LOR Women's Health Care
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American Board Certified

CONGRATULATIONS

Welcome to LOR Women's Health. To make your experience at our office the best that it can be, we have listed what to expect during normal prenatal visits. For most women prenatal visits are scheduled each month for the first 7 months (28 weeks), then every 2 weeks for the next 2 months (until 36 weeks) and weekly for the last month (until 40 weeks). Women who have or develop a high-risk condition in pregnancy may come more often. (In pregnancy there are only 4 weeks in a "month". This begins with the first day of your last period and continues until your due date 10 months later.)

Pregnancy test visit: This visit generally occurs at LOR Women's Health office. Information will be given about how to take care of yourself in early pregnancy.

- You may need help with nausea and vomiting at this time.
- You will be started on a prenatal vitamin.
- Your due date will be determined by the dates that you give us and/or your size that day. This may change with your ultrasound.

Enhanced Maternal Health Services and visits: Offered at LOR Women's Health. These services include:

- Information about resources and classes available to you during your pregnancy.
- Emotional support during pregnancy and postpartum.
- In depth education with a maternal health educator.
- Assistance with smoking cessation if desired.

Your first prenatal visit/Nurse visit: (May be combined with the pregnancy test visit). This will usually be your longest visit and includes:

- Complete history including your past and present health, medical history of your family, a genetic history (conditions that may be passed to your baby from your or the baby's father's family), and a substance abuse history.
- Review teaching materials.
- Consents, insurance information and other paperwork will be done.
- Blood work including tests for anemia, hepatitis B, HIV, blood type and Rh, syphilis, immunity to measles and Integrated screen for birth defects if requested. An ultrasound is part of this integrated screen and may be scheduled another day.
- Urine culture.
- Urine drug screen if indicated.

Your second prenatal visit/Provider visit:

- Complete physical including a pap smear if not done in the past year, breast exam, and cultures for sexually transmitted infections.
- Review of lab results from the first visit.
- An ultrasound may be done the same day if needed.

Other OB Appointments:

During your prenatal care visits we will evaluate:

- How your baby is growing by measuring the size of your uterus.
- Your urine for signs of infection and later, for signs of pre-eclampsia
- Your weight gain.
- Your baby's heart beat from about 12 weeks on.
- How your baby is moving (Not at your early visits).
- Any abdominal cramping, contractions, bleeding.
- Headaches/problems with vision.
- Blood pressure.
- Swelling.
- Review teaching materials/answer your questions.

<u>There are also special tests done during pregnancy that are done at specific times in pregnancy that helps us know how you and your baby are doing. Common ones are:</u>

OB Appointments at 16-20 weeks (Routine visits every 4 weeks)

- At 16-20 weeks we will do the second part of the Integrated Screen for birth defects or the Quad Screen if requested.
- Ultrasound to be scheduled at 18-20 weeks done in our office. Ultrasounds are done to see if the baby is developing normally and are NOT for determining the baby's sex.

OB Appointments at 24-28 weeks (Routing visits every 4 weeks)

- Blood test to screen for diabetes and anemia.
- Rhogam injection if Rh negative
- Discuss childbirth classes and birth control options.

OB Appointments 32-36 weeks (Routine visits every 2 weeks)

- Review teaching information about the last 3 months of pregnancy and labor.
- Blood test and vaginal cultures for possible infections and anemia at 36 weeks.
- Discuss C-Section and schedule surgery date if planning a repeat C-Section.

OB Appointments at 36-40 weeks (Routine visits every week)

- Testing based on individual needs.

OB Appointments at 40-42 weeks (visits weekly or twice/week)

- Monitor baby's heart rate and ultrasound as needed.
- Elective labor induction may be recommended around 41 weeks (1 week after due date).

Screening Tests Recommended For All Pregnant Women

Blood Test:

- Blood Type and Rh – At your first prenatal visit, your blood will be tested for Blood Type and Rh. Women who are Rh negative need a special injection called Rhogam during their pregnancy, especially if they have any vaginal bleeding. Your health care provider can explain this further.
- Anemia – You will also be tested for anemia at your first visit, at 28 weeks, and if necessary, at 36 weeks. Anemia is often caused by low iron. Women who have anemia feel tired, dizzy and/or short of breath with activity.
- Sickle Cell Disease – People of African or Mediterranean decent have an increased risk for 'Sickle Cell Disease". If the Sickle Cell trait is found, the newborn will be tested.
- HIV – It is recommended that all women should be tested for HIV during pregnancy. If a woman has HIV and is given medication during pregnancy, the baby is less likely to get HIV.
- Syphilis and Hepatitis B – are tested for with the initial prenatal blood work.

Urine Test:

- A urine test is usually done at each prenatal visit. This test checks for sugar and protein and also tests for urinary tract infections. A urine drug screen will be recommended for any woman or their partner with a past history of substance use, including smoking.

Pap Test:

- A pap test is generally done at the first prenatal visit if you have not had a recent test. It tests for signs of cervical cancer or cervical disease.

Sexually Transmitted Infections:

- Can be spread through sexual intercourse (vaginal, anal and/or oral) with an infected person. Sharing needles with an infected person can also spread them. This includes needles used to take drugs, make tattoos or pierce body parts.
- Gonorrhea and Chlamydia – are common. They are routinely tested for at the first prenatal visit. In your baby, these can cause eye and or/lung infections. If you are at risk, you will be tested again one month before your due date. These infections are treated with antibiotics.
- Testing is available for other infections including: genital herpes, genital warts, trichomoniasis, other types of Hepatitis, and/or other vaginal infections.

Test for Viral Infections:

Many viruses can cause birth defects, miscarriage or stillbirth. Often the mother only feels like she has the flu, or she may have a rash. Let your health care provider know if you have any symptoms. Some common infections include:

Chicken Pox/Varicella (As Needed):

- You are most likely immune if you have had the infection before, or if you have been immunized.
- A blood test can be ordered to see if you are immune.
- If you are not immune, you can be vaccinated after your baby's birth.
- A baby can get infected if a non-immune mother gets Chicken Pox during her pregnancy.
- Risk of infection to the baby is highest during the first half of pregnancy and close to your due date.
- Shingles, also caused by the Varicella virus, and does not appear to be harmful to a developing baby if the mother is immune. You can get Shingles if you have had Chicken Pox in the past.

Rubella (routine test done with initial blood work):

- This causes severe birth defects in babies and is often called “The 3 day measles” or ‘German Measles”
- Is a mild infectious disease for the mother.
- Is not the same as the regular measles or Rubeola. Rubella and Rubeola cause redness, rashes, and itching.
- Symptoms of infection usually show up two to three weeks after exposure.
- If you experience a slight fever, swollen glands and general achiness followed by a slight rash one or two days later. Notify your health care provider.

Since 1969, immunization for Rubella has become routine in the United States, so your risk of exposure from other people is small. Sometimes even if you have been immunized, the immunity wears off. Your blood will be tested for immunity at your first prenatal visit. If you are immune, your baby is not at risk during this pregnancy. If you are not immune, you should be vaccinated after your baby is born.

Toxoplasmosis: (As Needed)

- Caused by a parasite.
- Symptoms tend to resemble the flu, with swollen glands, fatigue, fever, muscle aches and general discomfort.
- Infection can affect the baby. The earlier the exposure occurs, the more severe the effects are to the baby.

YOU CAN REDUCE YOUR CHANCE OF BECOMING INFECTED BY PRACTICING THE FOLLOWING:

- Avoid cats during pregnancy. If you cannot, do not empty or clean the cat’s litter box. Have someone else do it.
- Do not feed your cat raw or undercooked meats. Keep cats indoors to prevent them from hunting birds and rodents. Avoid sandboxes, as cats tend to use them as litter boxes.
- Always wear gloves when gardening; the soil may contain parasites from stray cats. Wash your hands thoroughly after working in soil, before touching your face or preparing food.
- Never eat raw or undercooked meat.
- If a woman has had the infection before pregnancy, she is probably protected from getting the infection again. A simple blood test can check for immunity.

Other viruses that might be harmful include (as needed)

- Parvovirus (Fifths Disease)
- Herpes
- Cytomegalovirus

Any of these can cause birth defects, infection, stillbirth or miscarriage for your baby. Screening for infection may be done as needed throughout your pregnancy. You should let your health care provider know if you have been sick or have been exposed to any infection.

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Medication and Pregnancy

The following is a list of over-the-counter medicines that you may safely take during pregnancy without calling your health care provider. It is best not to take any medicines the first 3 months if possible.

**Follow the recommended dosing on the package information

PROBLEM	MEDICATION
Allergies	Claritin, Zyrtec, Benadryl (Diphenhydramine) **DO NOT TAKE THE FIRST THREE MONTHS OF PREGNANCY**
Asthma	Albuterol Inhaler
Constipation	Metamucil, Citrucel, Colace, Milk of Magnesia
Cough	Robitussin (plain), Cough Drops
Diarrhea	Kaopectate, Imodium
Head cold and/or sinus problems	Sudafed, Actifed, Tavist, Chlor-trimeton (plain), Claritin
Headaches, fever, minor aches and pains	Acetominophen/Tylenol *No more than 6 extra strength (500 mg tabs in 24 hours)
Heartburn	Pepcid, Zantec (Generics ok)
Hemorrhoids	Witch Hazel, Tucks, Anusol
Indigestion	Tums, Mylanta, Mylicon, Maalox
Nasal Congestion	Ocean Nasal Spray, Breathe
Sleeplessness or Nausea	Unisom
Sore Throat	Children's Sucrets
Vomiting	Emetrol

**If you have doubts or questions, consult your provider*

Medications to Avoid:

- Ibuprofen, Motrin, Advil, Aleve, Excedrin, Aspirin, Pepto Bismol.
- Medication that have extra letter at the end like DM, etc.

Flu Vaccine:

- All women pregnant during flu season (October through March) should have a flu vaccine.

NAUSEA DIET

About half of all expectant women experience nausea and vomiting during the early months of pregnancy. Morning sickness is misnamed, for it can strike morning, noon, or night. For most women, it does not last past the third month; some will experience it until well into the second trimester (12-24 weeks); and a few – especially if carrying twins – may feel the effects for the entire nine months.

Here are some suggestions to help reduce nausea while still eating right for your baby.

1. Keep diluted apple juice on hand and sip constantly. You may also use diluted lemonade. (Diluted = mixed with a small amount of water)
2. When diluted juice stays down for one hour, add in small amounts of banana, rice, applesauce, and toast.
3. If that stays down for several hours and your stomach is clam, add anything you like. Avoid fried or fatty foods.
4. Drink 2-3 quarts of water throughout the day before your evening meal. Sip liquids between meals rather than drinking with your meal.
5. At night, try to eat a high protein snack before bedtime and have a snack or drink some juice when you get up to go to the bathroom.
6. Put crackers by your bed and eat a few before you get up in the morning.
7. Suck on lemon slices.
8. Peppermint, Ginger or Chamomile tea may be soothing.
9. Eat something every two hours.
10. Medications:
    a. Vitamins B6 – 25 mg. three or four times/day (may use ½ 50 mg tab)
    b. Unisom 12.5-25 mg at bedtime (**Do Not use gel tabs, melts or products with diphenhydramine).
    c. _____
    d. _____

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How Much Weight Should I Gain?

First, figure out how your weight compares to your ideal weight. Use the following chart:

Height	Underweight (BMI<18)	Normal Weight (BMI 19-24)	Overweight (BMI 25-29)	Obese (BMI 30-39)	*** BMI ≥ 40
5’	<97	97-127	128-153	153-199	>204
5’2”	<104	104-135	136-163	164-216	>218
5’4”	<110	110-144	145-174	174-227	>232
5’6”	<118	118-154	155-185	186-241	>247
5’8”	<125	125-163	164-196	197-256	>262
5’10”	<132	132-173	174-208	209-271	>278

Weight (in pounds)

***Women with a higher BMI are more at risk for a C-section, diabetes, high blood pressure, shoulder dystocia and other problems

Your Weight Gain Plan (pounds):

If you were:	**Underweight**	**Normal Weight**	**Overweight**	**Obese**
You should gain:	28-40 lbs.	25-35 lbs.	15-25 lbs.	<15 lbs.

DO NOT TRY TO LOSE WEIGHT DURING PREGNANCY.

Your baby needs nutrients to grow and to develop in the best way possible. New research suggests that small or undernourished babies are more likely to have health problems such as obesity, high blood pressure, kidney problems or diabetes. Women who gain too much weight during pregnancy are more likely to have large babies who often become overweight as children. Gaining too much weight also increases your risks for diabetes or high blood pressure during pregnancy and higher risk for C-section births. Eating right during your pregnancy is one of the best things your can do for you and your baby. It is never too late to begin a healthy diet.

Where does the weight go?

- Baby’s Weight – 7.5 pounds
- Placenta (after birth) – 1.5 pounds
- Amniotic Fluid – 2.0 pounds
- Mother’s tissue increase – 15 pounds
    - Breast – 1 pound
    - Uterus – 2.0 pounds
    - Blood Volume – 3.5 pounds
    - Body Fluids – 3.5 pounds
    - Fat – 5 pounds

  Total 26 pounds

Nutrition

What is a good diet when you are pregnant?

While you are pregnant, the only food your baby gets is from the food you eat. The greatest gift you can give your baby before he/she is born is to eat well. Eat foods from every food group every day. Just as the good gets to your baby, so does the bad. Limit the use of high caffeine and high sugar drinks – or any other harmful substances.

Supplements/Vitamins:

Prenatal vitamins provide extra calcium, iron and folic acid. It may be difficult to get enough of these nutrients through your diet alone. Extra Vitamin B12 and D supplements may also be needed. Recently, fish oil or DHA supplements have been recommended to help prevent preterm birth and to improve your baby's brain and eye development.

How should I eat?

Plan to space your meals over 5-6 small meals each day, instead of 3 large meals a day. This will help with nausea and also help to relieve heartburn and discomfort, as the baby gets bigger. If you are a vegetarian, it is important to make sure you are getting enough protein in your diet. The food source groups and recommended daily amount are described below:

Fruits and Vegetables

- Purpose: Fights infection, promotes healthy skin and good eyesight.
- Servings: 4 or more
- Remember: Choose one serving rich in Vitamin A (dark yellow or green leafy vegetables such as broccoli, spinach, greens, carrots and winter squash).
- Amounts for 1 serving:
    - 1 cup raw vegetable
    - ½ cup cooked vegetable or ½ cup fruit
    - 1 medium fruit (orange, apple, tangerine, peach, or banana, etc.)
    - ½ cup fruit juice

Whole-Grains or Enriched Breads

- Purpose: Provides energy, helps prevent constipation. Good iron source if selecting whole grains.
- Servings: 4 or more
- Remember: Choose whole grain, enriched breads, and unsweetened cereals. Look at labels for those fortified with iron. Cream of wheat and Total cereal are good sources of iron.
- Amounts for 1 serving:
    - 1 slice of whole grains or enriched bread, tortilla, biscuit
    - ½ cup cooked cereal, rice, oatmeal, corn meal, or grits
    - ½ cup pasta (macaroni, noodles, or spaghetti)
    - ½ bagel, hamburger bun, English muffin, roll
    - 4 crackers, 1 cup cold cereal, 1 small potato

Nutrition (continued)

Milk, Yogurt and Cheese

- Purpose: Builds bones and teeth, helps grow new tissue and repairs body cells.
- Servings: 3-4
- Remember: If you do not like milk, choose items made from milk such as yogurt, cottage cheese, sliced cheese, or custard. Choose low-fat items.
- Amounts for 1 serving:
    - 1-8 oz. glass milk, buttermilk, or low fat milk
    - 1 1/3 cups cottage cheese
    - 1 ½ slices processed cheese or 1 oz. hard cheese.
    - 8 oz. yogurt, pudding, or custard.

Meat, Poultry, Fish, Eggs, Nuts and Beans

- Purpose: Helps to build new body tissue, prevents anemia
- Servings: 3-4
- Remember: Egg yolks and organ meats are very high in cholesterol; however, organ meats are also very good sources of protein. Be sure to add a little cheese, milk or lean meat to meals with main dishes made from dry beans, peas, nuts, lentils, or other legumes to get enough protein.
- Amounts for 1 serving:
    - 3 oz. cooked meat, fish, or poultry.
    - ½ cup cooked dry beans, peas or lentils.
    - 2 tbsp. peanut butter
    - 1 egg.

Water and Fluids

- Purpose: Helps prevent urinary tract infections, helps build new tissue, carries nutrients and waste products, prevents constipation, and helps prevent premature labor and dehydration.
- Servings: 8-10, 8oz. glasses
- Remember: A slice of lemon in a glass of water is refreshing. Squeeze an orange over crushed ice for a treat. Limit caffeine to 300 milligrams a day (2-8oz cups). Limit juice to one small glass per day. Avoid soda.

Fats, Oils and Sweets

- Purpose: No useful purpose
- Servings: Small amounts
- Remember: Avoid fried, fatty foods. Read food labels! Foods high in sugar include: white or brown sugar, honey, molasses, candy, cake, cupcakes, pastry, cookies, brownies, doughnuts, pie, jam, jelly and pickles, maple flavored syrup, or corn syrup. Foods with high fat or oil content have: cream, half & half, sour cream, cream cheese, salad dressing, margarine, butter, cooking oils, mayonnaise, sausage, fries, potato chips, hot dogs, bacon. Decrease fat content by selecting foods that are “Fat Free”

High Protein Snacks during Pregnancy

Protein is especially important during pregnancy to support increased blood volume, growth of the uterus and breasts, development of the placenta and to help your baby grow. Pregnant women need at least 60 grams of protein per day.

Try these healthful snacks to boost your protein intake:

- Two graham crackers with 2 tablespoons of peanut butter.
- Fruit and yogurt parfait made with 8 oz. vanilla yogurt, fruit and granola.
- Six whole wheat crackers and 2 oz. of cheese.
- Two small bran muffins or 2 slices of banana nut bread and 12 oz. low fat milk.
- One stalk of celery spread with 3 tablespoons of peanut butter and 15 raisins.
- One-half cup of trail mix with nuts, cereal, pretzels, and dried cranberries.
- One deviled egg or one hard-boiled egg.
- Strawberry banana smoothies made with 8 oz. yogurt, 1 banana, 8 oz. milk and fresh strawberries.
- One stick of string cheese.
- Pizza snacks made with half an English muffin, pizza sauce, 1 oz. lean Canadian bacon, mozzarella cheese, veggies or pineapple (toast).
- Tortilla wrap made with 2 tablespoons of fat free refried beans, 1 oz. shredded cheddar cheese and salsa (heated).
- One cup chopped lettuce with tomato, sunflower seeds, and 1 tablespoon light salad dressing.
- ½ cup cottage cheese with ½ cup canned peaches.
- 1/4 cup mixed nuts.
- 8 oz. ice cream milkshake.
- ½ roast beef, turkey or ham sandwich on whole wheat bread (heat meat thoroughly before making sandwich).

Special Food Issues for Pregnant Women

Is it safe to eat fish while pregnant?

Because fish and shellfish contain high-quality protein and contain Omega-3 fatty acids, they are part of a healthy diet. Women who are pregnant or nursing should not eat shark, swordfish, king mackerel or tilefish. These fish contain a high level of mercury that might harm an unborn baby or infant's brain. Pregnant women can safely eat 12 ounces of other types of cooked fish each week. The most commonly eaten fish low in mercury are shrimp, salmon, Pollock and catfish. It is important to vary the type of fish eaten per week. The amount of freshwater fish caught by family or friends should be limited to one serving per week – but do not eat any other fish during that week. Three to six ounces of fish is a serving size.

Listeriosis

Some foods can contain bacteria called Listeriosis. Foods most likely to have the bacteria are unpasteurized milk, soft cheese, raw vegetable and shellfish. Avoid raw or undercooked meat, poultry and seafood. Deli meat such as ham, bologna and hot dogs can cause food poisoning. Reheat those until steaming hot. Symptoms of Listeriosis may happen several weeks after exposure and often is like having the flu. Often there are no symptoms at all. Listeriosis can cause miscarriage or stillbirth. It can be treated with antibiotics if it is known that you have it. To prevent Listeriosis, wash all fresh fruits and vegetables and avoid the foods listed above. Always wash your hands, utensils, countertops and cutting boards that have been in contact with uncooked meats.

What about nuts?

In general, nuts are a good source of protein. However, if you have peanut allergies in your family, you should avoid peanuts.

Food Safety during Pregnancy	
DO NOT EAT:	**UNLESS:**
Hot dogs and luncheon meats	They are heated to steaming hot.
Soft cheese, such as Feta, Brie and Camembert cheeses	It is labeled as made with pasteurized milk.
Refrigerated smoked seafood	It is in a cooked dish.
Pates or meat spreads	They are canned
DO NOT EAT raw, uncooked meat, chicken or seafood	NEVER
DO NOT DRINK raw (unpasteurized) milk or eat foods that contain unpasteurized milk	NEVER

Handling Foods Safely During Pregnancy

It is always important to handle food safely. But now that you are pregnant, it is especially important for you and your baby to stay healthy and prevent disease. There are four steps to follow to promote food safety for you and your family.

- **Clean** – Always wash your hand thoroughly before handling food. Wash all fruits and vegetables with dish soap and rinse before eating.
- **Separate –** Keep raw meats, fish, poultry and cooked foods separate – Do not allow these foods to touch each other. Always clean counters, sinks, and cutting boards that have had raw meat on them.
- **Cook:** Always prepare food at the right temperature. Do not eat undercooked foods. Food thermometers work well for cooking meat to know that it is not undercooked.
- **Chill** – Always refrigerate or freeze food as quickly as possible.

* If you have questions, please talk with your healthcare provider.

Exercise during Pregnancy

Should I exercise during pregnancy?

Regular exercise for 30 minutes, most days of the week, is recommended for all pregnant women; unless they have health problems or pregnancy risks that prevent them from exercising. Talk to your health care provider first.

How does exercise help me during pregnancy?

- Exercise:
  - Helps decrease backaches, constipation and bloating.
  - Increases your energy.
  - May help prevent gestational diabetes.
  - Helps your muscles get stronger which helps with labor.
  - Decreases the amount of weight you gain.
  - Improves mood and helps you sleep.

What are the basic guidelines?

- If it's been awhile since you've exercised, start slow. Begin with as little as 5 minutes a day and slowly increase the time. Go slower at the beginning and again at the end of your exercise routine.
- Void outdoor exercise when it is hot and humid. Wear loose-fitting, lightweight clothes that allow heat and moisture to escape.
- Wear a bra that fits well and is comfortable and shoes with good support.
- Drink lots of water (it is better than sport drinks) while exercising, to avoid overheating and dehydration.

Will the pregnancy affect how I exercise?

- Yes, some things to consider:
  - It is easier to injure your joints during pregnancy. Avoid jerky or high impact exercise.
  - Your balance is different when you are pregnant. Avoid exercises that increase your risk for falling.
  - You are more likely to feel short of breath. Exercise at a speed where you can continue to talk normally.

Which exercises are safe?

- Walking is good for everyone and is a great way to start an exercise program if you have not been active before.
- Swimming is good for your body because it works all of your muscles. It also supports your weight so you are less likely to hurt yourself.
- Low-impact and water aerobics or classes set up for pregnant women are all good.
- While bicycling is good, there is more risk of falling because of a balance changes during pregnancy. A stationary bicycle is best.
- Other exercises you are already used to like running or strength training.

Exercise during Pregnancy (continued)

Pelvic Tilt Exercise:

This exercise can be used to relieve backache. Stand up straight with your back against a wall (knees slightly bent). Tighten you abdominal muscles while pressing the small or your back against the wall. Hold, relax and repeat. Another option would be to get on your hands and knees, keeping your back straight (do not let the lower back sag). Tighten your abs so the pelvis tucks under the lower back rounds. Hold for 5 count, relax and repeat. This exercise may also be done using an exercise ball. Pelvic Tilt exercises may be helpful in relieving sciatica pain.

Are there exercise I should avoid?

Avoid exercises where you might fall or hurt your abdomen. Examples are downhill snow skiing or water-skiing, any contact sports, scuba diving and horseback riding. Also avoid exercise on your back during pregnancy.

What are some danger signs that let me know I should stop exercising?

- Vaginal bleeding
- Dizziness or feeling faint
- Increased shortness of breath
- Chest pain
- Headache
- Muscle weakness
- Calf pain or swelling
- Uterine contractions
- Decreased movement from your baby.

Travel

If your pregnancy is normal, and your health care provider says it's safe, in most cases you can travel before the eighth month of your pregnancy.

If you have a high-risk pregnancy, traveling is not such a good idea, as you should stay close to your health care provider and your hospital. If you get sick or go into preterm labor while you are gone, you will have to find new care provider to take care of you. Always talk to your health care provider before you travel.

Seatbelts:
Always, always wear your seatbelt when you are traveling in a car. Wear it low, under your stomach and across your pelvic bones. Wear your shoulder harness too.

By Car:
Plan to stop every 1-2 hours to go to the restroom and to walk around for at least 5 minutes. Walking decreases your risk of developing blood clots and reduces swelling in your ankles and feet. Wearing maternity support hose will also help protect your legs. If you have an accident, even a minor one, you should see a medical provider to make sure you and baby are okay. Take along snacks and drink plenty of water.

By Air:
Most airlines will let pregnant women travel through 34-36 weeks. Pick a seat on the aisle so you can get up and walk around every hour or so. Hold on to the seats though, as some flights can be rough. See if it is possible to get a seat up front, close to the divider of the first class and coach, as it is often smoother and if you get the first row of seats you will have more legroom. Remember to take along food and water.

International Travel:
If you are planning to travel out of the country you will need to find out if traveling in that country is safe for you. You may need special vaccinations or medications before you go. Diseases common in certain countries can be harmful to both you and your baby. You can either call the International Travelers Hotline at the Centers for Disease Control and Prevention (CDC) at 800-CDC-INFO or check their website at www.cdc.gov for general safety and travel guidelines in other countries.

Be aware that medical emergencies can happen while on your trip, so be prepared. Before leaving home, locate the nearest hospital or medical clinic in the place you are visiting. Carry a list of your medication, allergies and any medical conditions along with your provider's name and phone number. You may need a copy of your medical records as well.

Dads…….We didn't Forget! This Section is For You!

First of all, CONGRATULATION!!! Fathers have a unique role to play in their children's lives. This begins from the moment of conception, continues throughout the pregnancy, and of course beyond! You probably have a lot of questions and concerns. This section gives you information on how you can help your partner.

While your partner is pregnant:

- Be involved with your partner's pregnancy. Go with her to her prenatal care appointments when you can. Attend childbirth education classes together to find out what labor and delivery will be like.
- Help her stay healthy throughout her pregnancy. Help her eat healthy foods and a well-balanced diet. Remind her to take a prenatal vitamin with folic acid in it every day.
- Encourage her to exercise and exercise with her. (See exercise section) Be sure to ask your provider about the safest kinds of exercise during pregnancy.
- If you smoke…QUIT, if you take illegal drugs…QUIT! Help her quit smoking, drinking alcohol, and/or taking illegal drugs. All of these can be harmful to the baby.
- Help out around the house. Help clean, shop for groceries, and cook.
- Be supportive about breastfeeding. Breast milk is the best food for the baby. Learn about breastfeeding and discuss it with your partner.
- Talk to the baby or read to him/her often so your baby will know your voice.
- Give backrubs when she has aches and pains.
- Take lots of pictures and tell the mother of your baby she is beautiful.
- Do not forget to share your needs and concerns with your partner and health care provider as well.

How to help your partner during labor and delivery

- Use encouraging words. Being there to support her is very important.
- Be understanding. Be patient. She may get angry.
- Take deep breaths with her. Remember and use what you learned in your childbirth education classes.
- Remind her how strong she is and that she can do it!
- Tell her provider what she needs. You know her best.
- Keep yourself well fed and hydrated!
- If you are having a hard time or feel sick, ask another support person or a nurse to step in and help out.

ENJOY! YOU ARE A FATHER!!!!

Sex during Pregnancy

Is it safe?
Sex during pregnancy does not hurt the baby. Unless there is a condition complicating the pregnancy, sex is allowed at any time. The bag of waters and the uterus protect the baby.

There are a few exceptions to this rule:

- If the water bag has broken or is leaking
- You have a lot of uterine contractions after sex or you are at risk for preterm labor.
- You have vaginal bleeding (see next paragraph)
- You have placenta previa (placenta covering the opening in the cervix).

Occasionally even in a normal pregnancy bleeding may occur after sex. The cervix has many more blood vessels near the surface, during pregnancy and during sex some of these break during intercourse causing spotting or bleeding. Please call your health care office if this should happen. Bleeding always needs to be evaluated at least by phone.

I am not always interested in sex now. Is there something wrong?
Interest in sex during pregnancy varies from person to person. Pregnant women have different needs and fears that may affect their interest. This can change from month to month.

Are there sexual things we should not do during pregnancy?
Certain activities such as blowing into the vagina and anal sex can cause problems and should be avoided.

Are there other things I should know?
Using different positions and being sensitive to the needs of both individuals involved should help you make decisions about when or how often you have sex. Talk to each other and share your needs. Never allow anyone to force you to have sex against your will. Sexual concerns are very common during pregnancy. If you have any questions, be sure to mention them to your health care provider.

Dental Health

Pregnancy is a time to take extra special care of your teeth and gums. Pregnancy causes hormonal changes that increase your risk for gum disease. Changing hormone levels can make your gums more sensitive to harmful plaque (sticky film of bacteria). When plaque builds up it can lead to gum disease. Gum disease may increase your risk for a low-birth weight or premature baby, or may cause an infection in your uterus. If caught early gum disease can usually be controlled or reversed.

Signs and Symptoms of gum disease:

- Gums that are tender, swollen or red.
- Gums that bleed when you brush or floss.
- Bad breath or a bad taste in your mouth that will not go away.

How should I take care of my teeth?

- Brush twice daily with fluoride toothpaste.
- Floss daily.
- Avoid sticky foods, limit sweets.
- Eat plenty of dairy products which help keep your teeth strong.
- Use an antibacterial mouthwash to reduce bacteria in your mouth.

Can I see a dentist during my pregnancy?

Yes. See a dentist early in your pregnancy to have your teeth cleaned and checked. While it is best to avoid x-rays during pregnancy, they can be done if needed. Make sure the dentist uses a lead shield over your stomach and neck (thyroid gland) if you need any x-rays. It is safe for the dentist to use local anesthetic if you have teeth that need to be pulled or filled.

Working during Pregnancy

Most women who work before pregnancy find they can keep working during their pregnancy. Many women are able to work right up until their baby is born. Discussing your job with your healthcare provider may help you to identify any problems with your work. Please discuss your work responsibilities at your routine prenatal appointments.

Jobs that may pose a risk include those that:

- Require heavy lifting or standing for long periods of time.
- Exposure to harmful substances such as cleaning solvents, pesticides, other chemicals, harmful viruses, heavy metals (lead, mercury) or radiation.
- Require excessive climbing or walking.
- May cause injury to your abdomen (stomach)

If you are exposed to harmful substances, contact your Human Resources Department about OSHA standards. These standards describe risks of exposure to certain products during pregnancy. Talk to your employer about transferring to a job with less risk if necessary.

If you cannot continue working during your pregnancy, or if you have to reduce your hours, you may lose benefits or pay depending on your employer's policies. Some women are able to use short-term disability if there is a **clear medical reason** to stop working during pregnancy.

There are federal laws that protect the health, safety, and employment rights of pregnant women. A description of these rights should be available in your human resource department. If you feel you employer has denied your rights contact:

- U.S. Department of Labor at 800-959-3652 or www.dol.gov
- Equal Employment Opportunity Commission at 800-669-3362 or www.eeoc.gov
- National Institute for Occupational Safety and Health at 800-356-4674 or www.cdc.gov/niosh
- Occupational Safety and Health Administration at 800-321-6742 or www.osha.gov
- Women's Bureau of the Department of Labor at 800-827-5335 or www.dol.gov/dol/wb

First Trimester

Weeks 1 through 13 (Months 1 through 3)

(For the first 20 weeks the baby's length is measured from the rump to the top of the head)

Week 3

Approximately 2 weeks after the first day of your period, conception occurs.

Week 4

The soon to be baby, or embryo as it is called, is implanting in the uterus. Baby is the size of a poppy seed.

Week 5

The baby is about the size of an orange seed, 1/16 of an inch. Baby looks like a tiny tadpole.

Week 6

The baby is the size of a head of a nail, ¼" long. The heart is beating already twice as fast as yours is. Nose, mouth and ears are already beginning to take shape.

Week 7

The baby is the size of a blueberry. Hands and feet are emerging into arms and legs.

Week 8

The baby's size is like a kidney bean and 1/3" long. Webbed fingers and toes have developed. Baby is constantly moving, but you cannot feel him/her yet.

Week 9

Now the baby has gone from an embryo to a fetus. The baby is the size of a grape, nearly 1" long and weighs almost 2 grams (the weight of 4 paperclips). Baby looks like a "gummy bear" and can move all its limbs.

Week 10

The baby is now 1 1/5" long, the size of a prune. Vital organs are in place and starting to function.

Week 11

The baby is 1 ½" to 2" long and weighs 7 grams. Baby teeth buds are forming. Baby is now almost fully formed. Baby is the size of a fig.

Week 12

The baby is the size of a lime and is 2-23/4" long, weighs about ½ ounce. The baby looks like a real baby now. Baby has reflexes and will start to make sucking movements.

Week 13

Your baby is 3" long, the size of a peach or a medium shrimp, and weighs 1 ounce, the weight of 4 quarters. Your baby now has fingerprints.

Second Trimester

Weeks 14 through 27 (Months 4 through 6)

Week 14

The baby is the size of a lemon and weighs 1 ½ ounce (weight of a letter). Baby can squint, frown, grimace, and possibly suck its thumb.

Week 15

The baby is 4" and the size of an apple. Weight is 2 ½-3 ounces. Baby is moving all of her joints and limbs.

Week 16

The baby is 4 ½" and 3-5 ounces and is the size of an avocado. Baby has started to grow fingernails and toenails.

Week 17

The baby is the size of the palm of your hand, 5" and weighs 5-5 ½ ounces. Baby's finger and tow prints have developed.

Week 18

The baby is the size of a bell pepper at 5 ½" and weighing 6-7 ounces. Baby can hear sounds now. Read aloud to your baby so it will know your voice.

Week 19

Baby is the size of a large tomato at 6" long and weighing ½ pound. If you have had a baby before you may be feeling movement already. If you have not had a baby before you will be feeling the flutters and soon to be kicks in the next two weeks.

Week 20

Baby is 6 ½" long, the length of a medium banana, and weighs 10 ounces. Baby is having regular sleep and wake times. Congratulations you are half-way there!

Now the baby's length is measured from the bottom of the feet to the top of the head.

Week 21

Baby is the length of a carrot, at 10 ½ and is ¾ of a pound. You may be feeling those kicks and nudges, especially when you try to relax.

Week 22

Baby is 10 ¾ -11", the size of a small doll. Weight is 1 pound. Baby looks like a mini newborn now!

Week 23

Baby is 11" -11 ¼" and is weighing about 1.1 pounds. Baby is the size of a large mango. Baby can feel all of your movements.

Week 24

Baby is the length of an ear of corn, 11.8" and weighs 1.3 pounds, Baby's brain and lungs are still developing. Baby has taste buds.

Week 25

Baby is now 13" and weighs 1 ½ pounds. Baby is the size of a large squash.

Week 26

Baby is now 14" and 1 2/3 pounds. Baby is as tall as a large cucumber.

Week 27

Baby is 2 pounds now and about 14 ½" long. Baby's movements are becoming very coordinated, (pedaling its feet). Baby opens and closes its eyes.

Third Trimester

Weeks 28 through 41 (Months 7 through 9)

Week 28

The baby is now about 2 ¼ pounds and about 14.8". Baby can blink its eyes, which now have lashes.

Week 29

Your baby now weighs about 2 1/2 pounds (like a butternut squash) and is a tad over 15" from head to heel. Muscles and lungs are continuing to mature.

Week 30

Your baby's about 15.7" now and weighs almost 3 pounds (like a head of cabbage).

Week 31

Baby measures over 16", weighs about 3.3 pounds (four navel oranges). Baby can turn its head from side to side, and body is beginning to plump out as needed fat accumulates underneath the skin.

Week 32

Baby weighs 3.75 pounds (pick up a large jicama) and is about 16.7". You're gaining about a pound a week and roughly half of that goes right to your baby.

Week 33

This week your baby weighs a little over 4 pounds (a pineapple) and has passed the 17" mark. Baby is rapidly losing that wrinkled, alien look and his skeleton is hardening. The bones in his skull aren't fused together, which allows them to move and slightly overlap, thus making it easier for him to fit through the birth canal.

Week 34

Your baby now weighs about 4 3/4 pounds (like your average cantaloupe) and is almost 18" long and skin is also smoother than ever.

Week 35

Your baby is now a little over 18" and about 5 1/4 pounds (honeydew melon). Baby isn't likely to be doing somersaults anymore, but the number of times he/she kicks should remain about the same.

Week 36

Baby now weighs almost 6 pounds (like a Crenshaw melon) and is more than 18 ½ ".

Week 37

Congratulations, your baby is full term! Baby's lungs should be fully mature and ready to adjust to life outside the womb, even though your due date is still three weeks away.

Week 38

Baby weighs about 6.8 pounds and is over 19 ½ ". Baby's organs have matured and ready for life outside womb.

Week 39

Baby continues to build a layer of fat to help control body temperature after birth, but it likely already measures about 20" and weighs a bit over 7 pounds, a mini watermelon.

Week 40

It's hard to say for sure how big your baby will be, but the average newborn weighs about 7 ½ pounds (a small pumpkin) and is about 20".

Week 41

Baby is a bit over 20 inches long, and may now weigh almost 8 pounds. For your baby's safety, your practitioner will talk with you about inducing labor if your baby isn't born in the next week — earlier if there are any problems.

Smoking in Pregnancy

Do you Smoke Cigarettes?

If you are smoking and you are pregnant, you need to stop! Cutting down is a good idea, but stopping is better. There is a lot of research that shows that smoking in pregnancy is very dangerous not only for you, but also for your baby.

What are the effects of smoking on pregnancy?

There are over three thousand poisonous chemicals in cigarettes, and these chemicals go right to your baby. Two of the chemicals in cigarettes are nicotine and carbon monoxide (car exhaust). When a mother takes a drag on a cigarette it causes blood vessels to narrow. This means less blood flow to the placenta that brings both food and oxygen to your baby. Carbon monoxide also takes the place of oxygen in the red blood cells in your body. These blood cells cannot carry oxygen to your baby when that happens.

Pregnant women who smoke increase their risk for:

- Miscarriage or stillbirth
- Placenta previa (the placenta covers the cervix)
- Placental abruption (the placenta separates from the wall of the uterus)
- Preterm birth

Babies shave increased health risks for:

- Sudden Infant Death Syndrome (SIDS or crib death)
- RSV and asthma
- Learning difficulties, A.D.D. (Attention Deficit Disorder) or behavior problems
- Birth defects like cleft palate or cleft lip
- Childhood cancer

How can you stop smoking?

Nicotine in cigarettes is an addictive drug and that makes it hard for some women to quit. But they must quit for their own health and the health of their baby. Some ideas include:

- Talk to your healthcare provider, social worker or nurse educator about how to quit.
- Call the TEXAS QUITLINE at 877-YES-QUIT for free, confidential counseling. The trained counselors are available 7 days a week.
- If your partner or other family members smoke, encourage them to quit. **There is no safe level of exposure to secondhand smoke.** If they cannot or will not quit, encourage them to always smoke outside and never in the house or car.

Alcohol in Pregnancy

ALCOHOL, found in beer, wine and liquors, is a toxic substance that is quickly passed from the mother's bloodstream to the baby. Toxic substances can damage the baby's organs, especially the brain. A safe level of alcohol use is not known. **Therefore, no alcohol intake is recommended during pregnancy**. Alcohol use is a leading cause of preventable birth defect.

What are the risks of using alcohol during pregnancy?
There are higher risks for miscarriage and stillbirth and birth defects such as Fetal Alcohol Syndrome (FAS). A child with FAS is smaller at birth and has a smaller brain. There are often defect of the face, childhood behavior problems, eating and sleeping problems, deformed organs, sight and hearing problems, and mental disorders.

If you use alcohol in early pregnancy, before you knew you were pregnant, you may have concerns. Discuss this with your healthcare provider. If you want help your healthcare provider or social worker can assist you in finding resources to help you quit.

Drug Use in Pregnancy

Women can easily become addicted to illegal drugs such as cocaine, methamphetamines, marijuana, heroin or prescription pain medication. Any drug the mother uses goes directly to her baby. There are serious health effects for both the mother and the baby.

Risks for the mother:
Low self-esteem, preterm labor, sexually transmitted infections, hepatitis, depression, placental abruption (placenta separated causing hemorrhage), HIV/AIDS.

Risk for the baby:
Premature birth, low birth weight, infections, birth defects, Sudden Infant Death Syndrome (SIDS), HIV/AIDS, learning/behavior problems.

You should not be afraid to seek treatment. Many women need and CAN get help to overcome their drug addictions. Please discuss your concerns with your healthcare provider. Every effort will be made to direct you to the appropriate treatment resource.

Exposure to Lead

What is lead poisoning?

Lead poisoning comes from exposure to lead products in the environment. Lead is commonly found in paint and pipes that were made before 1978 in the United States.

What health problems can happen from lead exposure?

While lead can affect almost every system in the body, it is most harmful to the brain and nervous system of developing babies and young children. In many cases, there are no visible symptoms of lead poisoning. The longer the lead exposure, the more severe the health problems are. The damages caused by lead poisoning are irreversible and permanent. When a pregnant woman is exposed to lead, it goes to her developing baby. Exposure during pregnancy can cause miscarriage or problems with the baby such as behavioral problems, brain damage, reduced IQ, hyperactivity, antisocial (criminal) behavior, seizures, coma, and even death.

How might I be exposed to lead?

- It has been illegal to use lead in paint or household products since 1978, but lead might be found in the paint and pipes of older homes. Living in a pre-1978 house can lead to exposure of dangerous levels of lead dust. If a home is being remodeled or renovated, it is even more dangerous.
- Women with a childhood history of lead poisoning, or who emigrate from another country where lead products are more common; may release lead into their bloodstream through bone demineralization. A woman from countries like Mexico, where leaded gasoline is still used and lead-glazes ceramic cookware is common, should be considered high-risk.
- Some pregnant women have cravings to eat clay soil or chips of clay pottery. This is called “pica” and can cause lead poisoning.
- Lead is found in some pottery or craft-making materials, guns, and certain herbs.

How can I prevent exposure?

The first step to stop lead exposure is to remove lead from the environment. The only cure is prevention. You can help prevent lead poisoning by:

- Only using cold tap water and letting the water run for at least a minute before using.
- Avoiding any activity that disturbs lead-based paint. Cover old paint with latex paint.
- Avoiding being in a house or apartment where remodeling or renovations are taking place and for at least 24 hours afterwards.
- Never use tap water to prepare infant formula.
- A reverse osmosis water filter such as the “Brita” type can remove lead in the water.

Local health departments do free screening. It requires a simple blood test.

Other Environmental Hazards

Cleaning products and garden chemicals:
There are many chemicals used in cleaning products and pesticides or weed killers used outside. Read the labels for warnings for pregnant women. NEVER use anything labeled toxic. If you cannot avoid chemical, make sure there is an open window or door for fresh air and use a fan. Do not mix ammonia and chlorine products. Use thick rubber gloves if you use any chemical products for cleaning or gardening. Look for natural products that do not use chemicals whenever possible.

Beauty products:
Chemicals used in nail salons are very dangerous and should be avoided. The fumes released are toxic to your baby. Do not use artificial fingernails while you are pregnant. Hair products such as dyes, permanents, and straighteners are considered safe to use during pregnancy.

Hot tubs and saunas:
The heat from these can damage your baby. You will know the water is too hot if it causes you to sweat.

X-rays:
These can slow your baby's growth and cause other problems. If you need x-rays for some reason, use a lead shield over your abdomen (stomach).

Tanning:
Tanning beds are not safe for anyone, let alone during a pregnancy. There is no evidence that tanning beds are harmful to a developing fetus, but there is plenty of proof that they are dangerous to YOU. It can increase your chances of developing melanoma – one of the most deadly types of cancer. Melanoma is the only type of cancer that spreads to the placenta, and that could be dangerous to both you and your baby. It is recommended that you discuss the use of tanning beds and/or creams with your provider.

In general, remember that whatever you are exposed to, your baby is too. Use common sense and ask your healthcare provider if you are unsure about what to do.

Common Discomforts in Pregnancy

There are many physical and hormonal changes during pregnancy that can lead to discomforts. These are some ideas for what to do and when to be concerned.

Backache, Hip or Pelvic Pain:

What causes it?

- The joints soften and loosen because of hormone changes. A growing baby changes the center of gravity and puts more pressure on your back.

What can help?

- Use good posture.
- Exercise.
- Wear shoes with good support and low heels.
- A maternity girdle or pelvis support belt may help.
- When you lift something, bend with your knees, not from your waist. Avoid lifting heavy objects.
- If your back hurts, lie down, apply ice or heat or take a warm bath, get a backrub.
- When getting up from a lying position, roll to your side before trying to sit or stand.
- When you have to stand in one place for a long period of time, place one foot on a low object like a footstool.
- Use the pelvic rock exercise:
    - Sit, stand or kneel in a comfortable position. Breathe in and relax. Breathe out and tighten your stomach muscles pushing your belly button into your back as you are curling your back outward. Relax and repeat.

Call your healthcare provider if:

- The back pain is low and comes and goes regularly.
- The back pain is high, under your ribs or near your waist on either side.

Colds:

What causes it?

- Colds are no more common or uncommon because of your pregnancy.

What can help?

- Avoid being around people who are sick.
- Wash your hands frequently.
- Drink plenty of fluids and rest.

Call your family healthcare provider if:

- You have a fever higher than 100°F
- Have a severe sore throat.
- Chest pain or difficulty breathing.

Common Discomforts in Pregnancy (cont.)

Constipation:

What causes it?

Hormone changes slow down the movement through the intestines. Prenatal vitamins and iron supplements may increase constipation.

What can help?

- Drink at least 8 glasses of water every day.
- Eat plenty of fiber found in fresh fruits and vegetables and whole grains.
- Exercise.
- Eat prunes or drink prune juice.
- Avoid laxatives, you may use a stool softener or fiber supplement.
- Avoid straining with bowel movements.

Cramping

What causes it?

During early pregnancy there is increased blood flow to your uterus, it softens, and grows larger. As it grows larger, it puts pressure on the surrounding ligaments and muscles.

What can help?

- A warm bath. NOT A HEATING PAD
- Sitting or lying down.

Call your healthcare provider if:

- The cramping is severe and lasts more than one hour.
- There is bleeding with the cramping.
- You have nausea, vomiting, dizziness, or faintness with increased pain and bleeding.

Diarrhea

What cause it?

Diarrhea can be caused by the flu, bacterial infections, certain foods, and some medications. It is characterized by more than one loose watery stool in a day. If it lasts longer than a day, call your healthcare provider.

What can help?

- BRAT Diet which includes bananas, rice, applesauce and dry toast.
- Use Kaopectate or Imodium following the directions on the package.

Common Discomforts in Pregnancy (cont.)

Dizziness

What can cause it?

Occasional dizziness is fairly common in pregnancy, especially if you sit up or stand up too fast. Anemia or not drinking enough fluids can make it worse.

What can help?

- Move slowly when you change position.
- If you feel dizzy, sit and put your head down or lie down.
- Drink plenty of fluids.

Call your healthcare provider if:

- Dizzy spells happen more than once a day.
- Your heart races before you feel dizzy.

Gas or Bloating

What causes it?

Hormone changes of pregnancy cause everything to move more slowly through your intestines.

What can help?

- Avoid gas-forming foods such as beans, spicy foods or carbonated beverages.
- Exercise.
- Use a heating pad on low setting over your stomach.
- Rock in a rocking chair or lie on your left side.
- Mylicon may be used to relieve gas buildup.

Groin or Round Ligament Pain

What causes it?

Early in pregnancy, women have a small cyst on one of their ovaries that produces needed hormones for the pregnancy. There are also ligaments, or strong rubber-band-like structures, that help hold your uterus in place as it grows. Either of these can cause a sharp, sudden pain on one side or the other of your lower abdomen. Both are harmless, even though they hurt.

What can help?

- Move slowly when turning in bed, getting out of bed, or getting out of a chair.
- Avoid sudden, jerky movements.
- Bend at the waist toward the side that hurts. Massage or put heat on the area that's hurts.
- Warm tub baths.

Call your healthcare provider if:

- You have a continuous pain, lasting longer than 2 minutes in your lower abdomen or if you have weakness, headache, shoulder pain, nausea, dizziness, cramping or bleeding along with the pain.

Common Discomforts in Pregnancy (cont.)

Heartburn or Indigestion

What causes it?

- Hormone changes of pregnancy allow the opening from the esophagus to the stomach to be more relaxed. As the baby grows, pressure on your stomach causes the acid to back up.

What can help?

- Eat small amounts of food often and avoid overeating.
- Do not lie down right after eating, wait at least 2 hours. Elevate your head at night or sleep in a semi-sitting position.
- Avoid caffeine and cigarettes.
- Avoid spicy and greasy foods.
- Sip milk or eat yogurt.
- Use antacids that are low in sodium. Do not use baking soda, Pepto Bismol or any products with aspirin in it. (See medication list).

Call your healthcare provider if:

- Your heartburn is not relieved with antacids or these suggestions.
- You get a continuous or frequent pain under your ribs on the right side.

Insomnia or Fatigue

What causes it?

- Fatigue is common the first 3 months of your pregnancy and again towards the end of the pregnancy. It becomes harder to get comfortable as your baby grows. Back or hip pain or frequent trips to the restroom often wake you up.

What can help?

- A warm bath or relaxation exercise before sleep.
- Exercising during the day but not within 4 hours of going to bed.
- Have a light snack before you go to bed.
- Sleep on your side with a pillow between your legs and under your abdomen.
- Avoid caffeine.
- Go to sleep and get up at the same time every day whenever possible.
- Use a pad over your mattress (like an “egg-crate” pad).
- Listen to your body and rest when you can.
- If you are anxious or have many things on your mind, discuss them with someone close to you or consider seeing a counselor.

Call your healthcare provider if:

- You remain much more tired than you usually are and the above suggestions do not help.

Common Discomforts in Pregnancy (cont.)

Leg Cramps

What causes it?

- The blood flow to your legs is not as good during pregnancy. Calcium imbalance, fatigue and prolonged standing or sitting can increase them.

What can help?

- Drink plenty or water.
- Get enough, but not too much calcium (about 4 servings of dairy products/day).
- Straighten your legs and point your toes toward your head to release the cramp.
- Use calf-stretching exercises (lean against a wall, hold one leg straight with the heel on the floor as you bend the other knee).
- Do foot twirls.
- A magnesium supplement (eg. Mag 64).

Call your healthcare provider if:

- One leg is more swollen than the other,
- You have a painful, red area in your calf or other part of your leg.

Nausea and Vomiting

What causes it?

- Nausea and vomiting are common in the first 3 months of pregnancy due to hormone changes.

What can help?

- Eat frequent, small meals.
- Avoid greasy, spicy, or rich foods.
- Eat something when you wake up, but before you get up, like crackers or hard candy.
- Drink sips of fluid between meals, not with your meals.
- Avoid strong smells.
- Eat a high protein snack before you go to bed to keep your blood sugar level.
- Listen to your body, do what seems to work for you.
- See other suggestions under “nausea diet”

Call your healthcare provider if:

- You are unable to keep down food or fluids and are becoming dehydrated.
- You are losing weight.

Common Discomforts in Pregnancy (cont.)

Nosebleeds

What causes it?

- Increased blood flow to your nose during pregnancy or dry air can cause these.

What can help?

- If you get a nosebleed sit with your head resting on the back of a chair or recline slightly. Apply pressure to your nose by pinching the nose gently.

Call you healthcare provider if:

- They are frequent, heavy or do not stop within ½ hour.

Shortness of Breath

What causes it?

- Hormone changes of pregnancy cause you to feel the need to take deep breaths. This helps protect your baby by getting enough oxygen into your system. As your baby grows larger, pressure from the uterus may put pressure on your diaphragm making it harder to breathe. Asthma may get worse with pregnancy.

What can help?

- Use good posture, stand and sit straight.
- Lift your rib cage or circle your shoulders up and back.
- Avoid lying on your back. Elevate your head on pillows when lying down.

Call your family healthcare provider if:

- You have wheezing or are unable to breathe easily.
- Your heart is racing or you have chest pain along with feeling short of breath.

Urinary Frequency

What causes it?

- During the first 3 months, the growing uterus takes up space your bladder normally has. Late in pregnancy, the baby's head fills up that space.

What can help?

- Avoid drinking shortly before you go to bed at night.
- Talk to your employer about more frequent restroom breaks if necessary.

Call your health care provider if:

- You have pain or burning with urination, a fever, a backache near your waist, or blood in your urine.

Common Discomforts in Pregnancy (cont.)

Vaginal Discharge

What causes it?

- An increase in hormones may cause a heavier than normal white, odorless discharge during pregnancy. Some vaginal infections are more common in pregnancy.

What can help to prevent vaginal infections?

- Wear cotton underwear.
- Wipe from front to back after you go to the restroom.
- Avoid douching.
- Avoid deodorized, scented or colored products.

Call you healthcare provider if:

- You notice a green, yellow or strong smelling discharge or vaginal irritation or itching.

Varicose Veins

What causes it?

- Varicose veins are swollen veins. They usually appear in the leg but can also appear in the vulva or vagina. Increased blood flow during pregnancy and pressure from your growing uterus slows the circulation in your legs. Hormone changes also cause the veins to relax. You are more likely to get varicose veins if others in your family have them.

What can help?

- Wear support stockings – put them on before you get out of bed in the morning.
- Avoid tight bands from your stockings or anything else on your legs.
- Elevate your legs and feet above your heart when you can.
- Avoid long periods of standing or sitting.
- Get an adequate amount of vitamin C in your diet.
- Avoid crossing your legs.

Call your healthcare provider if:

- You have a firm, red or tender area over one of your varicose veins or one leg is more swollen than the other.

Depression in Pregnancy

Why am I feeling so emotional now that I am pregnant?

- Pregnancy is a time of both physical and emotional change. It is normal to have mood swings. You may feel happy one minute and sad the next. These changes are due in part to hormonal changes, which occur during pregnancy, especially during the first three months. Although there is not a "cure" for these mood swings, you may feel better if you follow a good prenatal diet (avoid sugar, chocolate and caffeine which can make you feel worse), get exercise, and talk about your feeling with your partner, family and friends.

How do I know if I am depressed?

Symptoms of depression may include:

- Feelings of sadness or hopelessness.
- Changes in appetite (not eating at all or eating too much).
- Difficulty falling asleep or sleeping too much.
- A noticeable loss of interest or pleasure in almost all activities.
- Constant tiredness
- Felling of worthlessness.
- Inability to concentrate, to remember, or to make decisions.

If you have experienced some of these symptoms and they have continued for longer than two weeks, speak to your health care provider, nurse, or social worker for further evaluation. **If you have thoughts about death, suicide, or hurting yourself or your baby, call your health care provider or go to the emergency room immediately.** It is important to take proper care of depression during pregnancy. If you do not you may put your health at risk, which can harm both you and your baby.

Do expectant father experience emotional changes during pregnancy?

Yes, expectant fathers can experience emotional changes that are common in pregnant women. These changes can be due to fathers feeling pressure with their partner's increased needs and emotional changes, having doubts about being a good father, being worried about the mother and baby's health, and finances. Many of these feeling are normal.

What can expectant fathers do?

- Talk about your feelings with your partner (this will benefit both of you), family or friends.
- Stay physically active.
- Avoid alcohol or drugs which can make you feel worse.
- If your symptoms begin to interfere with your work or other areas of your life seek professional help from your health care provider or therapist.

Screening for Group B Streptococcus (GBS)

What is Group B Strep?

- This is bacteria that can cause serious illness or death for babies. Generally, the mother has no signs of illness, although GBS can cause urinary tract infections. Now that we know what the bacteria are and how to test mothers for it, the number of babies who die from the disease has gone down significantly.

How does someone get Group B Strep?

- The bacteria are found in the bowel or vaginal area. Anyone can be a "carrier" for GBS and one in four or five pregnant women generally are. It is not a sexually transmitted infection and you cannot "catch" it from anyone or "give" it to anyone else. Your baby can pick up the infection after your water breaks, during labor, or in rare instances, during your pregnancy.

How am I tested?

- Your vaginal and rectal areas will be swabbed with a special Q-tip at about 36 weeks of pregnancy (one month before your due date). This is sent to a lab. All women are tested.

How will I be treated?

- It does not help to treat the infection during the pregnancy. Instead, you should get antibiotics through an IV when you are in labor; especially after your bag of water has broken. It is best to get these antibiotics at least 4 hours before your baby is born.

What is my baby still gets it?

- Babies whose mothers carry GBS are watched closely after their birth and special blood tests may be done to test for infection. If your baby's doctor has any concerns that your baby may have it, the baby will be started on antibiotics. These antibiotics will continue for 3, 7, 10, or even 14 days and your baby will need to stay in the hospital during that time.

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WARNING SIGNS

There are many symptoms you experience in pregnancy, which may or may not have an explanation. However, if you experience any of the symptoms listed below, contact your doctor's office at **972-479-1222**. After hour calls please call our answering service at 817-589-4678.

- Severe abdominal pain
- Vaginal bleeding
- Persistent vomiting
- Fever and chills
- Painful urination
- Marked changes in frequency or intensity of fetal movements
- New onset of dizziness, headache or blurry vision
- Excessive swelling in hands, feet and face
- Gush or leaking of fluid from the vagina
- Severe or continuous headaches

Am I in Labor?

Labor usually happens sometime between 2 weeks before to 2 weeks after your due date. True labor means your cervix opens and allows the baby to be born.

What are the early signs of labor?

- The baby may "drop" lower. This usually happens only with your first baby and may happen 2 weeks or more before labor starts.
- You may have a heavy mucousy discharge that might have a red or pink color to it. This does not happen for everyone and may happen several days or even weeks before labor starts.
- You may feel more tired or have a burst of energy.

What does labor feel like?

- There will be contractions (tightening) across the upper part of your uterus that come and go, gradually getting closer and stronger.
- You may feel discomfort in the middle of your lower back, or in the middle of your lower abdomen – or both, that comes and goes with the tightening. This can feel like menstrual cramping, pressure or a dull ache and is not a sharp pain.
- You may have a leak or gush of fluid from your vagina.

How do I time contractions?

- Time contractions from the beginning of one contraction to the beginning of the next contraction. Contractions generally do not last longer than 60 seconds.

What is the difference between true and false labor?

- True labor contractions are at regular intervals, become closer together and do not go away with rest or moving. Frequently, true contractions begin in the back and come around to the front. False labor or Braxton Hicks contractions are also tightening that come and go – they may be with or without pain. They are usually irregular and do not get stronger or closer over time. They usually get better with walking or soaking in the tub. Your water will not break and your cervix does not open. They are more likely to happen in the evenings. Some women have a lot of false labor; others have none at all.

What should I do if I think I am in labor?

If you have any of the following signs you should call your healthcare provider:

- Your water is leaking.
- Your baby is not moving well.
- You have constant pain or vaignl bleeding.
- You have a high risk pregnancy.
- Otherwise, stay home until the contractions are 5 minutes apart or less and you cannot walk or talk through your contractions. Early labor may last for several hours and it is better to be home during early labor.

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Instrucciones De Parto

Cómo saber si el parto ha empesado:	Que hacer:
1. Si tiene contacciónes regulares cada 3 a5 minotos, por lo menos 2 horas. No se cambian, no importa lo que hace y puede ser que se pongan mas fuertes cuando camine. Recuerde anotar el tiempo que dura cada contracción hasta el comienzo de la seguiente contracción.	1. Si las contracciónes le duelen tanto que hacen horar, entonces venga a Labor y Delivery (sala de partos). Si las contracciónes estan regular pero todavía no estan fuertes, entonces se puede quedar en casa, a donde estas más cómodo y continuar con sus actividades normales.
2. Puede ser que manche poca sangre: puede ser rosa, colorado o café. La cantidad puede ser poco cuando se limpe, o con mucho de moco.	2. "La Mancha" es señal normal del parto TEMPRANO. No es necesario venir al hospital cuandro pase su mancha. Sangrado mocoso, como una regal, NO es normal y necesita venir al hospital en seguida.
3. Puede ser que su "fuente" se rompa. Podría ser un chorro grande de agua o quizas este goteando constantmente, no solo cuando se limpie.	3. Venga a la sala de parto, aunque las contracciónes no han comensado. Note el color del liquid.

Por favor **llámenos immediatamente** si:

- Tiene dolor de cabeza que no se mejora después de tomor Tylenol y descanso.
- El movimiento de su bebé no es tanto como antes, y has tratado de sentir movimiento del bebé mientras que esta descansando y tomando una bebida helada.
- Todaví NO ES TIEMPO de que sane su bebé y esta sintiendo señas de parto.
- Ha recibido instrucciones especiales de la enfermera partera o doctor que llame en cierta circunstancias.
- Si tiena un problema, una pregunta o preocupación acerca de su embarazo que usted crea que necisite atención inmediata, a una pregunta acer de venir al hospital, por favor LLAMENOS! Estamos contentos para ayudarle.

Si al caso sus preguntas, se puedan esperar, apuntelas para cuando venga a la siguiente consulta de clínica.

Recuerde: la decision final para venir al hospital es de USTED!

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Procedures that May Occur in Labor

Cesarean Births (C-Section)

The baby is born through an incision (cut) in the lower abdomen. This may be necessary if:

- Labor is not progressing well.
- The baby's heart rate is dropping (signs of stress).
- The baby is not in the right position (such as breech).
- There are other high-risk situations that could affect you or your baby's health.

A Cesarean Section birth might be planned ahead of time if the baby is not in the right position or if you have had a Cesarean before. You will stay about three days in the hospital after a Cesarean birth.

Post Dates/Induced Labor:

The "due date" is an estimate of when your baby is due. Very few women actually have their baby on their due date. It is expected you will have your baby no more than 2 weeks past your due date. An induction is commonly offered 1 week past your due date if your cervix seems ready for labor. **An induction may not be done sooner than one week before your due date unless there are medical concerns for you or your baby.** There are more risks for the mother and the baby with induced labor.

Induction means:

To artificially start labor using medications or breaking your water bag. This may be necessary if:

- The baby is overdue (1-2 weeks past your due date).
- The contractions are not strong enough.
- There are other medical risks to continuing the pregnancy.

Episiotomy

- This is a cut between the vagina and the rectum that if necessary allows for more room for the baby to be born.

Vacuum or Forceps

- These are instruments that can be used to help the baby be born during the delivery process when your health provider feels it is necessary.

An Intravenous (IV) line

- Many healthcare providers start an IV for all women in labor. An IV makes it easier to give you fluids and medicines you may need during or after your delivery.

Electronic Fetal Monitoring

- This is used for most women in labor, at least part of the time. Belts are place around your abdomen to monitor your baby's heart rate and your contractions. Internal monitors are more accurate but are only needed if it is not possible to monitor you or your baby well enough with the outside monitors. Electronic monitoring will be used all the time if you or your baby have health risks, you are induced, or if you have pain medication.

Pain Relief during Labor and Delivery

Each woman's labor is different and how much pain a person has in labor is also different. There are things you can do to decrease or deal with your pain and there are medications available to help you if needed.

What can you do to decrease the pain you feel?

- First of all, eat right and limit the amount of weight you gain to the recommended amount.
- Exercise most days of the week (walking and swimming are best). This makes the muscles you need for labor stronger and decreases weight gain.
- Attend childbirth classes. This helps you learn what labor is about and what to expect during labor, which decreases fear. Fear causes tension and pain. Classes also help you learn breathing and relation methods to help deal with labor.
- Think about what helps you to relax and use those things during your labor. Limit the people who are with you during labor to those you are very comfortable with. Some other ideas are music, a favorite pillow, tub socks, or backrubs.
- Avoid having your labor induced unless there is a medical reason to do so.

What should I do after labor start?

- Unless you are high risk or have history of fast labors, stay home in early labor. At the hospital or at home it may help to walk, sit up in a chair, rest on your side or use the bathtub. Slow, easy breathing is the most relaxing.

What if I need pain medication?

- It is best to avoid pain medication until labor is "active". This usually means you are 4 or more centimeters dilated and contractions are regular, 5 minutes apart or less. The nurse will frequently ask you to rate your pain on a scale of 1 to 10. If you need pain medication, you will need to be in a bed and the baby's heart rate will need to be monitored. You will also need an intravenous fluid line (IV).

What types if pain medications are available?

- <u>IV Pain Medication</u>:
    - This is a pain medication given through an IV that helps to decrease pain and fear. The pain is not gone, but is less. You will often feel sleepy and lightheaded. This generally lasts for about 2 hours and can be repeated. It should not be given less than an hour before your baby is born as it may affect the baby's breathing. There is medicine to use for the baby if this happens unexpectedly.

Pain Relief during Labor and Delivery (cont.)

- Epidural
    - An anesthesiologist places an epidural. A small catheter is placed in your back (just outside the spinal cord) and an anesthetic (numbing medicine) is run through the catheter throughout your labor. You can expect to continue to feel "pressure" but not pain. Your legs will feel heavy, you will be unable to walk, you will have monitors on for both your heart rate and your baby's heart rates, your blood pressure (BP) will be checked often, and you will need a catheter placed in your bladder.
    - Epidurals are generally safe and well tolerated. Some of the possible risks include:
        - It may not work or may not work completely.
        - There is some pain with putting it in.
        - Your blood pressure may drop which can cause the baby's heart rate to drop. You will need other medication if this happens or rarely, an emergency Cesarean Section.
        - There may be an increased risk of assisted delivery, which is given through vacuum extractor, forceps or a Cesarean Section.
        - You are more likely to need a medicine called Pitocin, which is given through an IV to keep your contractions strong.
        - It may take longer to push your baby out.
        - You may have a mild backache later or you can get a headache.
        - There are other rare risks your anesthesiologist will talk to you about.
- **Local anesthesia**
    - Local anesthesia or a numbing medicine may be used if you need stiches after the birth. This is put in with a needle in the area where the suturing needs to happen.
- **General anesthesia**
    - A general anesthetic, which puts you to sleep, may be used if you need an emergency Cesarean Section. This is given by an anesthesiologist and is similar to getting put to sleep for any kind of surgery.
- **Spinal anesthesia**
    - Spinal anesthesia is generally used for C-Section, unless you already have an epidural in place. A small needle places anesthesia directly into the spinal column. This provides pain relief from the breasts down and last for 1 ½ hours. Risks are similar to those for epidural anesthesia.

Ideas for Things to Bring With You to the Hospital

When you are 3-4 weeks away from your due date, it is helpful to get your bag packed so it is easy to just pick up and go when it is time to go to the hospital. Some of the following are ideas for what you may want to have with you.

- Your "What to Expect when Expecting" book
- A baby book for special memories and footprints.
- A list of family and friends to call (you will need a cell phone)
- Cash or blank check for registering the birth certificate.
- Camera and film.
- Relaxation items (photo, music, movies, etc.)
- Pillows (if you want your own).
- Personal hygiene items (toothbrush, toothpaste, deodorant, comb, lotion, lip balm, cosmetics, hair care items, hair bands).
- Contact lens case, solution, and eye glasses even if wearing contacts.
- Snacks, hard candy, gum.
- Food, medicine, a change of clothes, and toiletries for your support person.
- A small amount of money.
- Loose and comfortable clothes to go home in.
- Nursing or sports bras, panties, and socks.
- Nightgown, robe, slippers (if you want to wear your own).
- Baby clothes for a picture and appropriate seasonal clothes to go home in.
- Baby blankets (hospital linens need to remain at the hospital).
- CAR SEAT – a car seat is required by law and should be properly installed in your car before you go to the hospital.

Getting Ready for Your Baby

Your healthcare provider will take care of you in the hospital, but you will need another doctor to care for your baby. You can choose a family practitioner or a pediatrician. If you have not seen this provider before, you will want to call their office and check if they are taking new patients, and let them know when you are due. Often you can make an appointment to meet the provider and decide if you want them for your baby's care.

It is a good idea to get things ready before baby is born when you have more time to make careful selections. Things need not be new or expensive but they do need to be safe.

Crib

- If you are using a used crib, be sure the slats are not more than 2 3/8 inches apart – to prevent your baby from catching his/her head between the slats. (If a can of pop can pass through the slats, they are too far apart).
    - The mattress must be the same size as the crib so that it fits snug; it should be firm and moisture-proof.
    - The surface should be smooth and free of cracks and splinters. It should be painted with nontoxic, lead-free paint.
    - All the hardware and latches should be free of rough edges.
    - The sides must be operated with a locking latch that cannot be accidentally released.

Baby Clothes

- It is so much fun to shop for your baby, but it is also easy to overdo it. A general guideline below will help get you started. Remember to consider the time of the year when baby is due as they grow fast.
    - 1-2 dozen disposable diapers. For babies over 6 pounds, size one will work.
    - 2-4 dozen cloth diapers, pins, and waterproof pants (only if you are choosing cloth).
    - 1 container of diaper wipes.
    - 6 onesies (sleeve length will depend on the weather).
    - 6 sleepers, or nightgowns if you prefer.
    - 2 sweaters.
    - 4 receiving blankets.
    - 2 sheets for the crib and waterproof pads to protect the mattress.
    - 1 snowsuit for cold weather.
    - Car seat cover or blanket for cool, windy weather.

Getting Ready for Your Baby (cont.)

Baby's Bath Needs

- Plastic infant tub with a non-slip bottom (you can use the kitchen sink lined with a towel or a large plastic dishpan).
- 3-4 soft washcloths for bathing and cleaning little "bottoms"
- Non-deodorant soap or baby soap.
- Baby bath towels (the towels that you already have will work fine).

Supplies for Feeding

- If you are breast feeding:
  - 3-4 nursing bras.
  - 1 box of disposable nursing pads or 6 washable pads.
- If you are bottle-feeding:
  - 8, eight-ounce bottles with nipples and caps.
  - Bottle/nipple brush.
  - Formula

Optional Items:

- Changing table. Convenient to have one with drawers to store baby clothes.
- Rocking chair.
- Stroller for walks and shopping trips.
- High chair (you will not need this for several months).
- Playpen (a safe area for baby away from pets, and from activities of older children).
- A ling or backpack baby carrier.
- A mobile to hang on baby's crib.
- A small wastebasket with a lid for diapers, diaper pail if using cloth.

Circumcision of Male Newborns

Parents make a choice about whether or not to have their son circumcised. Law does not require your son to be circumcised and it is not a requirement of hospitals. Usually there is not a medical reason for a circumcision.

Some parents choose to have their son circumcised for religious beliefs. Some choose circumcision for cleanliness. A discharge can build up under the foreskin of uncircumcised boys. This may lead to infection or an odor. Parents will need to teach their uncircumcised son to wash his penis as part of his bathing routine.

Circumcision may lower the risk for sexually transmitted infection. It is also believed to protect against HIV. Circumcision is felt to help prevent cancer of the penis. This is a rare condition in males who are not circumcised. Risk for urinary tract infection is low in both groups.

Before the newborn leaves the hospital, circumcision will be performed if the parents choose this. If you have any questions or concerns regarding your decision for or against circumcision, please contact your healthcare provider.

You may also want to check with your insurance company as many now consider circumcision an elective surgery and will not pay for this procedure.

Car Safety

The National Highway Traffic Safety Administration says: *Car crashes are the leading killer of children in the US today*.

Don't let this happen to your family!

Quick Care Seat Checklist:

- ✓ Use a rear facing car seat for the babies until they weigh a full 20 pounds **and** are at LEAST one year old.
- ✓ Do NOT use a car seat where there is an air bag.
- ✓ Clinch the seat belt down tight around the car seat, following the seat belt path - if you can move the seat side to side or back and forth more than an inch, it is too loose.
- ✓ Never buy a used car seat. Car seats are made for one accident, like air bags they need to be replaced even if they don't look damaged.

There are many reasons the car seat may not be tight enough.
Some things to check for include:

- Twisted straps
- Does the buckle lock the seatbelt?
- Does the belt retractor lock?
- Do you need a device called a locking clip?
- Read your car's owner manual and your car seat owner manual for more information.

- ✓ Secure your child snugly and correctly into the seat. Use manufacturer's instructions.
- ✓ Remember, in a crash, the baby will be thrust into the straps. If they are not tight, the baby will not move much, if it is loose, the baby will be at much higher risk for injury. So, "hug, do not squish" your baby with the harness.
- ✓ The straps (harness) should be in the slots that are at or below shoulder height.
- ✓ The plastic harness clip should be at mid-chest level.
- ✓ Do not use heavy blankets or coats between your baby and the harness straps.
- ✓ Keep the seats at the proper recline, 45° - just enough to keep baby's head from flopping forward when riding, as this can cut off the airway.

Texas law says your baby must be in a properly installed rear-facing child restraint seat until **20 pounds and one year old**.

Please remember, as your baby grows and changes, their car seat needs will grow and change too. You will need to remember to know about forward-facing car seats, tether anchors, latch systems, booster seats and eventually correct seat belt use for your child.

If you have questions or are just not sure if you have it right, go to the National Highway Traffic Safety Administration's website at www.nhtsa.dot.gov to look for tips on correct usage and installation. There is also a schedule of car seat "Check Up Events" near you.

Shaken Baby Syndrome (SBS)

It happens when a caregiver shakes a baby so hard that brain damage occurs. Symptoms include irritability, lethargy, tremors, vomiting, retinal hemorrhage, seizures, coma, stupor, and finally death. It is defined as rapid and violent motion of the head in one or more directions that "snaps" the baby's head back and forth.

Shaken Baby Syndrome does not referral to gentle bouncing that many parents do to calm their babies. Your baby's head moving like it does in a car, a bouncy seat or swing is safe.

Shaken Baby Syndrome happens in anger and frustration when a baby does not stop crying. Abusers of SBS are not typical abusers; they are care takers who are exhausted, stressed and who are not handling the baby's crying appropriately. If you are becoming frustrated by your baby's crying, consider getting some outside help to ease your stress level.

There are many places to learn about Shaken Baby Syndrome, most you can contact on the internet.

- The first place to learn about Shaken Baby Syndrome is your pediatrician. Many parents are afraid to go to their pediatrician with this question because they are afraid they might be viewed as parents who shake their baby. However, your pediatrician knows you and can point you in the direction of materials to answer your questions. If you suspect a care giver is shaking your baby, report it to your pediatrician immediately.

- The American Academy of Pediatricians also has information about Shaken Baby Syndrome. They list a multitude of articles, though some might be difficult to read unless you have a medical background.

- The National Center on Shaken Baby Syndrome is another wonderful resource for information. The website goes over symptoms of SBS in detail. The website also explains the difference between normal activities that jiggle/bounce babies and Shaken Baby Syndrome. It has a wonderful question and answer page that may answer all your questions in detail.

- The Shaken Baby Alliance offers support for families and education for professionals. Their goal is to prevent SBS and support the families dealing with ramifications.

- SBS Prevention Plus offers discussion and training to prevent Shaken Baby Syndrome, what they can do to prevent it and products for training about SBS.

Pregnancy Books

- *What to Expect When You're Expecting* – Arlene Eisenberg and Heidi E. Murkoff
- *Planning for Pregnancy, Birth, and Beyond* – published of ACOG
- *Advice from a Pregnant Obstetrician* – Shari E. Brasner, MD
- *The Girlfriends' Guide to Pregnancy* – Vicki Lovine
- *The Mother Dance: How Children Change Your Life* – Harriet Lerner, PhD
- *The New Mother's Survival Guide* – Elizabeth Wright
- *The Girlfriends' Guide to Surviving the First Year of Motherhood* – Vicki Lovine

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Pregnancy Websites

www.parenting.com

www.babycenter.com

www.parentsoup.com

www.ePregnancy.com

www.Sheknows.com

www.abcbirth.com

www.fathersworld.com

www.pregnancyweekly.com

www.Americanbaby.com

www.pregnancywithoutpounds.com

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Notes

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Depression

Q: What is depression?

A: Life is full of ups and downs. But when the down times last for weeks or months at a time or keep you from your regular activities, you may be suffering from depression. Depression is a medical illness that involves the body, mood, and thoughts. It affects the way you eat and sleep, the way you feel about yourself, and the way you think about things.

It is different from feeling "blue" or down for a few hours or a couple of days. It is not a condition that can be willed or wished away.

Q: What are the different types of depression?

A: Different kinds of depression include:

- **Major depressive disorder.** Also called major depression, this is a combination of symptoms that hurt a person's ability to work, sleep, study, eat, and enjoy hobbies.
- **Dysthymic (diss-TIME-ic) disorder.** Also called dysthymia, this kind of depression lasts for a long time (two years or longer). The symptoms are less severe than major depression but can prevent you from living normally or feeling well.

Some kinds of depression show slightly different symptoms than those described above. Some may start after a particular event. However, not all scientists agree

Depression has many different faces:

After 10 years of working for a company she loved, Kim was laid off. She never saw it coming. Kim is a single mother raising two kids. She has been looking for work for about eight months now. Since losing her job, she's felt like a failure. Kim is up all night, and she never feels like eating much. She yells at her kids often.

Rose used to be an active senior citizen. Since retiring, Rose and her husband have traveled a lot – Europe, Australia, South Africa – they have been everywhere. Rose's husband died last year of a heart attack. She has been in mourning for a year. She rarely gets out, and she doesn't accept visitors into her home.

Many of Julie's family members have suffered with depression. But nobody ever talks about it. Julie has been dealing with depression since she was a teen. She is now 46. She has tried to kill herself twice. Julie has never been in counseling. "What is wrong with me?" she always asks herself. She just can't seem to "shake it off."

You probably know women with stories like these. Depression affects both men and women, but more women than men are likely to be diagnosed with depression in any given year. That being said, depression is not a "normal part of being a woman" nor is it a "female weakness." Many women with depression never seek treatment. But most women, even those with the most severe depression, can get better with treatment.

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on how to label and define these forms of depression. They include:

- **Psychotic depression,** which occurs when a severe depressive illness happens with some form of psychosis, such as a break with reality, hallucinations, and delusions.
- **Postpartum depression,** which is diagnosed if a new mother has a major depressive episode within one month after delivery.
- **Seasonal affective disorder (SAD),** which is a depression during the winter months, when there is less natural sunlight.

Q: What causes depression?

A: There is no single cause of depression. There are many reasons why a woman may become depressed:

- Genetics (family history) – If a woman has a family history of depression, she may be more at risk of developing it herself. However, depression may also occur in women who don't have a family history of depression.
- Chemical imbalance – The brains of people with depression look different than those who don't have depression. Also, the parts of the brain that manage your mood, thoughts, sleep, appetite, and behavior don't have the right balance of chemicals.
- Hormonal factors – Menstrual cycle changes, pregnancy, miscarriage, postpartum period, perimenopause, and menopause may all cause a woman to develop depression.
- Stress – Stressful life events such as trauma, loss of a loved one, a bad relationship, work responsibilities, caring for children and aging parents, abuse, and poverty may trigger depression in some people.
- Medical illness – Dealing with serious medical illnesses like stroke, heart attack, or cancer can lead to depression.

Q: What are the signs of depression?

A: Not all people with depression have the same symptoms. Some people might only have a few, and others a lot. How often symptoms occur, and how long they last, is different for each person. Symptoms of depression include:

- Feeling sad, anxious, or "empty"
- Feeling hopeless
- Loss of interest in hobbies and activities that you once enjoyed
- Decreased energy
- Difficulty staying focused, remembering, making decisions
- Sleeplessness, early morning awakening, or oversleeping and not wanting to get up
- No desire to eat and weight loss or eating to "feel better" and weight gain
- Thoughts of hurting yourself
- Thoughts of death or suicide
- Easily annoyed, bothered, or angered
- Constant physical symptoms that do not get better with treatment, such as headaches, upset stomach, and pain that doesn't go away

Q: I think I may have depression. How can I get help?

A: Below are some people and places that can help you get treatment.

- Family doctor
- Counselors or social workers

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- Family service, social service agencies, or clergy person
- Employee assistance programs (EAP)
- Psychologists and psychiatrists

If you are unsure where to go for help, check the Yellow Pages under *mental health, health, social services, suicide prevention, crisis intervention services, hotlines, hospitals,* or *physicians* for phone numbers and addresses.

Q: What if I have thoughts of hurting myself?

A: Depression can make you think about hurting yourself or suicide. You may hurt yourself to:

- Take away emotional pain and distress
- Avoid, distract from, or hold back strong feelings
- Try to feel better
- Stop a painful memory or thought
- Punish yourself
- Release or express anger that you're afraid to express to others

Yet, hurting yourself does just that—it hurts you. If you are thinking about hurting or even killing yourself, PLEASE ASK FOR HELP! Call 911, 800-273-TALK (8255) or 800-SUICIDE, or check in your phone book for the number of a suicide crisis center. The centers offer experts who can help callers talk through their problems and develop a plan of action. These hotlines can also tell you where to go for more help in person. You also can talk with a family member you trust, a clergy person, or a doctor. There is nothing wrong with asking for help – everyone needs help sometimes.

You might feel like your pain is too overwhelming to cope with, but those times don't last forever. People do make it through suicidal thoughts. If you can't find someone to talk with, write down your thoughts. Try to remember and write down the things you are grateful for. List the people who are your friends and family, and care for you. Write about your hopes for the future. Read what you have written when you need to remind yourself that your life is IMPORTANT!

Q: How is depression found and treated?

A: Most people with depression get better when they get treatment.

The first step to getting the right treatment is to see a doctor. Certain medicines, and some medical conditions (such as viruses or a thyroid disorder), can cause the same symptoms as depression. Also, it is important to rule out depression that is associated with another mental illness called bipolar disorder. A doctor can rule out these possibilities with a physical exam, asking questions, and/or lab tests, depending on the medical condition. If a medical condition and bipolar disorder can be ruled out, the doctor should conduct a psychological exam or send the person to a mental health professional.

Once identified, depression almost always can be treated with:

- Therapy
- Medicine called antidepressants
- Both therapy and medicine

Some people with milder forms of depression do well with therapy alone. Others with moderate to severe depression might benefit from antidepressants. It may take a few weeks or months before you begin to feel a change in your

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mood. Some people do best with both treatments – therapy and antidepressants.

Q: Should I stop taking my antidepressant while I am pregnant?

A: The decision whether or not to stay on medications is a hard one. You should talk with your doctor. Medication taken during pregnancy does reach the fetus. In rare cases, some antidepressants have been associated with breathing and heart problems in newborns, as well as jitteriness, difficulty feeding, and low blood sugar after delivery. However, moms who stop medications can be at high risk of their depression coming back. Talk to your doctor about the risks and benefits of taking antidepressants during pregnancy. Your doctor can help you decide what is best for you and your baby. In some cases, a woman and her doctor may decide to slowly lower her antidepressant dose during the last month of pregnancy. Doing so can help the newborn suffer from fewer withdrawal symptoms. After delivery, a woman can return to a full dose. This can help her feel better during the postpartum period, when risk of depression can be greater.

Q: Should I stop taking my antidepressant while breastfeeding?

A: If you stopped taking your medication during pregnancy, you may need to begin taking it again after the baby is born. Be aware that because your medication can be passed into your breast milk, breastfeeding may pose some risk for a nursing infant.

However, a number of research studies show that certain antidepressants, such as some of the SSRIs (see box at right) have been used relatively safely during breastfeeding. You should discuss with your doctor whether breastfeeding is an option or whether you should plan to feed your baby formula. Although breastfeeding has some advantages for your baby, most importantly, as a mother, you need to stay healthy so you can take care of your baby.

Before taking medication for an anxiety disorder:

- Ask your doctor to tell you about the effects and side effects of the drug.
- Tell your doctor about any alternative therapies or over-the-counter medications you are using.
- Ask your doctor when and how the medication should be stopped. Some drugs can't be stopped abruptly but must be tapered off slowly under a doctor's supervision.
- Work with your doctor to determine which medication is right for you and what dosage is best.
- Be aware that some medications are effective only if they are taken regularly and that symptoms may come back if the medication is stopped.

What are SSRIs?

Selective serotonin reuptake inhibitors (SSRIs) are a kind of antidepressant for treating depression and anxiety disorders.

Q: Is it safe for young adults to take antidepressants?

A: It may be safe for young people to be treated with antidepressants. However, drug companies who make antidepressants are required to post a "black box" warning label on the medication. A "black box" warning is the most serious type of warning on prescription drugs.

It may be possible that antidepressants

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make children, adolescents, and young adults more likely to think about suicide or commit suicide. In 2007, the FDA said that makers of all antidepressant medications should extend the warning to include young adults up through age 24.

The warning says that patients of all ages taking antidepressants should be watched closely, especially during the first weeks of treatment. Possible side effects to look for are worsening depression, suicidal thinking or behavior, or any unusual changes in behavior such as sleeplessness, agitation, or withdrawal from normal social situations. Families and caregivers should pay close attention to the patient, and report any changes in behavior to the patient's doctor. The latest information from the FDA can be found on their Web site at http://www.fda.gov.

Q: Can I take St. John's wort to treat depression?

A: St. John's wort is a plant with yellow flowers that has been used for centuries for health purposes, including depression and anxiety. However, research studies from the National Institutes of Health found that St. John's wort was not effective in treating major depression.

Other research shows that St. John's wort can make some medicines not work or that it can cause dangerous side effects. The herb appears to interfere with certain drugs used to treat heart disease, HIV, depression, seizures, certain cancers, and organ transplant rejection. The herb may also make birth control pills not work as well. Because of this, people should always consult their doctors before taking any herbal supplement.

St. John's wort is not a proven therapy for depression. If depression is not treated the right way, it can become severe and, in some cases, may be linked with suicide.

Q: How can I help myself if I am depressed?

A: You may feel exhausted, helpless, and hopeless. It may be very hard to do anything to help yourself. But it is important to realize that these feelings are part of the depression and do not reflect real life. As you understand your depression and begin treatment, negative thinking will fade. In the meantime:

- Engage in mild activity or exercise. Go to a movie, a ballgame, or another event or activity that you once enjoyed. Participate in religious, social, or other activities.

  ⋆ Set realistic goals for yourself.
- Break up large tasks into small ones, set some priorities and do what you can as you can.
- Try to spend time with other people and confide in a trusted friend or relative. Try not to isolate yourself, and let others help you.
- Expect your mood to improve gradually, not immediately. Do not expect to suddenly "snap out of" your depression. Often during treatment for depression, sleep and appetite will begin to improve before your depressed mood lifts.
- Postpone important decisions, such as getting married or divorced or changing jobs, until you feel better. Discuss decisions with others who know you well and have a more objective view of your situation.
- Be confident that positive thinking will replace negative thoughts as your depression responds to treatment. ■

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For more information

For more information on depression, call womenshealth.gov at 1-800-994-9662 or contact the following organizations:

National Institute of Mental Health
Phone Number: (866) 615-6464
Internet Address: http://www.nimh.nih.gov

National Suicide Prevention Lifeline
Phone Number: (800) 273-TALK (8255)
Internet Address: http://www.suicidepreventionlifeline.org

Kristin Brooks Hope Center
Phone Number: (800) SUICIDE (784-2433)
Internet Address: http://www.hopeline.com/

National Mental Health Information Center, SAMHSA, HHS
Phone Number: (800) 789-2647
Internet Address: http://mentalhealth.samhsa.gov/

Depression and Bipolar Support Alliance
Phone Number: (800) 826-3632
Internet Address: http://www.dbsalliance.org/

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AIDSinfo

FACT SHEETS

HIV and Pregnancy

HIV Testing and Pregnancy
Mother-to-Child Transmission of HIV
Anti-HIV Medications for Use in Pregnancy
Safety of Anti-HIV Medications During Pregnancy
Preventing Transmission of HIV During Labor and Delivery
Women Infected with HIV and Their Babies After Birth

Telephone: 1-800-448-0440
International: 1-301-315-2816
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Web: http://aidsinfo.nih.gov

HIV and Pregnancy

These fact sheets on HIV and pregnancy are intended for women infected with HIV who are pregnant or thinking about becoming pregnant. The fact sheets include information to help women infected with HIV stay healthy during pregnancy and reduce the risk of transmitting HIV to their babies.

The information in these fact sheets is based on the *Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health* and *Interventions to Reduce Perinatal HIV Transmission in the United States*. The Guidelines are developed by the U.S. Department of Health and Human Services (HHS) Panel on Treatment of HIV-Infected Pregnant Women and Prevention of Perinatal Transmission, a working group of the Office of AIDS Research Advisory Council (OARAC). The Guidelines are updated according to the latest advances in the management of HIV in pregnant women and the prevention of mother-to-child transmission of HIV. The current Guidelines are available on the AIDS*info* website at http://aidsinfo.nih.gov/guidelines.

These fact sheets are not intended as a substitute for the expert advice and care of medical professionals. For individualized treatment, pregnant women infected with HIV should consult with a health care provider experienced in managing HIV during pregnancy.

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HIV Testing and Pregnancy

I am pregnant. Will I be tested for HIV?

HIV testing is recommended for all pregnant women. HIV testing is provided to pregnant women in two ways: *opt-in* or *opt-out testing*. In areas with *opt-in testing*, women may be offered HIV testing. Women who accept testing will need to sign an HIV testing consent form. In areas with *opt-out testing*, HIV testing is automatically included as part of routine prenatal care. With *opt-out testing*, women must specifically ask **not** to be tested and sign a form refusing HIV testing. The Centers for Disease Control and Prevention (CDC) recommends that *opt-out testing* be provided to all pregnant women.

Ask your health care provider about HIV testing in your area. If HIV *opt-out testing* is not available, ask to be tested for HIV.

What are the benefits of HIV testing for pregnant women?

A mother who knows early in her pregnancy that she is HIV infected has more time to make important decisions. She and her health care provider will have more time to decide on effective ways to protect her health and prevent **mother-to-child transmission of HIV**. She can also take steps to prevent passing HIV to her partner. (See the Preventing HIV Transmission fact sheet.)

How will I be tested for HIV?

The most common HIV test is the **HIV antibody test**. HIV antibodies are a type of protein the body produces in response to HIV infection. An HIV antibody test looks for HIV antibodies in a person's blood, urine, or fluids from the mouth. When a person has a positive result from an HIV antibody test, a second and different type of antibody test is done to confirm that the person is indeed infected with HIV. The second test is called a confirmatory HIV test. To be diagnosed with HIV, a person's confirmatory HIV test must also be positive. (For more information, see the Testing for HIV fact sheet.)

Getting results from an HIV antibody blood test generally takes only a few days. (Results from some tests that use fluids from the mouth are ready within an hour.) Getting results from a confirmatory HIV test can take longer—from a few days to a few weeks after the test. People generally receive their results during a follow-up visit with a health care provider. It is important to keep your appointment for your HIV test results.

Terms Used in This Fact Sheet:

Mother-to-child transmission of HIV: the passing of HIV from a woman infected with HIV to her baby during pregnancy, during labor and delivery, or by breastfeeding.

HIV antibody test: an HIV test that checks for HIV antibodies in a person's blood, urine, or fluids from the mouth. When the body is infected with HIV, the immune system (the system of the body that fights off infections) produces HIV antibodies.

Pregnant women who test positive for HIV have many options to stay healthy and protect their babies from becoming HIV infected. Health care providers recommend that women infected with HIV take anti-HIV medications to prevent mother-to-child transmission of HIV and, if needed, for their own health.

If you are diagnosed with HIV, your health care provider will answer your questions about HIV and discuss ways to help you and your baby stay healthy. Together you can make decisions about HIV care during your pregnancy.

What happens if I ask not to be tested for HIV?

You will not be tested for HIV. However, your health care provider will likely re-emphasize the importance of HIV testing. You may be offered counseling on how HIV is spread and ways to prevent HIV transmission. Throughout your pregnancy, your health care provider may encourage you to reconsider your decision not to be tested.

Where can I find information on HIV testing in my state?

The U.S. Department of Health and Human Services (HHS) offers information on HIV testing for each state. Contact HHS at 1–877–696–6775 or 1–202–619–0257. You can also find information on your state health department website.

For more information:

Contact an AIDS*info* health information specialist at 1–800–448–0440 or visit http://aidsinfo.nih.gov. See your health care provider for medical advice.

This information is based on the U.S. Department of Health and Human Services' *Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health* and *Interventions to Reduce Perinatal HIV Transmission in the United States* (available at http://aidsinfo.nih.gov/guidelines).

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Mother-to-Child Transmission of HIV

How is HIV transmitted?

HIV is transmitted (passed) from one person to another through specific body fluids—blood, semen, genital fluids, and breast milk. Having **unprotected sex** or sharing needles with a person infected with HIV are the most common ways HIV is transmitted.

Mother-to-child transmission of HIV is when a woman infected with HIV transmits HIV to her baby during pregnancy, during labor and delivery, or by breastfeeding. Because HIV can be transmitted through breast milk, women infected with HIV should not breastfeed their babies. In the United States, baby formula is a safe and healthy alternative to breast milk.

Although the risk is very low, HIV can also be transmitted to a baby through food that was previously chewed (pre-chewed) by a mother or caretaker infected with HIV. To be safe, babies should not be fed pre-chewed food.

HIV ***cannot*** be transmitted through casual contact, such as hugging and closed-mouth kissing. HIV also ***cannot*** be transmitted by items such as toilet seats, door knobs, or dishes used by a person infected with HIV.

When are anti-HIV medications used to prevent mother-to-child transmission of HIV?

Anti-HIV medications are used at the following times to reduce the risk of mother-to-child transmission of HIV:

- *During pregnancy*, pregnant women infected with HIV receive a **regimen** (combination) of at least three different anti-HIV medications.
- *During labor and delivery*, pregnant women infected with HIV receive **intravenous (IV) AZT** and continue to take the medications in their regimens by mouth.
- *After birth*, babies born to women infected with HIV receive liquid AZT for 6 weeks. (Babies of mothers who did not receive anti-HIV medications during pregnancy may be given other anti-HIV medications in addition to AZT.)

In addition to taking anti-HIV medications to reduce the risk of mother-to-child transmission of HIV, a pregnant woman infected with HIV may also need anti-HIV medications ***for her own health***. Some women may already be on a regimen before becoming pregnant. However, because during pregnancy some anti-HIV medications may not be safe to use or may be absorbed differently by the body, the medications in a woman's regimen may change.

Terms Used in This Fact Sheet:

Unprotected sex: sex without using a condom.

Mother-to-child transmission of HIV: the passing of HIV from a woman infected with HIV to her baby during pregnancy, during labor and delivery, or by breastfeeding.

Regimen: Anti-HIV medications are grouped into "classes" according to how they fight HIV. A regimen is a combination of three or more anti-HIV medications from at least two different classes.

Intravenous (IV): to give a medication through a needle directly into a vein.

AZT: an anti-HIV medication in the nucleoside reverse transcriptase inhibitor (NRTI) class. AZT is also called zidovudine, Retrovir, or ZDV.

Placenta (also called the afterbirth): tissue that develops within the mother's uterus during pregnancy to provide the baby with oxygen and nutrition.

How do anti-HIV medications help prevent mother-to-child transmission of HIV?

Taking anti-HIV medications during pregnancy reduces the amount of HIV in an infected mother's body. Having less HIV in the body reduces the risk of mother-to-child transmission of HIV.

Some anti-HIV medications also pass from the pregnant mother to her unborn baby through the **placenta** (also called the **afterbirth**). The anti-HIV medication in the baby's body helps protect the baby from HIV infection. This is especially important during delivery when the baby may be exposed to HIV in the mother's genital fluids or blood.

After birth, babies born to women infected with HIV receive anti-HIV medication. The medication reduces the risk of infection from HIV that may have entered the babies' bodies during delivery.

For information on what anti-HIV medications to take during pregnancy, see the Anti-HIV Medications for Use in Pregnancy fact sheet.

For more information:

Contact an AIDS*info* health information specialist at 1–800–448–0440 or visit http://aidsinfo.nih.gov. See your health care provider for medical advice.

This information is based on the U.S. Department of Health and Human Services' *Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health* and *Interventions to Reduce Perinatal HIV Transmission in the United States* (available at http://aidsinfo.nih.gov/guidelines).

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Anti-HIV Medications for Use in Pregnancy

I am HIV infected and pregnant. When should I start taking anti-HIV medications?

When to start taking anti-HIV medications depends on your health, how much HIV has affected your body, and how far along you are in your pregnancy. In general, people infected with HIV who are not pregnant begin taking anti-HIV medications when their **CD4 counts** fall below 500 cells/mm^3 or if they develop certain other infections. (See the When to Start Anti-HIV Medications fact sheet.) Pregnant women infected with HIV must also consider whether they need anti-HIV medications for their own health or only to prevent **mother-to-child transmission of HIV**.

Women who need anti-HIV medications ***for their own health***:

- may be taking anti-HIV medications before becoming pregnant; or
- may start taking anti-HIV medications when they become pregnant.

Women who need anti-HIV medications only to prevent mother-to-child transmission of HIV can consider waiting until after the first trimester of pregnancy to take anti-HIV medications. However, starting medications earlier may be more effective at reducing the risk of mother-to-child transmission of HIV.

All pregnant women infected with HIV should be taking anti-HIV medications by the second trimester of pregnancy. Women diagnosed with HIV later in pregnancy should start taking anti-HIV medications as soon as possible.

What anti-HIV medications should I use during my pregnancy?

All pregnant women infected with HIV should take a **regimen** (combination) of at least three anti-HIV medications. However, the specific medications in your regimen will depend on your individual needs. To select a regimen, your health care provider will review your medical history and order blood tests to assess your health and the stage of your HIV infection. Your health care provider will also consider:

- why you need anti-HIV medications—for your own health or only to prevent transmitting HIV to your baby;
- changes in how your body may absorb medications during pregnancy; and
- the potential of anti-HIV medications to harm your baby or cause birth defects.

I am currently taking anti-HIV medications and just learned I'm pregnant. What should I do?

Continue taking your anti-HIV medications until you talk to your health care provider. Stopping treatment could harm both you and your baby.

If you are in the first trimester of pregnancy, tell your health care provider right away if you are taking **Sustiva** (or **Atripla**, an anti-HIV medication that contains Sustiva). Sustiva alone or in Atripla may cause birth defects that develop during the first few months of pregnancy. Your health care provider may recommend safe alternatives for these medications. After the first trimester, Sustiva or Atripla can be used safely.

Terms Used in This Fact Sheet:

CD4 count: CD4 cells, also called T cells or CD4+ T cells, are white blood cells that fight infection. HIV destroys CD4 cells, making it harder for the body to fight infections. A CD4 count is the number of CD4 cells in a sample of blood. A CD4 count measures how well your immune system is working.

Mother-to-child transmission of HIV: the passing of HIV from a woman infected with HIV to her baby during pregnancy, during labor and delivery, or by breastfeeding.

Regimen: Anti-HIV medications are grouped into "classes" according to how they fight HIV. A regimen is a combination of three or more anti-HIV medications from at least two different classes.

Sustiva: an anti-HIV medication in the NNRTI class. Sustiva is also called efavirenz or EFV.

Atripla: a combination of three anti-HIV medications in one pill—Sustiva (also called efavirenz or EFV), Emtriva (also called emtricitabine or FTC), and Viread (also called tenofovir or TDF).

Viral load: the amount of HIV in a sample of blood. Viral load measures how much virus you have in your body and how well anti-HIV medications are controlling the infection.

Drug-resistance testing: a blood test to identify which, if any, antiretroviral (ARV) drugs will not be effective against a person's specific strain of HIV. Resistance testing is done using a sample of blood.

This information is based on the U.S. Department of Health and Human Services' *Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health* and *Interventions to Reduce Perinatal HIV Transmission in the United States* (available at http://aidsinfo.nih.gov/guidelines).

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Talk to your health care provider about the anti-HIV medications in your regimen. Because pregnancy can affect how the body absorbs medications, the doses of some medications you take may change later in pregnancy.

If you are taking anti-HIV medications and your **viral load** is more than 500 copies/mL, your current regimen may not be effective at suppressing HIV. Your health care provider will recommend a test to see if the medications are still working against HIV (**drug-resistance testing**) and use the test results to find more effective anti-HIV medications.

I used to take anti-HIV medications, but I don't anymore. What should I do?

Talk to your health care provider about all anti-HIV medications you have used, the results of past drug-resistance testing, and why you no longer take anti-HIV medications. Your medical history, past drug-resistance test results, and additional drug-resistance testing will help you and your health care provider select a new regimen that is safe for use during pregnancy.

Whether you were on anti-HIV medications before becoming pregnant or are just starting a regimen, your health care provider will:

- explain the risks and benefits of using anti-HIV medications during pregnancy;
- stress the importance of taking anti-HIV medications exactly as directed; and
- arrange for additional medical or social support you may need to help you have a healthy pregnancy.

For more information:

Contact an AIDS*info* health information specialist at 1–800–448–0440 or visit http://aidsinfo.nih.gov. See your health care provider for medical advice.

This information is based on the U.S. Department of Health and Human Services' *Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health* and *Interventions to Reduce Perinatal HIV Transmission in the United States* (available at http://aidsinfo.nih.gov/guidelines).

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Safety of Anti-HIV Medications During Pregnancy

I am HIV infected and pregnant. Is it safe to use anti-HIV medications during my pregnancy?

Women infected with HIV can safely use many anti-HIV medications during pregnancy to protect their health and to prevent transmitting HIV to their babies. However, some anti-HIV medications can cause problems when used during pregnancy. Knowing more about the safety of anti-HIV medications and pregnancy will help you and your health care provider decide what medications are right for you.

Is my baby at risk from anti-HIV medications I take during pregnancy?

It's not known if babies will have any long-term effects from the anti-HIV medications their mothers use during pregnancy. However, the risk of **mother-to-child transmission of HIV** is known. And the illness that results when HIV infection is passed from a mother to her child is very real. Because anti-HIV medications can greatly reduce the risk of passing HIV infection from a mother to her child during pregnancy, all pregnant women infected with HIV should take anti-HIV medications.

Information on the use of anti-HIV medications during pregnancy is limited. But enough information is known to make recommendations about the safety of the most commonly used medications from the three most commonly used classes of anti-HIV medications—**protease inhibitors (PIs)**, **non-nucleoside reverse transcriptase inhibitors (NNRTIs)**, and **nucleoside reverse transcriptase inhibitors (NRTIs)**. (Not enough information is known to make recommendations about use during pregnancy of **entry inhibitors** and **integrase inhibitors**, two additional classes of anti-HIV medications.)

Protease inhibitors (PIs)

There may be a link between the use of some PIs and high blood sugar (**hyperglycemia**) or **diabetes**. For some women, the risk of hyperglycemia increases in pregnancy. It is unclear if taking PIs adds to this risk. Talk to your health care provider about the use of PIs during pregnancy and about when to have blood tests to check for hyperglycemia or diabetes.

Non-nucleoside reverse transcriptase inhibitors (NNRTIs)

Two NNRTIs, **Sustiva** and **Viramune**, should be used in pregnant women only under certain conditions.

- Sustiva may cause birth defects that develop during the first few months of pregnancy. Therefore, if possible, use of Sustiva should be avoided in the first trimester of pregnancy. **Atripla**, a combination pill that contains Sustiva,

Terms Used in This Fact Sheet:

Mother-to-child transmission of HIV: the passing of HIV from a woman infected with HIV to her baby during pregnancy, during labor and delivery, or by breastfeeding.

Protease inhibitor (PI): a class of anti-HIV medications. PIs block HIV protease, an enzyme HIV needs to make copies of itself.

Non-nucleoside reverse transcriptase inhibitor (NNRTI): a class of anti-HIV medications. NNRTIs bind to and alter reverse transcriptase, an enzyme HIV needs to make copies of itself.

Nucleoside reverse transcriptase inhibitor (NRTI): a class of anti-HIV medications. NRTIs block reverse transcriptase, an enzyme HIV needs to make copies of itself.

Entry inhibitor: a class of anti-HIV medications. Entry inhibitors block CCR5 , a protein on the CD4 cells that HIV needs to enter the cells.

Integrase inhibitor: a class of anti-HIV medications. Integrase inhibitors work by blocking HIV integrase, a protein HIV needs to make copies of itself.

Hyperglycemia: too much glucose (sugar) in the blood.

Diabetes (also known as diabetes mellitus): high levels of glucose (sugar) in the blood.

Sustiva: an anti-HIV medication in the NNRTI class. Sustiva is also called efavirenz or EFV.

Viramune: an anti-HIV medication in the NNRTI class. Viramune is also called nevirapine or NVP.

Atripla: a combination of three anti-HIV medications in one pill—Sustiva (also called efavirenz or EFV), Emtriva (also called emtricitabine or FTC), and Viread (also called tenofovir or TDF).

CD4 count: CD4 cells, also called T cells or CD4+ T cells, are white blood cells that fight infection. HIV destroys CD4 cells, making it harder for the body to fight infections. A CD4 count is the number of CD4 cells in a sample of blood. A CD4 count measures how well your immune system is working.

Lactic acidosis: a condition caused by too much lactic acid in the blood.

Zerit: an anti-HIV medication in the NRTI class. Zerit is also called stavudine or d4T.

Videx: an anti-HIV medication in the NRTI class. Videx is also called didanosine or ddI.

This information is based on the U.S. Department of Health and Human Services' *Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health* and *Interventions to Reduce Perinatal HIV Transmission in the United States* (available at http://aidsinfo.nih.gov/guidelines).

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should also be avoided in the first trimester of pregnancy. After the first trimester, Sustiva or Atripla can be used safely.

- Viramune increases the risk of very serious liver damage in women with **CD4 counts** greater than 250 cells/mm^3. Viramune should only be started in pregnant women with CD4 counts higher than 250 cells/mm^3 if the benefits very clearly outweigh the risks. Women who begin using Viramune during pregnancy are carefully monitored for early signs of liver damage. Women taking Viramune without problems before they become pregnant can safely continue to take the medication. Liver damage from Viramune use in pregnancy has not been seen in women already taking the medication without side effects.

Nucleoside reverse transcriptase inhibitors (NRTIs)

Using NRTIs can sometimes lead to **lactic acidosis**, a condition caused by the buildup of a specific acid in the blood. Women should not take the combination of **Zerit** and **Videx** during pregnancy because the combination has caused deaths from lactic acidosis and liver failure. Women taking NRTIs during pregnancy are watched carefully for signs of lactic acidosis.

Talk to your health care provider about the safety of anti-HIV medications during pregnancy. There are many anti-HIV medications to choose from that will keep you and your baby healthy.

For more information:

Contact an AIDS*info* health information specialist at 1–800–448–0440 or visit http://aidsinfo.nih.gov. See your health care provider for medical advice.

This information is based on the U.S. Department of Health and Human Services' *Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health* and *Interventions to Reduce Perinatal HIV Transmission in the United States* (available at http://aidsinfo.nih.gov/guidelines).

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Preventing Transmission of HIV During Labor and Delivery

I am HIV infected and pregnant. Will I need anti-HIV medications during labor and delivery?

Women infected with HIV take anti-HIV medications during labor and delivery to reduce the risk of **mother-to-child transmission of HIV**. (See the Mother-to-Child Transmission of HIV fact sheet.) During labor and delivery, women continue to take the anti-HIV medications they took throughout their pregnancies. They also receive an anti-HIV medication called **AZT intravenously** to protect their babies from HIV in the mother's genital fluids or blood during labor and delivery.

Talk to your health care provider about the use of anti-HIV medications during labor and delivery well before your due date.

Will I have a vaginal or a cesarean delivery?

The risk of mother-to-child transmission of HIV is low for women who take anti-HIV medications during pregnancy and have a **viral load** less than 1,000 copies/mL near the time of delivery.

For some HIV-infected mothers, a scheduled **cesarean delivery** (also called a **C-section**) at 38 weeks of pregnancy (2 weeks before the due date) can reduce the risk of mother-to-child transmission of HIV. A scheduled cesarean delivery is recommended for HIV-infected women who:

- have not received anti-HIV medications during pregnancy;
- have a viral load greater than 1,000 copies/mL or an unknown viral load near the time of delivery.

If, before her scheduled cesarean delivery, a woman's water breaks (also called **rupture of membranes**) or she goes into labor, a cesarean delivery may not reduce the risk of mother-to-child transmission of HIV. If there is not another pregnancy-related reason to have a cesarean delivery, the risks of going ahead with the scheduled cesarean delivery may be greater than the benefits. Depending on an individual woman's situation, a vaginal delivery may be the best alternative to a planned cesarean delivery.

What are the risks of delivery?

All deliveries have risks—even for mothers without HIV infection. In general, a cesarean delivery has greater risks than a vaginal delivery.

Terms Used in This Fact Sheet:

Mother-to-child transmission of HIV: the passing of HIV from a woman infected with HIV to her baby during pregnancy, during labor and delivery, or by breastfeeding.

AZT: an anti-HIV medication in the nucleoside reverse transcriptase inhibitor (NRTI) class. AZT is also called zidovudine, Retrovir, or ZDV.

Intravenously: giving a medication directly into a vein through a needle.

Viral load: the amount of HIV in a sample of blood.

Cesarean delivery (C-section): delivery of a baby by a surgical incision through the mother's abdominal wall and uterus.

Rupture of membranes: when the amniotic sac ("bag of waters") holding the unborn baby bursts. Also called "water breaking."

For the mother, the risk of infection or a blood clot in the legs or lungs is greater with a cesarean delivery than with a vaginal delivery. All women who have a cesarean delivery, including women infected with HIV, should receive antibiotics to prevent infection. For the infant, the risk of temporary breathing difficulties may be greater with a cesarean delivery.

Talk to your health care provider about the risks and benefits of each type of delivery early in your pregnancy.

For more information:

Contact an AIDS*info* health information specialist at 1–800–448–0440 or visit http://aidsinfo.nih.gov. See your health care provider for medical advice.

This information is based on the U.S. Department of Health and Human Services' *Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health* and *Interventions to Reduce Perinatal HIV Transmission in the United States* (available at http://aidsinfo.nih.gov/guidelines).

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Women Infected with HIV and Their Babies After Birth

I am HIV infected and pregnant. What are the chances my baby will be born with HIV?

In the United States and Europe, fewer than 2 babies in 100 born to mothers infected with HIV are infected with the virus. This is because most women infected with HIV and their babies receive anti-HIV medications to prevent **mother-to-child transmission of HIV** and do not breastfeed. If you take anti-HIV medications during pregnancy and labor and delivery, if your baby receives anti-HIV medications after birth, and if you do not breastfeed your baby, the risk of passing HIV to your baby is very low.

Will my newborn baby receive anti-HIV medications?

Yes. Within 6 to 12 hours after delivery, babies born to women infected with HIV receive an anti-HIV medication called AZT. AZT helps prevent mother-to-child transmission of HIV. The babies receive AZT for 6 weeks. (In certain situations, some babies may receive other anti-HIV medications in addition to AZT.)

When will my baby be tested for HIV?

HIV testing for babies born to women with known HIV infection is recommended at 14 to 21 days, at 1 to 2 months, and again at 4 to 6 months. Testing for babies is done using a **virologic HIV test**. Virologic HIV tests look directly for the presence of HIV in the blood.

- To be ***diagnosed with HIV***, a baby must have ***positive results from two virologic HIV tests***.
- To know for certain that a baby is ***not infected*** with HIV, the baby must have ***two negative virologic HIV tests***, the first at 1 month of age or older, and the second at least 1 month later.

Babies who are HIV-infected receive a combination of anti-HIV medications to treat HIV. At 4 to 6 weeks of age, babies infected with HIV also start a medication called **Bactrim**. (Bactrim is also given as a precaution when it's not known if a baby is HIV infected or not.) Bactrim helps prevent ***Pneumocystis jiroveci*** **pneumonia (PCP)**, a type of pneumonia that can develop in people with advanced HIV.

What is the best way to feed my baby?

Because HIV can be transmitted through breast milk, women infected with HIV who live in the United States should not breastfeed. In the United States, infant formula is a safe and healthy alternative to breast milk. Although the risk is very low, HIV can be transmitted to a baby through food that was previously chewed (pre-chewed) by a mother or caretaker infected with HIV. To be safe, babies should not be fed pre-chewed food.

Terms Used in This Fact Sheet:

Mother-to-child transmission of HIV: the passing of HIV from a woman infected with HIV to her baby during pregnancy, during labor and delivery, or by breastfeeding.

AZT: an anti-HIV medication in the nucleoside reverse transcriptase inhibitor (NRTI) class. AZT is also called zidovudine, Retrovir, or ZDV.

Virologic HIV test: a laboratory test that measures the amount of HIV in a sample of blood.

Bactrim: an antibiotic used to prevent and treat infection with *Pneumocystis jirovecii* pneumonia (PCP). Bactrim is also called Septra, Sulfatrim, Sulfamethoxazole/Trimethoprim, or TMP-SMX.

Pneumocystis jiroveci **pneumonia (PCP):** a lung infection caused by a fungus that occurs in people with weakened immune systems.

Regimen: Anti-HIV medications are grouped into "classes" according to how they fight HIV. A regimen is a combination of three or more anti-HIV medications from at least two different classes

CD4 count: CD4 cells, also called T cells or CD4+ T cells, are white blood cells that fight infection. HIV destroys CD4 cells, making it harder for the body to fight infections. A CD4 count is the number of CD4 cells in a sample of blood. A CD4 count measures how well the immune system is working.

Viral load: the amount of HIV in the blood.

Will my anti-HIV medications change after I give birth?

After your baby is born, you and your health care provider may decide to stop or change your anti-HIV **regimen**. The decision to continue, change, or stop your anti-HIV medications will depend on several factors:

- current expert recommendations on the use of anti-HIV medications

This information is based on the U.S. Department of Health and Human Services' *Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health* and *Interventions to Reduce Perinatal HIV Transmission in the United States* (available at http://aidsinfo.nih.gov/guidelines).

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- your **CD4 count** and **viral load**
- issues that make it hard to take medications exactly as directed
- whether or not your partner is infected with HIV
- the preferences of you and your health care provider

Don't stop taking any of your anti-HIV medications without first talking to your health care provider. Stopping your medications may limit the number of anti-HIV medications that will work for you and may cause your HIV infection to worsen.

Having a new baby is exciting! However, caring for a new baby while dealing with the physical and emotional changes that follow childbirth can be stressful. It may be difficult to take your anti-HIV medications exactly as directed. If you feel sad or overwhelmed or have concerns about taking your medications, talk to your health care provider. Together you can make a plan to keep you and your baby healthy.

For more information:

Contact an AIDS*info* health information specialist at 1–800–448–0440 or visit http://aidsinfo.nih.gov. See your health care provider for medical advice.

This information is based on the U.S. Department of Health and Human Services' *Recommendations for Use of Antiretroviral Drugs in Pregnant HIV-1-Infected Women for Maternal Health* and *Interventions to Reduce Perinatal HIV Transmission in the United States* (available at http://aidsinfo.nih.gov/guidelines).

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The umbilical cord: a rich and ethical stem cell source to advance regenerative medicine

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Abstract

Science and medicine place a lot of hope in the development of stem cell research and regenerative medicine. This review will define the concept of regenerative medicine and focus on an abundant stem cell source – neonatal tissues such as the umbilical cord. Umbilical cord blood has been used clinically for over 20 years as a cell source for haematopoietic stem cell transplantation. Beyond this, cord blood and umbilical cord-derived stem cells have demonstrated potential for pluripotent lineage differentiation (liver, pancreatic, neural tissues and more) *in vitro* and *in vivo*. This promising research has opened up a new era for utilization of neonatal stem cells, now used beyond haematology in clinical trials for autoimmune disorders, cerebral palsy or type I diabetes.

Introduction

'Stem cells'; never in the history of science and medicine have two words sparked off so much interest, passion, controversy and hope from the scientific, medical, public, ethical, religious, political and commercial communities. It is, however, important to state clearly that despite many significant clinical achievements and great promises, stem cells are not the sole means to cure all diseases. Biomedical research and future treatments will always rely on innovation in medicine, surgery, technology and/or pharmaceutical developments.

This review will outline concepts surrounding stem cell applications and regenerative medicine and focus particularly on a fascinating and abundant stem cell source – the umbilical cord. This tissue physiologically supports development of the child throughout foetal life until birth, and can further be used for biomedical research and clinical applications.

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Regenerative medicine

The advancement of science, medicine and surgery has helped mankind improve global health, albeit with significant disparities in accessing healthcare worldwide between developed and emerging countries, but many definitions have been proposed for the term 'regenerative medicine' (1–3). Kaiser, a health economist forecasting future medical technologies, first presented this concept in 1992 as an attempt to alleviate chronic diseases and restore damaged and failing organs (4).

With the development of immunosuppressive regimens, transplantation medicine and surgery in the 20th century and now the 21st, have enabled treatment of patients who would have had no therapeutic alternatives. However, shortage of donor organs increased significantly with clinical demand.

Taking liver as an example, it is estimated that 70% of patients awaiting liver transplantation in European Union countries will never find a donor. This persistent shortage of liver donors has led to mortality rate of 20% per year from the waiting list (5).

Our modern lifestyles have also increased prevalence of diabetes (type I and II) and cardiovascular diseases, which both cause major complications (stroke, kidney failure and more), and in the USA alone account for annual health care costs as high as 174 billion dollars and 475 billion dollars, respectively (source: USA National Institute of Health).

These challenges represent opportunities for the field of regenerative medicine. This aims to gather different scientific specialties and technologies to restore impaired functions in tissues and organs that have been damaged by illnesses, accidents or even by treatments.

Innovation and research in nanotechnologies, biomaterials, tissue engineering, bio-imaging, cells and stem

cells are key to the advance of regenerative medicine, as demonstrated with recent case studies and clinical trials. For instance, in 2006, Atala and colleagues isolated cells from patients with bladder dysfunction and cultured each patient's own (autologous) cells on bioscaffolds in the shape of a bladder, in the laboratory. These artificially engineered bladders were later successfully re-implanted into the patients and restored their function (6). More recently, Macchiani and colleagues of an international consortium transplanted a young adult in Spain with a tissue engineered trachea segment. The donor trachea was made acellular and seeded with the recipient's own epithelial cells and mesenchymal stem cell-derived chondrocytes that had been cultured *in vitro* (7,8). This technique was repeated for a child using a longer trachea segment in 2010 in the United Kingdom. So far, no complications have been reported as donor tracheas were decellularized and further reconstructed using the patient's own cells. No rejection nor immune complication has been reported. At the time of writing, both patients are leading a normal life without immunosuppression (18 months and 5 months post-transplantation, respectively).

Such exciting and safe clinical cases of modern regenerative medicine illustrate the need for interdisciplinary research and understanding the full potential of stem cells for clinical applications.

Stem cells

Stem cells are defined by their capacity to divide and produce (at least one) identical stem cell (self-renewal) and for one to undergo lineage differentiation (9). Depending on potency of stem cells to produce one or more lineages, they can be identified as totipotent (for example the zygote, the only mammalian cell capable of producing all cells and tissues of an organism), pluripotent (with capacity to produce cells and tissues from all three germ layers – ectoderm, mesoderm and endoderm), multipotent (capacity to produce more than one cell lineage) or unipotent (differentiation into a single cell phenotype).

Early in the 1900s, Maximow was the first to propose that lymphocytes acted as common *stem cells* and migrated through tissues to form blood circulation components (10), but the 1960s shaped the true beginning of stem cell research as we know it today. Research by Till and McCulloch (11) and by Goodman and Hodgson (12) demonstrated in mice, that the bone marrow hosted stem cells, from which clonogenic precursors could be derived and could restore haematopoiesis in irradiated animals. This work simultaneously evolved with the advent of human stem cell transplantation for bone marrow replacement (13). At the same time, research by Edwards and colleagues generated the first embryonic stem cell lines in rabbits (14), which much later advanced into the development of the first human embryonic stem cell line (15). Stem cells today can also be categorized according to the source of tissues from which they originate.

Embryonic stem cells

Human embryonic stem cells (ESC) are derived *in vitro* from the blastocyst of an embryo usually left over from *in vitro* fertilization. ESC are cell lines derived from the embryoblast of early embryo at the blastocyst stage. They proliferate *in vitro* while maintaining an undifferentiated state, and are capable of differentiating into many specialized somatic cell types under appropriate conditions (pluripotency). Much fascination and controversy has fuelled the world of biomedical research since derivation of the first human embryonic stem cell lines, as it induces destruction of a human embryo. However, beyond ethical objections raised by research on human ESCs, significant technical hurdles have slowed their progress towards clinical application, not least their immunogenic status, spontaneous formation of teratocarcinomas upon transplantation and genetic/genomic instability in cell culture systems during scale-up (16).

Adult stem cells

Adult or somatic stem cells can be isolated from specific adult human tissues (brain, skin, gut, bone marrow, fat, cornea and more). They have limited ability to regenerate damaged tissues physiologically. Although their differentiation potency is considered to be less than ESC by some scientists, their isolation, characterization and translation to pre-clinical and clinical studies have increased during the past two decades, not least in the field of haemato/immunotherapies, but also recently for certain cardiovascular indications (17), wound healing (18,19), corneal repair (20) or even although less advanced, for multiple sclerosis (21). Beyond tissue-specific stem cells, mesenchymal stem cells (MSCs) were first characterized as a specific bone marrow-derived fibroblast-like adherent cell population with potential and capacity to support haematopoiesis (22,23). Further studies demonstrated their potential to differentiate initially into three specific lineages: osteocytic, chrondrocytic and adipose lineages and later on into many endodermal, mesodermal and ectodermal tissues (24,25).

Different adult tissues have been proposed as sources for MSCs: bone marrow, adipose tissues, synovium, dental pulp and more. Clonogenic assays and putative markers have also been proposed for MSCs, the biology of which is becoming better understood and standardized (26).

Induced pluripotent stem cells

The recent discovery of induced pluripotent stem cells (IPS), by the initial work of Yamanaka and colleagues first in mice then in humans, has circumvented to a certain extent some ethical and scientific limitations of ESC research (27). This technique consists of using somatic terminally differentiated cells and inducing expression of a number of genes therein, to produce stable lines of embryonic-like pluripotent stem cells. This technique offers the interesting possibility of creating patient-specific stem cell lines for research, and perhaps one day, diagnostic applications without the controversial use/destruction of human embryos. However, its significance for relevant clinical applications remains unknown as yet, mostly because of the low efficiency of such induced gene expression. New techniques are being investigated to generate IPS cells with minimal or no exogenous genetic modifications (28).

Neonatal stem cells

Our group previously proposed a distinct category of somatic stem cells called 'neonatal' stem cells, derived from various biological tissues often considered as biological waste after birth, rather than biological resources, namely amniotic fluid, placenta, umbilical cord and cord blood (29,30). With over 135 million births per year worldwide (source: USA Central Intelligence Agency Factbook 2009), neonatal tissues are objectively the largest and most genetically diverse stem cell source that can be accessed in a non-invasive, rapid and cost-effective manner during and after birth. This review will particularly focus on the umbilical cord as a stem cell source for biomedical research and clinical applications.

The umbilical cord as a source of stem cells

From the third week of development, the human embryo becomes attached *via* a connecting 'stalk' to the forming placenta. At week 5, a primitive umbilical cord is formed in the shape of an umbilical ring. At week 10, after development of the gastrointestinal tract in the foetus, the umbilicus appears as a hernia linking into the umbilical cord.

The umbilical cord is covered by an amniotic epithelium which protects a gelatinous and elastic matrix made of mucopolysaccharides (mostly hyaluronic acid and chondroitin sulphate) called 'Wharton's jelly' named after Dr Thomas Wharton who first described it in 1656 (31). The amnion and Wharton's jelly protect three blood vessels that are crucial for embryonic and foetal development. One large umbilical vessel supplies the developing foetus with placental blood, rich in nutrients and oxygen, and in the last trimester with important antibodies provided by the mother. Two smaller umbilical vessels return from the foetus the blood with carbon dioxide, wastes and other toxins.

The umbilical cord can provide stem cells from the blood running in the umbilical vessels, walls surrounding the vessels and from the Wharton's jelly.

Cord blood stem cells

Cord blood can be collected at birth using a sterile collection kit consisting of an anticoagulant (usually citrate or heparin)-containing collection bag connected to one or several collecting needle(s). Cord blood samples can be collected *in utero*, after the birth of the child and before delivery of the placenta or *ex utero*, from normal deliveries and caesarean sections with no pain for the mother or the child (Fig. 1).

In a recent study, our group demonstrated that cord blood stem cells and other cell populations, in general, were influenced by obstetric history and other maternal factors (30). Cord blood units are usually transferred to a laboratory where they undergo cell separation to extract the buffy coat and/or cell preparations enriched with stem cells. Different techniques exist to extract cells from cord blood, such as: centrifugal elutriation, rouleaux formation, starch-based methods, and density-gradient methods, among others (32–34) (Fig. 1).

Historically, umbilical cord blood has been known to contain haematopoietic stem/progenitor cells with that have the ability to produce clonogenic progeny. In 1974, Knuddtzon (35) was the first to confirm presence of cells with haematopoietic clonogenic potential in cord blood *in vitro*. Broxmeyer and colleagues published in 1989 a report confirming presence of haematopoietic stem cells in cord blood (36). Further studies verified their clonogenic potential, self-renewal property and capacity to be expanded *in vitro* (37–41).

Our research group and others spent many years analysing the different cell groups present in cord blood to distinguish between stem cell and progenitor cell phenotypes, and later on between haematopoietic and non-haematopoietic cell groups (40,42). In 2004, our team reported for the first time, the discovery of non-haematopoietic pluripotent embryonic-like stem cells from cord blood, named cord blood embryonic-like stem cells (CBEs). Further investigation of these cells demonstrated that they could be harvested from fresh and cryopreserved units and had expansion and differentiation potential into neural, hepatobiliary and pancreatic-like precursors (43–50). This ground-breaking discovery, albeit challenged at the time, has since been confirmed by several other groups (51–55).

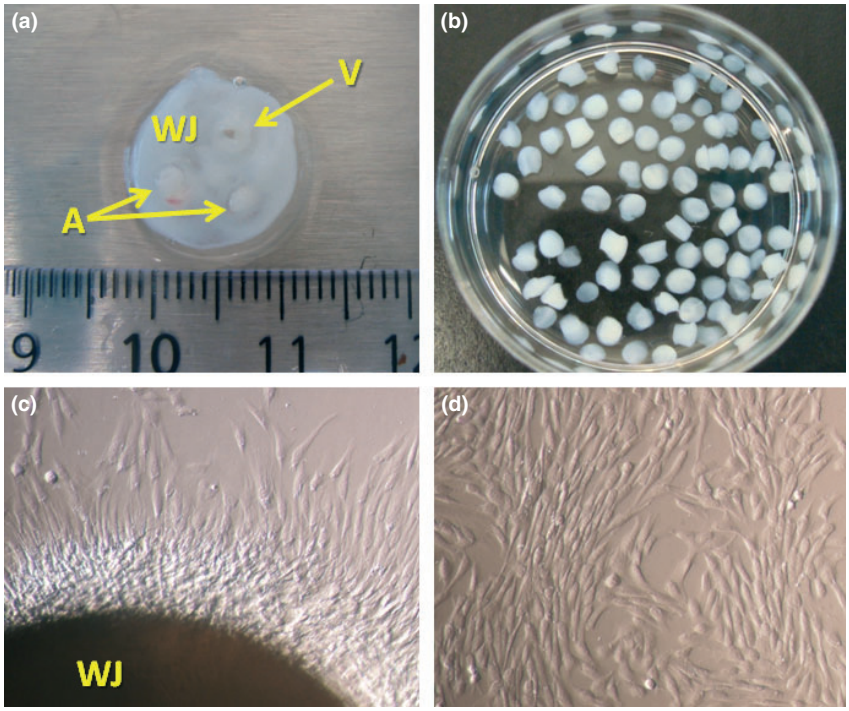

Figure 1. Umbilical cord Wharton's jelly as a source of mesenchymal stem cells. (a) Sagittal section of a 1 cm diameter umbilical cord with Wharton's jelly (WJ) surrounding two arteries (A) and one vein (V). (b) 10 mm^3 biopsy pieces of Wharton's jelly. (c) Wharton's jelly piece (WJ) in serum-free culture growing-out mesenchymal stem cells. (d) Mesenchymal stem cells from umbilical cord at 80% confluence in serum-free culture.

Further to this, our group and others have also been able to identify and isolate multipotent MSCs from cord blood with more restricted differentiation potential and significant variability between samples (unpublished observations; 56–58).

These studies have demonstrated that cord blood has potential beyond haematopoietic differentiation and could be considered for further regenerative medicine research (59).

Umbilical cord Wharton's jelly stem cells

Several groups have recently reported the possibility of deriving MSCs, not only from cord blood but also from the umbilical cord matrix – Wharton's jelly. McElreavey and colleagues first reported in 1991 the possibility of isolating fibroblast-like cells with population growth potential from the Wharton's jelly (60). Several techniques have been reported to dissect Wharton's jelly mechanically and/or digest it enzymatically to culture homogeneous MSC populations.

The French Academy of Medicine presented a report in January 2010 in which they considered that research on umbilical cord stem cells was extremely promising and could provide useful new tools for treatment of several diseases. A single piece of 5–10 mm^3 Wharton's jelly has the potential to yield as many as 1 billion MSCs in 30 days (Degoul O., Jurga M., Forraz N. and McGuckin C.P. unpublished personal data). With the average umbilical cord measuring 50 cm, one could predict that this source of MSCs will become more and more clinically relevant as research advances (Fig. 2). Umbilical cord Whar-

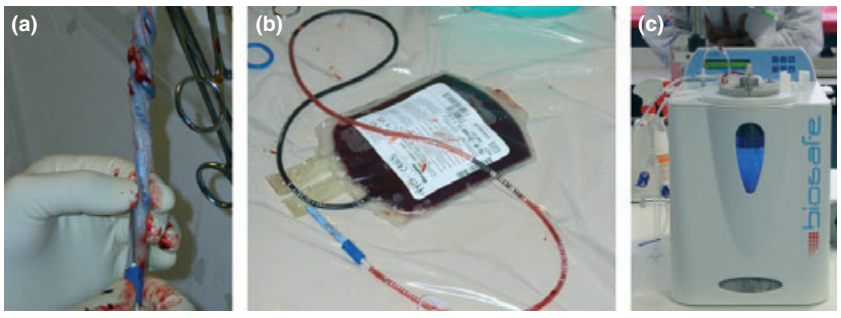

Figure 2. Umbilical cord blood collection and processing. (a) Cord blood is collected after birth from the umbilical vein into (b) citrate-based anticoagulant-containing blood collection bag. (c) Sepax device, enabling closed system cord blood processing in approximately 20 min.

ton's jelly-derived MSCs are increasingly being considered as more robust than those from cord blood itself and, by nature, they are less invasive than those from the bone marrow (61). Several studies have shown that umbilical cord-derived MSCs can be differentiated into bone (62,63), skin (64), endothelium (65), hepatocyte (66,67) and neural lineages (68) to name but a few. The immunomodulatory properties of umbilical cord MSCs were shown to be similar to bone marrow-derived MSCs (69). The potential of this stem cell source is therefore enormous for regenerative medicine applications.

Umbilical cord blood vessels

The umbilical cord is well known as a source of endothelial progenitor cells. These have been identified for angiogenesis and vasculogenesis research and as model tissues, not least with the now standard isolation of human umbilical cord vein endothelial cells (HUVEC) (70). Their role in haematopoiesis has also been demonstrated as HUVECs produce growth factors and adhesion molecules that can induce maintenance and proliferation of cord blood haematopoietic progenitors (71). In 2003, Saraguser and colleagues proposed that the umbilical vein and HUVECs were a source of perivascular cells – pericytes. For their study, they hypothesized that umbilical blood vessels were a potential source for a distinct population of pericytes, which were ancestors of MSCs found in Wharton's jelly (72). This hypothesis has since been corroborated in supplementary studies, which further identified these pre-MSC pericytes in other adult tissues (73,74).

Umbilical cord and cord blood stem cells for regenerative medicine

Haemato/immunotherapies

As early as 1939, Dr J Halbrecht, Beilinson Hospital, Judah and Sharon regions, Israel, published two reports on the use of placental (umbilical cord) blood for transfusion purposes. Placental blood stored for up to 15 days was used for 220 transfusions with minimal or no undesired effects observed in patients (75,76). Ende and Ende reported in 1972 the first clinical case (in 1970) using eight umbilical cord blood units to transfuse a 16-year-old patient suffering from leukaemia (77). These studies led to transplantation into a child suffering from the bone marrow disorder, Fanconi's anaemia, with his sister's umbilical cord blood, in 1988; her cord blood sample was collected and conditioned at birth (78). Wagner and colleagues in Minnesota, USA initiated the first volunteer family banks for young patients who had a compatible sibling from which cord blood could be collected at birth, in 1995 (79). Technical progress in bone marrow transplantation was hindered, however, by the shortage of suitable HLA-compatible bone marrow donors, and in 1991, the New York Blood Center created the first public cord blood bank in the USA. This today holds the largest cord blood public registry and in 1995 provided a cord blood sample for the first unrelated cord blood transplant (80). Cord blood compared to bone marrow, was rapidly identified as a valuable stem cell source for clinical applications; it offers more tolerant HLA matching between donor and recipient, results in less graft-versus-host disease and is readily available from biobanks. In bone marrow transplantation though, time for engraftment and cell dose available have been highlighted as major drawbacks of using cord blood as an option for haematological transplantation. However, since the mid-2000s double and triple cord blood unit transplants have been standardized and applied to children and adult patients. Recent findings on graft engineering and robust *ex vivo* expansion protocols have also increased the potential of cord blood for immune and haematopoietic reconstitution (81,82). Today, over 20 000 cord blood transplantations have taken place worldwide for related (sibling) and unrelated allogeneic transplantation, mostly to treat patients with haematological and immunological conditions needing to restore haematopoiesis or their immune systems (83). Very few clinical cases have been reported of autologous use of cord blood for transplantation to restore haematopoiesis (84–86).

Umbilical cord and cord blood stem cells for non-haematopoietic applications

Advances in biomedical research and thorough regulatory environments will jointly contribute to development of clinical trials for stem cell-based therapy. Scientists and clinicians should not have a haematocentric perspective for use of cord blood and umbilical cord cells for regenerative medicine, as recent clinical studies widen the potential of neonatal stem cells for clinical applications beyond haematotherapies.

Type 1 diabetes. Type 1 diabetes is an autoimmune disease that causes destruction of insulin-producing pancreatic beta cells, by T cells. This disease is managed by patients in lifelong administration of exogenous insulin. Following several *in vitro* and *in vivo* animal studies, a prospective clinical trial has taken place under the supervision of Dr MJ Haller and colleagues at the University of Florida, USA, in which 15 young children received infusions of their own umbilical cord blood cells. Three to six months post-infusion, all patients demonstrated slowing of loss of endogenous insulin production correlated with lowered daily insulin requirements, improved HbA1c lev-

els and increase in regulatory T cells, suggesting potential immune-modulatory effect as a mechanism of action for this treatment. Although 1-year post-infusion assessment confirmed the safety of autologous cord blood therapy for type I diabetes, no significant improvement in C-peptide endogenous production, insulin requirements or HbA1c levels were observed by this time. Further to this, no changes in T-cell phenotype ratios nor autoantibody titres were seen. It was further suggested that cell dose and multiple time-lapsed infusions of cord blood cells could be necessary to improve glycaemic regulation in type I diabetes patients (87–89).

Systemic lupus erythematosus. Systemic lupus erythematosus (SLE) is a chronic autoimmune disorder caused by production of autoantibodies against connective tissues, leading most usually to significant inflammation of skin, joints and kidneys, although other organs can also be affected. At the University Medical School of Nanjing, China, a single arm safety and efficacy clinical trial on 16 SLE patients refractory to standard therapy, on reception of allogeneic umbilical cord-derived MSC transplantation, has recently been reported. Fifteen months post-transplantation, all patients experienced significant amelioration of disease (recorded by SLE disease activity index) and renal function, improved serological results (antinuclear antibody, anti-double-stranded DNA antibody, C3 complement, albumin), increase in regulatory T cells and stabilization of pro-inflammatory cytokines. These initial encouraging results will be followed by a randomized controlled clinical trial (90).

Epidermolysis bullosa. Epidermolysis bullosa (EB) is an inherited mutational disorder, causing skin to be deficient in collagen, laminin, integrin and/or plakin. Patients usually suffer from severe blistering of the skin and mucosal membranes. A prospective clinical study being carried out by Pr Wagner and colleagues at the University of Minnesota Medical Centre has concerned patients undergoing bone marrow and umbilical cord blood stem cell transplantation. Preliminary results from this study have shown that patients experienced correction of the disease with reduction in blistering and production of healthy skin (91 and communication at the Responsible Stem Cell Research Conference, November 2009, Monaco and clinicaltrials.gov ref# NCT01033552).

Inherited metabolic diseases. Many patients with inherited metabolic diseases experience progressive degeneration of the central nervous system. Cord blood stem cell transplantation (as well as bone marrow and peripheral blood-derived stem cells) has already been used to treat patients with inherited metabolic diseases with lysosomal and/or peroxisomal storage disorders. Several pre-clinical and clinical studies have confirmed that cord blood-derived cells containing normal levels of enzymes have high potential to migrate to non-haematopoietic organs and trigger cross-correction of the recipient's enzyme-deficient cells and may account for a certain degree of neural regeneration (92).

Neonatal asphyxia and cerebral palsy. Cerebral palsy is a generic term referring to a number of disorders that appear in early childhood, affecting muscle coordination and body movement. Foetal, neonatal and post-birth asphyxia often lead to cerebral palsy disorders due to neurological lesions incurred.

Beyond neurological improvement observed in patients treated for inherited metabolic diseases, several pre-clinical studies have demonstrated that human cord blood-derived stem cells could induce endogenous neural repair processes. Although the precise mechanisms of action remain to be confirmed, infusion of cord blood cells following brain ischaemia has been shown to induce neurogenesis, and to bring trophic factors with neuroprotective effects to sites of injury (29,30,59).

Further, a pilot non-randomized clinical study at Duke University, USA, is currently assessing safety of autologous umbilical cord blood cells in newborn infants with hypoxic–ischaemic encephalopathy. Cord blood cells were provided by 14 private biobanks and to date 188 patients (aged 1 week–9 years) have been infused with autologous cord blood cells with a minimum cell dose of 1×10^7 cells/kg. Infusions were well tolerated and no clinical adverse effects have yet been reported. These children will be followed up for neurodevelopmental outcome and functional MRI imaging (clinicaltrials.gov ref# NCT00593242 and Kurtzberg in communication at 8th Annual International Transplantation Symposium, San Francisco June 2010).

In an additional study, a randomized observer-blinded crossover clinical trial, has just been initiated at the Medical College of Georgia for children diagnosed with cerebral palsy, whose parents had saved their infants' cord bloods. Patients to be included are aged between 2 and 12 years and have clinical evidence of a non-progressive motor disability (clinicaltrials.gov ref# NCT01072370).

Storing neonatal stem cells

Much scientific, ethical and political debate surrounds the concept of storing umbilical cord blood and other neonatal cells and tissues, for clinical applications. In many countries parents receive information consent to donate umbilical cord blood to a public bank where samples are anonymized and stored for future unrelated (or sometimes

related-sibling) allogeneic purposes (generally only for haematotherapy) as long as they meet certain quality control criteria. Costs of storage are supported by public banks, usually through public state funding. Further parents decide to store umbilical cord blood with private biobanks through a payable service over several years or decades. Cord blood samples are then available for future autologous or sibling-related allogeneic use, if required. Recent initiatives however, have offered a third model for storage of umbilical cord blood, through a mixed banking model whereby samples are stored by the family but can also be donated to suitable patient/s needing transplantation.

To date, only just over 400 000 cord blood samples are available from public registries worldwide and we estimate that a further million samples are stored in private biobanks (Fig. 3). Private and public biobanks have also recently begun to offer storage of the umbilical cord as a potential source for autologous and allogeneic regenerative medicine applications. We strongly believe that most parents should be informed of storage options regarding umbilical cord blood or other neonatal cells and tissues, as this extraordinary bioresource is widely available worldwide in developed and emerging countries. Furthermore, advancement of regenerative medicine now requires that other medical disciplines have both opinion and an interest in uses of umbilical cord and cord blood-derived cells. No longer must we allow haematologists, who are not experts in other medical disciplines, to prevent other clinics from developing and using these important stem cell sources. In our recent landmark paper comparing different ways to separate cord blood stem cells of clinical grade, we have shown that not all current methods are appropriate for regenerative medicine (34). In the future, there is a need to have a variety of banks, where cord blood and placental tissues are processed using a range of methods, then made available to a wider group of clinicians.

Conclusion

Although many types of stem cells have been proposed in recent years, much hyperbole unfortunately exists. In reality, umbilical cord and cord blood-derived stem cells remain the world's largest potential source, bearing in mind the global birth rate of around 135 million per year. The exponential rise of cord blood banking also shows the global interest in the use and need for these cells. Through regenerative medicine, we and others have proven that these placental- and umbilical-derived tissues, which would otherwise be thrown away, must be considered for use either immediately or after storage. With no ethical controversies in collection of these umbilical cord stem cells, the only question that remains is the potential for defined clinical trials. For this, governments need to be ready with cell therapy legislation to allow cells' rapid transit to hospital clinics, while ensuring patient safety.

Acknowledgement

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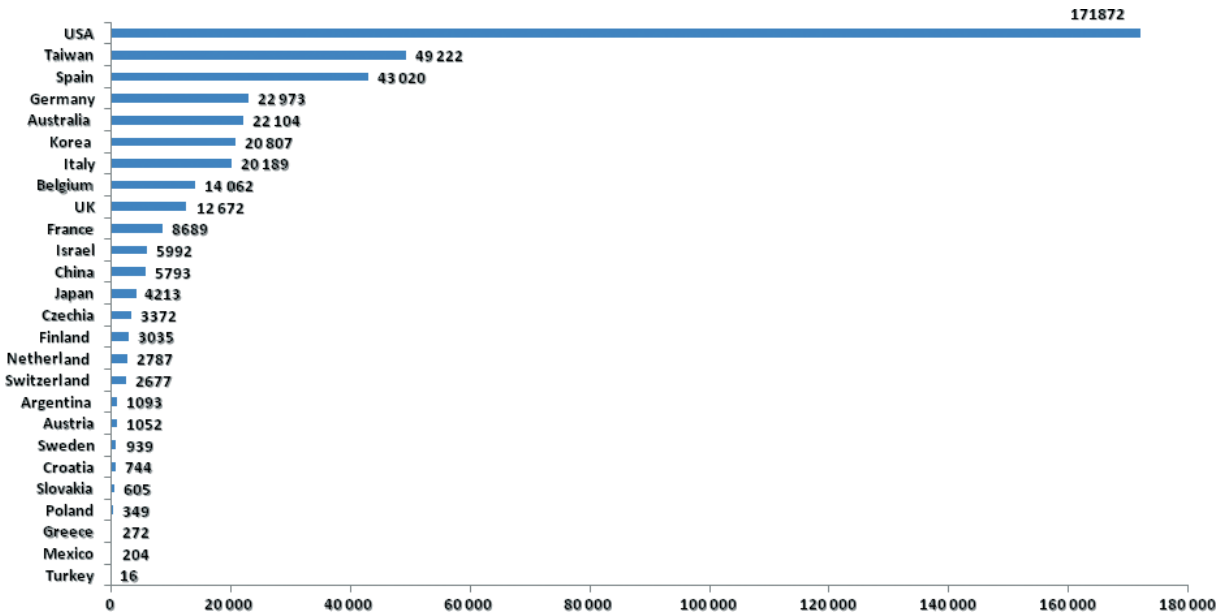

Figure 3. Over 419 000 umbilical cord blood samples are stored in public registries worldwide (source Bone Marrow Donor Worldwide http://www.bmdw.org, March 2010).

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