1. Purpose
   a. Nutrition Indicators-
      - There are several tests used to determine Wilson’s disease including: examination for Kayser-Fleisher rings, serum ceruloplasmin test, 24-hour urine copper test, liver biopsy, and genetic testing.
      - Liver, neurological, musculoskeletal and psychiatric areas of health can also have indicators of Wilson’s disease helping to diagnose the disease.
        o These can include chronic active hepatitis, cirrhosis, jaundice, hematemeses, difficulty speaking, excessive salivation, ataxia, personality changes, dystonia, grand mal seizures, emotional liability, compulsiveness, self-injurious behavior, schizophrenic-like behavior, skeletal abnormalities, and cardiac manifestations.
      - Tests
        o Serum ceruloplasmin levels < 20 mg/dL
        o Urinary copper excretion rate > 100 mcg/day
        o Hepatic copper concentration (liver biopsy) > 250 mcg/g of dry weight
   b. Criteria to Assign the Diet:
      If the patient has any of the above testing levels or multiple it is recommended they follow a Wilson’s Disease diet.
   c. Rationale for Diet:
      The diet is recommended to decrease the levels of copper in the blood by decreasing the amount of copper in the diet.

2. Population
   a. Overview-
      - An autosomal recessive disease
      - Occurs equally in men and women
      - Both parents must carry the gene in order to inherit Wilson’s disease
      - At least 1 in 20,000 people of all known rates and nationalities has the disease
      - The carrier frequency of the gene is 1 in around 100 people in the U.S.
        o This gene is located on the 13th chromosome and is called ATP7B
   b. Disease Process-
      o The genetic mutation located on chromosome 13 of the body is responsible for Wilson’s disease.
      o This gene contains the necessary information for making a copper transport protein that is responsible for removing copper from the liver, but mutations in the gene inhibit proper removal of excess copper from the liver and allows copper to accumulate in other organs and the liver.
      o This excess build up of copper can lead to the symptoms described above.
   c. Biochemical and Nutrient Needs-
• It is important to limit foods high in copper because the body is not able to excrete the excess amounts from the organs, especially during the beginning stages of the disease. The copper content of drinking water must also be tested because it is possible for water to contain copper as well so bottled water is recommended. It is recommended also to be cautious of vitamins and supplements containing copper.

• A zinc supplement, such as Zinc acetate prevents the absorption of dietary copper in your body so a low copper diet can be tolerated.

3. General Guidelines
   a. Nutrition Rx –
      • Patients must avoid copper-rich foods and beverages and restrict copper intake to < 1 mg/day. A Zinc supplement can be added into the diet to help with copper excretion in addition.

   b. Adequacy of Nutrition Rx
      • This Nutrition Rx is an adequate Rx because it is focused on the issue of the patients’ in ability to excrete copper. By decreasing the intake of copper and increasing a supplement that will help with the excretion of copper, the amount of excess copper in the body should be able to be maintained.

   c. Goals
      • The goal of this diet is to ultimately decrease excess levels of copper within the body and be able to maintain a balanced level of copper intake with excretion through diet and supplementation.

   d. Does it Meet DRI
      • The RDA for copper in an adult is 900 mcg or 0.9 mg. If a patient follows the Wilson’s disease diet of low copper intake they will meet the RDA for copper.

4. Education Material
   a. Nutrition Therapy
      • It is important for the client to fully understand the implications of their disease from a nutrition and diet stand point. Using nutrition handouts and nutrition education tools, the client can gain a better understanding of high copper foods they should avoid and low copper foods they are allowed to include in their diet. By going through their typical day and understanding their likes and dislikes it would be helpful in order to advise them on slight changes they can make in their eating plans in order to follow the diet successfully. Also, keeping a food log and tracking the amount of copper in their diet will also be a helpful tool in making sure they are following the recommended diet.

   b. Ideas for Compliance
      • In order to increase compliance the patient should be fully aware of the consequences of not accommodating to the low copper diet and the health risks that are likely if non-compliant.
• Building a positive relationship with the client and using a reward system can also be beneficial in compliance to the diet so the patient knows the dietitian is invested in their health and they should be as well.

5. Sample Menu

a. Foods Recommended

• Beef
• Eggs
• White meat turkey and chicken
• Cold cuts and frankfurters that do not contain pork, dark turkey, dark chicken, or organ meats
• Most vegetables including fresh tomatoes
• Breads and pasta from refined flour
• Rice
• Regular oatmeal
• Cereals with <0.1 mg of copper per serving (check label)
• Butter
• Cream
• Margarine
• Mayonnaise
• Non-dairy creamer
• Sour cream
• Oils
• Salad dressings (made from allowed ingredients)
• Most milk products
• Milk flavored with carob
• Cheeses
• Cottage cheese
• Jams, jellies, and candies made with allowed ingredients
• Carob
• Flavoring extracts
• Coffee
• Tea
• Fruit juices
• Fruit-flavored beverages
• Lemonade
• Soups made with allowed ingredients

b. Foods to Avoid

• Lamb
• Pork
• Pheasant
• Quail
• Duck
- Goose
- Squid
- Salmon
- Organ meats including liver, heart, kidney, and brain
- Shellfish including oysters, scallops, shrimp, lobster, clams, and crab
- Soy protein meat substitutes
- Tofu
- Nuts and seeds
- Vegetable juice cocktail
- Mushrooms
- Nectarines
- Commercially dried fruits including raisins, dates, prunes
- Avocado
- Dried beans including soy beans, lima beans, baked beans, garbanzo beans, pinto beans
- Dried peas
- Lentils
- Millet
- Barley
- Wheat germ
- Bran breads
- Cereals with >0.2 mg of copper per serving (check label)
- Soy flour
- Soy grits
- Fresh sweet potatoes
- Chocolate milk
- Soy milk
- Cocoa
- Instant breakfast beverages
- Mineral water
- Soy-based beverages
- Copper-fortified formulas
- Brewer’s yeast
- Multi-vitamins with copper or minerals

c. Example of a meal plan

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<thead>
<tr>
<th>Sample Menu</th>
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<tbody>
<tr>
<td><strong>Breakfast</strong></td>
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<tr>
<td>• 1 C Oatmeal</td>
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<td>• ½ C 2% Milk</td>
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<td>• 1 Scrambled Egg (with cheese)</td>
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<td>• 8 oz. Orange Juice</td>
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### 6. Websites
a. Organizations with Websites
   - Arizona Digestive Health
7. References
   a. Journal articles references

   a. Websites


