt.
**Sample menu**

**Breakfast**
- ¾ cup shredded wheat with ½ cup mixed berries
- ½ cup skim milk
- Coffee

**Lunch**
- 4 ounces broiled salmon
- 2 cups salad with mixed lettuces, tomato, cucumber, radish and carrots with 2 tablespoons olive oil and lemon dressing
- ½ cup wild rice
- Fresh apple
- Water with lemon slices

**Dinner**
- 4 ounces baked chicken breast
- 1 cup whole wheat pasta with olive oil, pine nuts, and feta cheese
- 1 cup broccoli, carrots, and spinach stir-fry in olive oil
- Water with lemon slices

**Snack**
- 2 whole grain oatmeal raisin cookies, or
- Trail mix made with 1 ounce walnuts, 2 ounces dark chocolate, and 1 tablespoon dried cherries

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Talk to your doctor or health care team if you have any questions about your care.

The Library for Health Information is available to help you find more health information at (614) 293-3707 or e-mail: health-info@osu.edu.

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