

# POLY-CYSTIC OVARIAN SYNDROME

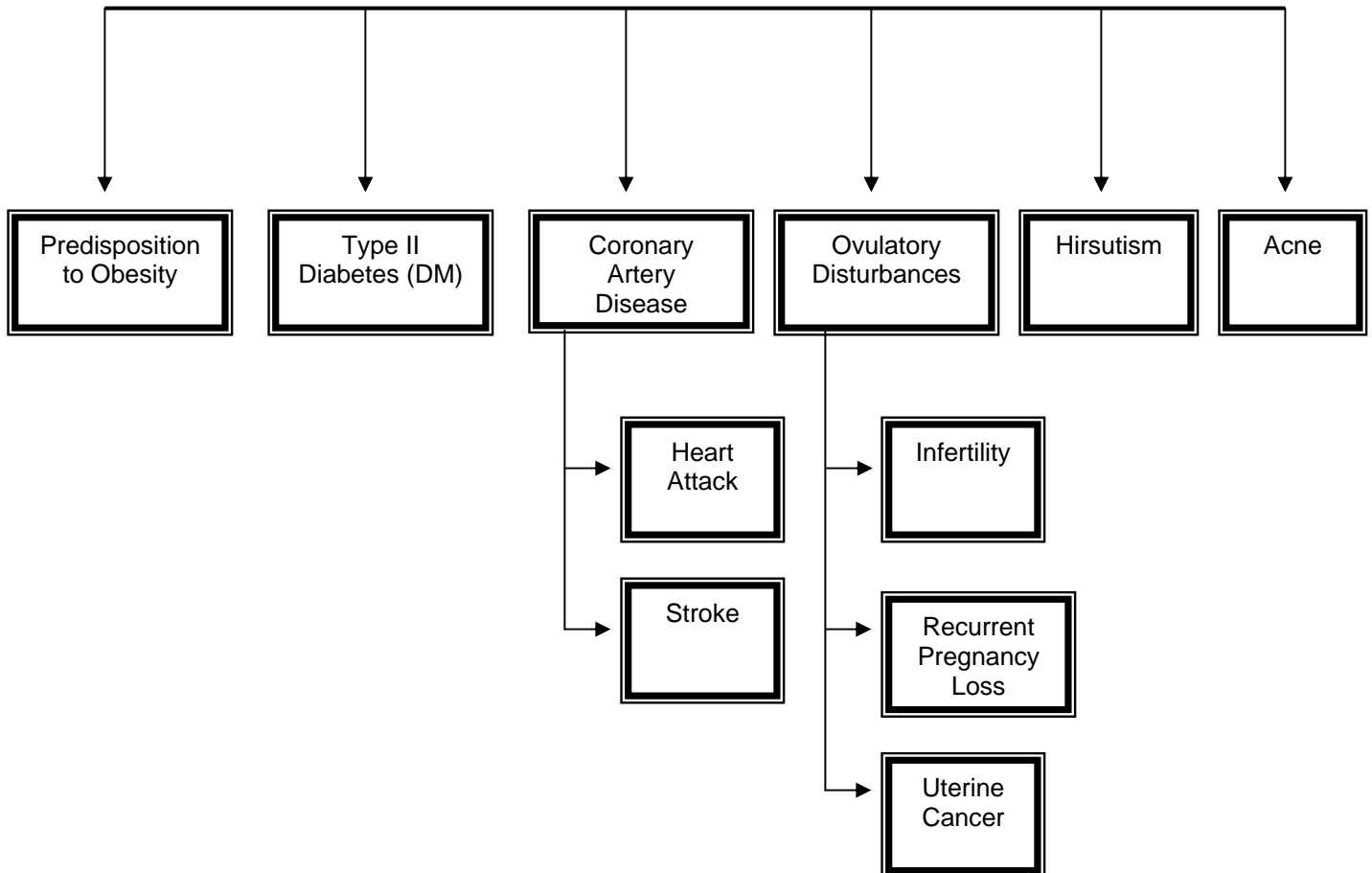
PATIENT INFORMATION

BY: DR. NATALIE SCHULTZ

# PCOS

*Why should we care?*

Insulin Resistance Can Lead to Long Term Health Sequelae



# Polycystic Ovarian Syndrome (PCOS)

There are greater than 100 different genetic causes of PCOS. 52% of the population with this condition have one particular genetic (enzymatic) defect. This will be explained to help illustrate the pathophysiology.

Insulin drives glucose into the cell. Once in the cell, glucose is converted to ATP. ATP is the source of energy (fuel) for the cell. The conversion of ATP is much slower in a patient with PCOS; therefore, the body compensates and increases insulin levels to drive more glucose into the cell for fuel.

## **IT IS THE INCREASED INSULIN PRODUCTION THAT IS THE COMMON CAUSE OF THE CONDITION.**

1. The cells most responsive to increased insulin levels are the fat cells in the abdomen causing central weight gain. Insulin inhibits the breakdown of fat. The result is that it is easier to gain weight and harder to lose weight. Leading to:
  - Central obesity
  - Increased insulin resistance
2. High insulin levels adversely affect the lipid profile resulting in:
  - Increased total cholesterol
  - Decreased HDL (good cholesterol)
  - Increased LDL (bad cholesterol)
  - Increased or decreased triglycerides
3. The increased insulin causes increased release of LH from the pituitary gland. The Theca cells (cells in the ovary that make testosterone) are stimulated by both insulin and LH. This leads to an abnormal hormonal environment in the ovaries where testosterone is predominant instead of estrogen. Increased testosterone in the ovaries is toxic to developing eggs. The eggs develop in follicles. One sees a background of egg/follicle development and degeneration. This multicystic ovarian appearance is due to:
  - Increased insulin which causes increased testosterone production
4. High insulin levels decrease the protein that binds with testosterone and estradiol, SHBG (sex hormone binding globulin). SHBG increases free (active) testosterone levels which leads to:
  - Unwanted hair growth or unwanted hair loss
  - Increased acne
  - Increased insulin resistance
5. High insulin levels decrease plasminogen which is necessary to break down clots that begin to form in blood vessels. Decreased levels can lead to:
  - Hypertension
  - Cardiovascular disease
6. Increased testosterone results in:
  - Cosmetic effects (hirsutism/acne)
  - Central weight gain
  - Increased insulin resistance
  - Worsening of the lipid profile

7. The effect of:
- Central obesity
  - Abnormal lipids
  - Hypertension (increased blood pressure)
  - Increased incidence of heart attacks and strokes

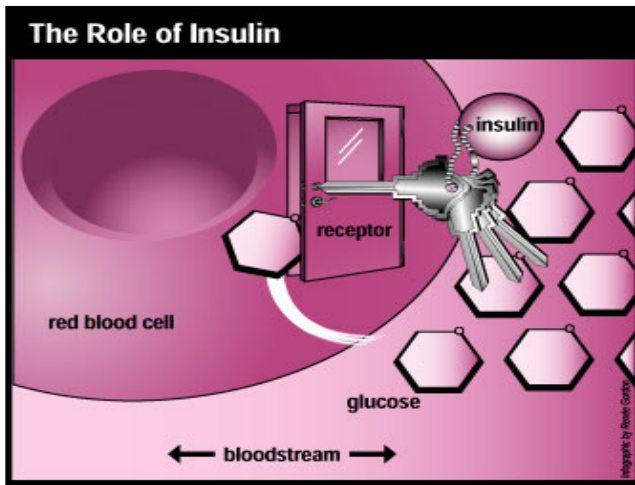
## HOW YOU MAY FEEL OR WHAT YOU MIGHT NOTICE

The symptoms of PCOS are caused by Insulin Resistance and vary widely from woman to woman and not all women display all of the following symptoms:

- Irregular or completely absent periods, and/or irregular bleeding
- Less frequent or no ovulation (release of an egg), which can lead to difficulty becoming pregnant
- Exhaustion or lack of mental alertness (due to low blood glucose)
- Abnormal lipid levels (such as high cholesterol and LDL and low HDL)
- High blood pressure
- Weight gain or obesity, especially in the waist area; difficulty losing weight
- Sleep apnea (excessive snoring; breathing stops at times while asleep)
- Hirsutism (excess hair growth on face, chest, stomach, back, pubic area, thumbs or toes)
- Alopecia (male pattern hair loss or thinning hair)
- Acne
- Skin tags (tiny excess growths of skin in the armpits or neck area)
- Acanthosis Nigricans (brown skin patches on the neck, arms, breasts, groin, thighs or skin folds)
- Decreased sex drive



# INSULIN RESISTANCE



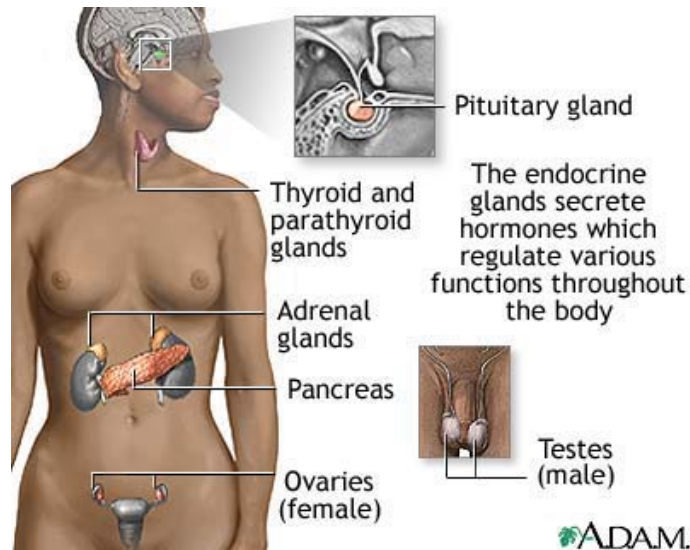
- Insulin is the “gatekeeper” that allows glucose to enter the red blood cells.
- The body uses glucose for energy. The only source of energy for the brain is glucose.

## ↑ INSULIN CAUSES .....

### Changes lipid profile:

- ↑ Total cholesterol
- ↑ LDL (bad cholesterol)
- ↑/↓ Triglycerides
- ↓ HDL (good cholesterol)

↓ Plasminogen which is necessary to break down clots that form in blood vessels. This can lead to high blood pressure and cardiovascular disease (heart attacks and/or stroke)



↑ Release of LH from pituitary gland causing a testosterone environment in ovaries, instead of estrogen environment, which prevents normal egg maturation & ovulation

These high levels of male hormones (androgens) cause central weight gain, acne, unwanted hair growth and/or unwanted hair loss

# TREATMENT

for

*Polycystic Ovarian Syndrome (PCOS) - Insulin Resistance - Metabolic Disorder*



# NUTRITION

## 1. Eat balanced meals and snacks

- 3 meals per day & 3 snacks per day
- Food combining: Protein + Good Fat + Complex Carbohydrate
- Total protein should be 80-100 gm per day (aim for 20 gm of protein for breakfast)
- Healthy fats should be a part of each snack and meal as well
- Food ideas: Everything should be whole grains, Ezekiel bread (flourless/sprouted), Fiber One or All Bran cereal, walnuts, almonds, cottage cheese, string cheese, Greek yogurt, low-fat low-carb yogurt & hard boiled eggs

## 2. Eat for nutrition, not for entertainment. Make healthy choices.

- × Avoid sugary drinks and concentrated sweets (soft drinks, fruit juices)
- × Avoid fast foods
- × Avoid processed foods and snacks
- × Avoid white flour and white sugar products
- × Avoid soy and flax products (soy lecithin is acceptable as it is an emulsifier)

## 3. Recommended Reading:

- The Insulin Resistance Diet
- The PCOS Diet Book: How you can use the nutritional approach to deal with Polycystic Ovarian Syndrome

# Shopping List

The following recommendations are to serve as a guide for healthy shopping and eating. It does not serve as an all-inclusive list.

Trader Joe's is a grocery store where you will find many of the healthy items. Back in Time Foods (Avon), Whole Foods, Wild Oats, Georgetown Market and Nature's Way are health food stores where you can find the recommended supplements. Udo's Blended Oil without lignan is also available at the outpatient pharmacy located in the gift shop at Clarian West Medical Center.

## THE CONCEPT OF BALANCE: "FOOD COMBINING"

**Protein** + **Healthy Fat** + **Complex Carbohydrate**  
(80-100 gm/day)

Beans	Almond, raw, organic	Apricots
Chicken, lean, skinless	Almond butter	Banana (1/2)
Cottage cheese (low-fat)	Avocados	Berries (all types)
Eggs, free range	Coconut oil	Cabbage
Fish	Extra virgin olive oil	Cantelope
Greek yogurt (0% fat)	Peanuts, raw, organic	Dark green vegetables (asparagus, broccoli, brussel sprouts, spinach, dark salad greens)
Smoked salmon	Peanut butter, natural	Kiwi
String Cheese	Walnuts	Oranges
Turkey, lean		Red grapefruit
Whey or Rice Protein Powder		Wheat germ
		Whole grain breads (Ezekial, etc.)
		Brown rice, whole grain pasta
		Whole grain cereal, steel cut oatmeal

\* Remember to steam veggies and only broil, bake or grill fish, chicken and turkey.

\* Only use extra virgin olive oil for cooking.

### Healthy Extras

Balsamic vinegar

Dark chocolate

Lemons/limes (rinds are very good source of anti-oxidants)

Raw blue agave nectar (very slow absorption and 4 times sweeter than honey)

### Good Carbs

The type of carbs you eat is important. Instead of foods high in simple sugars, you should choose whole grain foods such as whole grain bread, brown rice, whole wheat pasta, and whole grain cereals. These are healthier than their refined alternative - white bread, white rice, etc. Fruits and vegetables are excellent examples of healthy carbs.

**Whole Grains** The ingredient list can also help you find foods made with whole grains, which are healthier and are preferred to refined grains. Whole grain foods should have one of the following whole grain ingredients listed as their first ingredient: whole grain wheat, whole oats, bulgar or other grains (quinona), brown rice, wild rice, graham flour, steel cut oatmeal, whole grain corn



## Foods To Avoid

Bagels  
Bread (non whole-grain)  
Cake  
Candy  
Cereal (processed, sugary types, non-whole grain) – choose steel cut oatmeal, All Bran, Fiber One, or wheat germ  
Chips  
Concentrated sweets (sodas, fruit juices)  
Cookies  
Corn  
Crackers  
Dried fruits (dates, raisins, etc.)  
Fast foods  
Flax products  
Fried foods  
Grapes  
High fructose corn syrup  
Honey  
Hot chocolate  
Ice cream  
Pancakes  
Pasta (white) - choose whole grain ½ cup servings  
Peas  
Pineapple  
Popcorn  
Potatoes  
Pretzels  
Processed foods  
Red meat  
Rice (white) - choose whole grain, wild or brown rice in ½ cup servings  
Salad dressings  
Soy products  
Table sugar  
Waffles  
Watermelon

### Bad Carbs

In addition to choosing foods that don't have a lot of sugars in them, you can check the ingredient list to avoid foods with [added sugars](#). If things like corn syrup, high-fructose corn syrup, fruit juice concentrate, maltose, dextrose, sucrose, honey, or maple syrup, are listed in the first few ingredients, then the food does have added sugars and you might look for a alternative with less sugar. Foods with added sugars will list corn syrup, fruit juice concentrates, honey, molasses, etc. on their ingredient list. Other names for added sugars can include:

- brown sugar, corn sweetener, dextrose, fructose, glucose, high-fructose corn syrup, invert sugar, lactose, malt syrup, maltose, raw sugar, sucrose, sugar, syrup

# Keep a Food Journal

Studies have shown that people who keep food journals lose more weight than those who don't because a food journal makes you focus on what, when, where and why you eat. This knowledge leads to healthier eating choices, less caloric intake, and better weight management and health. Your food journal will help to analyze the nutrient content of your diet, as well as help you realize why you eat and how you feel. You can use a small notebook, index cards, or anything that is easy to keep with you at all times.

Include: Day of the week, the food and drink consumed, the amount or serving size (be specific), the time and place you ate it, how you felt physically and any personal observations. At the end of the day, write down any exercise you did for the day. Example:

## MONDAY

FOOD & DRINKS	HOW MUCH?	TIME & PLACE	REASON FOR EATING	EMOTIONS
Banana	1 large	7:00 am; in the car	Not very hungry, but know I need to eat something	Tired; late for work.
Candy bar & Diet Coke	1 snack size bar & 12 oz. can	10:00 am; at the office	Starving	Stressed; shouldn't eat them, but don't have time to find something healthier.
Grilled chicken salad with low-fat dressing & water with lemon	Small dinner plate	12:30 pm; at a relaxing restaurant with co-workers	Hungry, plus it's my lunch hour	Happy to be with friends. Feels good to eat healthy.

1. Be diligent! Record everything you eat and drink including snacks, candy and water. Record how many of everything you eat (number of crackers) and size of drink (12 oz can of Coke or 8 oz water).
2. Note the time and place when you ate and what you were doing – at home, at a restaurant, friend's house, watching TV, on the computer, in your car, while preparing dinner, in your office, at a party.
3. Record your feelings and your hunger level. Were you really hungry or were you angry, sad, happy, bored, stressed, or nervous? What were you thinking or feeling when you ate?
4. Record information immediately after eating. You don't want to rely on memory. You're looking for clues as to why you eat and when you eat, not only what you eat.
5. Try to be as accurate and honest as possible - this information is for your eyes only. No one else needs to see it unless you want to share.
6. At the end of the day, write down any exercise you did during the day.
7. Analyze your journal at the end of the day and determine your problems areas and brainstorm ways to repair those problems. Calculate the number of servings you've had from each food group. Are you taking in enough fiber, calcium, water, fruits, vegetables, etc.? Examine how your emotions affected your eating.

# Reading Nutrition Labels

Sample label for  
Macaroni & Cheese

① **Start Here** →

Nutrition Facts	
Serving Size 1 cup (228g)	
Servings Per Container 2	

② **Check Calories**

Amount Per Serving	
<b>Calories</b> 250	Calories from Fat 110

③ **Limit these Nutrients**

	% Daily Value*
<b>Total Fat</b> 12g	<b>18%</b>
Saturated Fat 3g	15%
Trans Fat 3g	
<b>Cholesterol</b> 30mg	<b>10%</b>
<b>Sodium</b> 470mg	<b>20%</b>
<b>Total Carbohydrate</b> 31g	<b>10%</b>

⑥

**Quick Guide  
to % DV**

④ **Get Enough  
of these  
Nutrients**

Dietary Fiber 0g	0%
Sugars 5g	
<b>Protein</b> 5g	
Vitamin A	4%
Vitamin C	2%
Calcium	20%
Iron	4%

• 5% or less  
is Low

• 20% or more  
is High

⑤ **Footnote**

* Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs.			
	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

# How to Read a Nutrition Label

## 1 The Serving Size

The first place item to look at is the serving size and the number of servings in the package. The size of the serving on the food package influences the number of calories and all the nutrient amounts listed on the top part of the label. **Pay attention to the serving size, especially how many servings there are in the food package. Then ask yourself, "How many servings am I consuming"? (e.g., 1/2 serving, 1 serving, or more)** In the sample label, one serving of macaroni and cheese equals one cup. If you ate the whole package, you would eat **two** cups. That doubles the calories and other nutrient numbers, including the %Daily Values as shown in the sample label.

## 2 Calories (and Calories from Fat)

Calories provide a measure of how much energy you get from a serving of this food. Many Americans consume more calories than they need without meeting recommended intakes for a number of nutrients. The calorie section of the label can help you manage your weight (i.e., gain, lose, or maintain.)

**Remember: the number of servings you consume determines the number of calories you actually eat (your portion amount).** In the example, there are 250 calories in one serving of this macaroni and cheese. How many calories from fat are there in ONE serving? Answer: 110 calories, which means almost half the calories in a single serving come from fat. What if you ate the whole package content? Then, you would consume two servings, or 500 calories, and 220 would come from fat.

### General Guide to Calories:

- 40 Calories is low
- 100 Calories is moderate
- 400 Calories or more is high

The **General Guide to Calories** provides a general reference for calories when you look at a Nutrition Facts label. This guide is based on a 2,000 calorie diet. **Eating too many calories per day is linked to overweight and obesity.**

## 3 Limit These Nutrients

The nutrients listed first are the ones Americans generally eat in adequate amounts, or even too much. They are identified as **Limit these Nutrients**. Eating too much fat, saturated fat, *trans* fat, cholesterol, or sodium may increase your risk of certain chronic diseases, like heart disease, some cancers, or high blood pressure. **Important: Health experts recommend that you keep your intake of saturated fat, *trans* fat and cholesterol as low as possible as part of a nutritionally balanced diet.**

## 4

**Get Enough of These**

Most Americans don't get enough dietary fiber, protein, vitamin A, vitamin C, calcium, and iron in their diets. Eating enough of these nutrients can improve your health and help reduce the risk of some diseases and conditions. For example, getting enough calcium may reduce the risk of osteoporosis, a condition that results in brittle bones as one ages. Eating a diet high in dietary fiber promotes healthy bowel function. Additionally, a diet rich in fruits, vegetables, and grain products that contain dietary fiber, particularly soluble fiber, and low in saturated fat and cholesterol may reduce the risk of heart disease.

Remember: You can use the Nutrition Facts label not only to help *limit* those nutrients you want to cut back on but also to *increase* those nutrients you need to consume in greater amounts.

## 5

**Understanding the Footnote on the Bottom of the Nutrition Facts Label**

Note the \* used after the heading "%Daily Value" on the Nutrition Facts label. It refers to the Footnote in the lower part of the nutrition label, which tells you "**%DVs are based on a 2,000 calorie diet**". This statement must be on all food labels. But the remaining information in the full footnote may not be on the package if the size of the label is too small. When the full footnote does appear, it will always be the same. It doesn't change from product to product, because it shows recommended dietary advice for all Americans--it is not about a specific food product.

Look at the amounts noted by the arrow in the footnote--these are the Daily Values (DV) for each nutrient listed and are based on public health experts' advice. DVs are recommended levels of intakes. DVs in the footnote are based on a 2,000 or 2,500 calorie diet. Note how the DVs for some nutrients change, while others (for cholesterol and sodium) remain the same for both calorie amounts.

## 6

**The Percent Daily Value (%DV):**

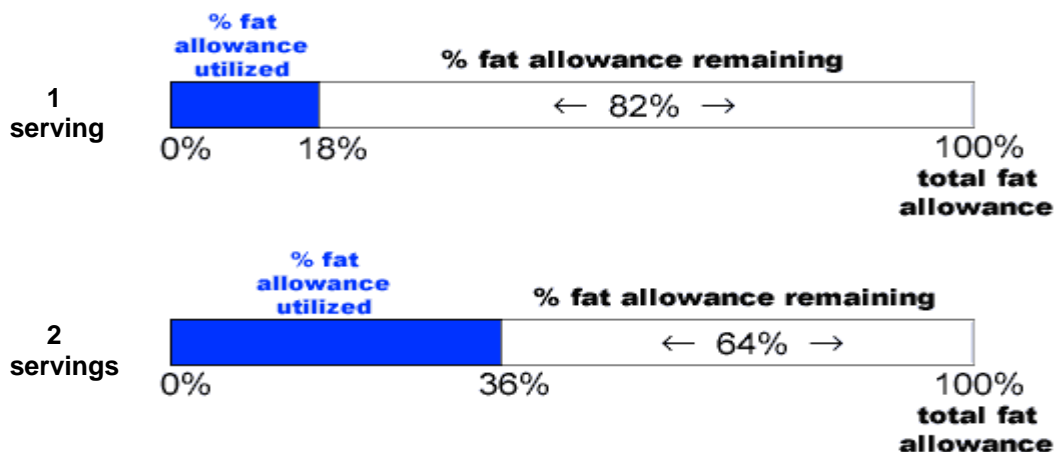
The % Daily Values (%DVs) are based on the Daily Value recommendations for key nutrients but only for a 2,000 calorie daily diet--not 2,500 calories. You, like most people, may not know how many calories you consume in a day. But you can still use the %DV as a frame of reference whether or not you consume more or less than 2,000 calories. The %DV helps you determine if a serving of food is high or low in a nutrient. Note: a few nutrients, like *trans* fat, do not have a %DV--they will be discussed later.

Do you need to know how to calculate percentages to use the %DV? No, the label (the %DV) does the math for you. It helps you interpret the numbers (grams and milligrams) by putting them all on the same scale for the day (0-100%DV). The %DV column doesn't add up vertically to 100%. Instead each nutrient is based on 100% of the daily requirements for that nutrient (for a 2,000 calorie diet). This way you can tell high from low and know which nutrients contribute a lot, or a little, to your **daily** recommended allowance (upper or lower).

**Quick Guide to %DV:** 5%DV or less is low and 20%DV or more is high

This guide tells you that 5%DV or less is low for all nutrients, those you want to limit (e.g., fat, saturated fat, cholesterol, and sodium), or for those that you want to consume in greater amounts (fiber, calcium, etc). As the Quick Guide shows, 20%DV or more is high for all nutrients.

*Example:* Look at the amount of Total Fat in one serving listed on the sample nutrition label. Is 18%DV contributing a lot or a little to your fat limit of 100% DV? Check the **Quick Guide to %DV**. 18%DV, which is below 20%DV, is not yet high, but what if you ate the whole package (two servings)? You would double that amount, eating 36% of your daily allowance for Total Fat. Coming from just one food, that amount leaves you with 64% of your fat allowance ( $100\% - 36\% = 64\%$ ) for *all* of the other foods you eat that day, snacks and drinks included.



**Using the %DV for:**

**Comparisons:** The %DV also makes it easy for you to make comparisons. You can compare one product or brand to a similar product. Just make sure the serving sizes are similar, especially the weight (e.g. gram, milligram, ounces) of each product. It's easy to see which foods are higher or lower in nutrients because the serving sizes are generally consistent for similar types of foods except in a few cases like cereals.

**Nutrient Content Claims:** Use the %DV to help you quickly distinguish one claim from another, such as "reduced fat" vs. "light" or "nonfat." Just compare the %DVs for Total Fat in each food product to see which one is higher or lower in that nutrient--**there is no need to memorize definitions**. This works when comparing all nutrient content claims, e.g., less, light, low, free, more, high, etc.

**Dietary Trade-Offs:** You can **use the %DV to help you make dietary trade-offs** with other foods throughout the day. You don't have to give up a favorite food to eat a healthy diet. When a food you like is high in fat, balance it with foods that are low in fat at other times of the day. Also, pay attention to how much you eat so that the **total** amount of fat for the day stays below 100%DV.

# Smoothie Recipe

## Drink Twice Per Day

1 Cup Water

Whey or Rice Protein Powder (read ingredients: no corn syrup, sugars, etc.)

2 Tbsp. Wheat Germ (organic)

2 tsp. Fibersol (any pharmacy)

$\frac{3}{4}$  Cup organic frozen fruit

1 Tbsp. High Fat Whipping Cream\* (organic)

1 generous Tbsp. Udo's Choice Blended Oil 3-6-9 (no lignan)

(Back in Time Foods, 7900 E. US 36 in Avon, 272-0726 & Georgetown Market, Indpls)

1-1/2 generous tsp. Carlson's Norwegian Fish Oil (lemon flavoring) **OR** 1 tsp of Nutra Sea Oil (1 tsp daily)

\* May substitute a "tart juice" (pineapple/grapefruit) for whipping cream using  $\frac{1}{2}$  cup water and  $\frac{1}{2}$  cup juice.

Measurements for Fish Oil:

800 mg per teaspoon

1-1/2 tsp = 1200 mg

2 x day = 2.4 gm

2-10 gm per day is therapeutic

# EXERCISE

1. Walk for 30 minutes (at least) every day. This will help improve your lipid profile.
2. Weight training for 30 minutes per day (at least) for 5 days a week.
  - Strengthens muscles
  - Converts fat to muscle
  - More muscle will increase your metabolic rate
  - Carbohydrates will be used for muscles instead of converting to fat that is stored in the abdomen
  - Lower carbs will result in decreased insulin production
  - Muscle strengthening acts as an antidepressant
3. Recommended strength training equipment
  - Dumbbell weights: 3, 5, 8 and 10#
  - Balance ball
  - DVD: Walk Away the Pounds by Leslie Sansone
  - DVD: Lift Weights to Lose Weight by Kathy Smith (2 versions)
    - 20 minute upper body + 7 minute core/abs
    - 20 minute lower body + 7 minute core/abs
    - Never work the same muscle groups with weights two days in a row; your muscles need 48 hours to recover.
    - Core/ab routine can be done everyday.
  - Pilates and Yoga are also helpful for core, back and overall strengthening
  - Eat a healthy carbohydrate snack 15-45 minutes prior to strength training (i.e., an apple and a few almonds).
4. Schedule your daily exercise. Your health is important and you owe it to yourself and your family to take care of yourself! You need to make an appointment, just like you would for a doctor or dentist visit. Try writing it on your calendar or in your planner.
5. Drink plenty of water. Keep yourself well hydrated. Drink before exercising as well as throughout the day. Strive to drink 6-8 ounces of water per hour.







# MEDICATIONS

## **METFORMIN HCL up to 2000mg daily (Glumetza, Fortamet, Glucophage, Glucophage XR)**

- This medication lowers insulin levels by decreasing the rate of glucose production by the liver, it reduces the amount of glucose absorbed from food through your stomach, and it makes the insulin that your body produces work better to reduce the amount of glucose already in your blood.
- Side effects may include nausea, diarrhea, loss of appetite and presence of metallic taste in your mouth. These usually occur when treatment is first started and when the dose is increased and usually subside within one month. To avoid these side effects, take this medication with your evening meal which includes protein, healthy fat and complex carbohydrates.
- Avoid excessive alcohol intake.
- Metformin should not be taken by patients with known liver or kidney problems.
- Please suspend use two days before any surgical procedure or radiology procedure that will use contrast dye. Restart after oral intake has resumed.
- Please call our office with any questions regarding this medication (Clarian West office, 317-217-2525 or Clarian North, 317-814-4110).
- This medication is commonly prescribed for diabetics, however, you have not been diagnosed with diabetes.
  - Diabetes is a condition where patients have elevated blood glucose and low insulin levels.
  - PCOS is a condition where patients have elevated insulin levels and normal to low blood glucose.

Diabetes = ↓ insulin and ↑ blood glucose

PCOS = ↑ insulin and ↓ to normal blood glucose

## **Aspirin 81mg daily (Baby Aspirin)**

- This medication is over-the-counter and is recommended to help prevent blood clots.
- With PCOS, patients are thought to be at a higher risk for forming blood clots due to the multiple symptoms associated with PCOS such as elevated lipids, potential for atherosclerosis and/or arteriosclerosis (hardening of the arteries), and hypertension.

## **Prenatal Vitamin**

- It is recommended that patients who are trying to become pregnant take a prenatal vitamin supplement with folic acid daily.
- Try to obtain a prenatal vitamin that includes iodine (20% of females are deficient and iodine is needed for fetal and maternal thyroid function).

## **Also, possibly:**

- Oral contraceptives for hirsutism, acne, hyperandrogenism
- Spironolactone (Aldactone) for hirsutism
- Gonadotropins for ovulation induction

# NATURAL CO-THERAPIES

## **Potent anti-inflammatories:**

- Udo's 3-6-9 Blended Oil without lignan. One tbsp in the morning and 1 tbsp in the afternoon or evening.
- Carlson's Norweigan Fish Oil lemon flavor. 1-1/2 tsp twice daily **OR** Nutra Sea 1 tsp daily
- Vitamin D 2000 IU daily

## **Natural Insulin Sensitizer:**

- Cinnamon – ½ teaspoon per day. It is available in pill form.

## **Other Recommended Supplements:**

- Vitamin B Complex – 100 mg daily.
- High quality Antioxidant