


**COLLEGE OF EDUCATION & HUMAN DEVELOPMENT**  
**LAMAR UNIVERSITY®**  
 MEMBER THE TEXAS STATE UNIVERSITY SYSTEM™

## PRECONCEPTION NUTRITION

Nutrition Through the Life Cycle

---

---

---

---

---

---

---

---

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

“During their reproductive years, women conceive, nourish, and bring into the world the new life that perpetuates the human life cycle. The foundation for life’s continuing cycle are the healthy bodies of young adult women.”



The Three Graces by Raphael

LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

## THE EGGS (OVA)

- Develop during the woman’s own fetal life – she starts out with 7 million.
- About 450 are released over her lifetime.
- At menopause, the remaining eggs disintegrate.



<http://www.ncl.com.sg/tourism-information/types-of-cancer/gynaecological-cancers.html>

LAMAR UNIVERSITY

---

---

---

---

---

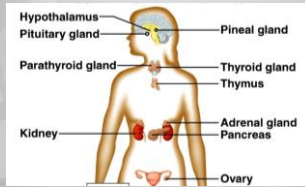
---

---

---

## THE HORMONES OF PUBERTY

- Hypothalamus signals the pituitary to release hormones that target the ovaries.
- Ovaries secrete estrogen and progesterone.



LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

## EFFECTS OF ESTROGEN AT PUBERTY

- Increase in uterine size and changes in lining of uterus and oviducts (Fallopian tubes)
- Increase in breast size and development of milk-producing structures



The Birth of Venus by Alexandre Cabanel

LAMAR UNIVERSITY

---

---

---

---

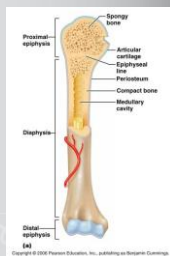
---

---

---

---

- Increased bone density and uniting of epiphyses with the shafts of the long bones, stopping growth in stature
- Increased fat deposits



Copyright © 2006 Pearson Education, Inc., publishing as Benjamin Cummings.  
<http://media.pearsoned.com/origdata/V02/0205/SKELETAL%20%20OBJECTIVES.htm>

LAMAR UNIVERSITY

---

---

---

---

---

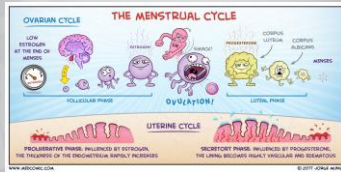
---

---

---

## MENSTRUAL CYCLE

- Menarche (the first menses) – 11-15 years of age
- Menopause (cessation of menses) – 45-55 years of age



LAMAR UNIVERSITY

---

---

---

---

---

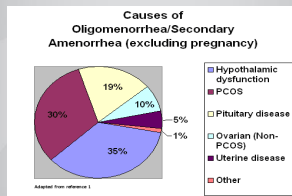
---

---

---

## AMENORRHEA

- The absence of menses
- Can result from malnutrition, among many other reasons



LAMAR UNIVERSITY

---

---

---

---

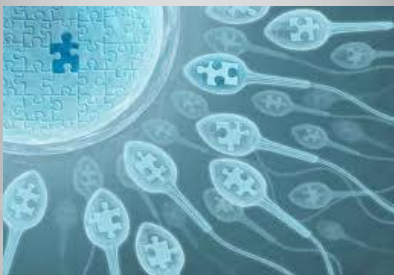
---

---

---

---

## FERTILITY


<http://howtopregnant.com/what-is-fertility/>

LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

---

---

---

---

---

---

## COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

# NUTRITION AND FERTILITY

- Chronic Undernutrition
  - High birth rate
  - Small frail infants
- To decrease birth rate:
  - Education for women
  - Child survival



[https://www.thestar.com/news/Canada/2014/12/29/29181\\_g01-very\\_rare\\_falls\\_in\\_Canada\\_during\\_recession\\_unleashed.html](https://www.thestar.com/news/Canada/2014/12/29/29181_g01-very_rare_falls_in_Canada_during_recession_unleashed.html)

LAMAR UNIVERSITY

[illegible]

- Acute undernutrition (due to famine)
  - Dramatic decrease in fertility



A photograph showing a woman wearing a blue headscarf and a patterned green and yellow dress, holding a severely malnourished child. The child's ribs are clearly visible through their thin skin. They are sitting on a patterned rug in front of a wall with colorful, abstract patterns.

<http://www.unicef.org/datacenter/geographic/regions/sub-saharan-africa/jpagan4>

---

---

---

---

---

---

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

## OBESITY AND FERTILITY



<http://med.nyu.edu/2012/03/04/obesity-may-affect-adult-fertility/>

LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

## UNDERWEIGHT AND FERTILITY



LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

## INCIDENCE OF IRREGULAR OR ABSENT MENSTRUAL CYCLES\*

|                                         | % irregular or absent cycles |
|-----------------------------------------|------------------------------|
| Joggers (5-30 miles/week)               | 23%                          |
| Runners (over 30 miles/week)            | 34%                          |
| Long-distance runners (> 70 miles/week) | 43%                          |
| Competitive bodybuilders                | 86%                          |
| Noncompetitive bodybuilders             | 30%                          |
| Volleyball players                      | 48%                          |
| Ballet dancers                          | 44%                          |
| Sedentary women                         | 13%                          |

\*Williams, N.L. et al., Evidence for a causal role of low energy availability in the induction of menstrual cycle disturbances during strenuous exercise training. *J Clin Endocrinol Metab* 2001; 151:1072-9.

LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

# CONTRACEPTION AND NUTRITION

- Pills, patches, injections, implants, intrauterine systems
  - Increased triglycerides and cholesterol
  - Weight gain




<http://www.catholicccdc.org/planned Parenthood pushing taxpayer-funded birth-control/>

[http://www.123rf.com/photo\\_15865900\\_abstract-word-cloud-for-birth-control-with-related-tags-and-items.html](http://www.123rf.com/photo_15865900_abstract-word-cloud-for-birth-control-with-related-tags-and-items.html)

[illegible]

# COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

## PRECONCEPTION CARE

- Advance planning of pregnancy
- Purpose – to prepare for the best possible prenatal environment for the conceptus



<http://www.cdc.gov/media/releases/2009/s090923-preconception.html>

LAMAR UNIVERSITY

---

---

---

---

---

---

# HEALTHY PEOPLE 2020: OBJECTIVES FOR THE NATION

- Nutrition Objectives
- Objectives related to preconception care
  - Healthy weight
  - Iron deficiency
  - Neural tube defects
  - Preconception counseling



<http://www website.org/healthresources/index.php?category=9>

LAMAR UNIVERSITY

---

---

---

---

---

---

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

## PRECONCEPTION NUTRITION ISSUES

- Underweight
- Obesity
- Alcohol
- Nutrient status
- Lead exposure



[http://havegenerationswithless.com/nutrition/pelvic\\_weight\\_and\\_fertility/](http://havegenerationswithless.com/nutrition/pelvic_weight_and_fertility/)

LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

## PRECONCEPTION NUTRITION ISSUES

- Chronic Disease
  - Diabetes
  - PKU
  - Celiac disease



[http://www.ahaw.com/aw\\_2001008\\_twin-cystic-fibrosis-pregnant.html](http://www.ahaw.com/aw_2001008_twin-cystic-fibrosis-pregnant.html)

LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

## VALUE OF PRECONCEPTION CARE

- WIC – California experiment
  - Women who received WIC benefits between, as well as during pregnancy, had better pregnancy outcomes
  - Mother had better iron status and bigger babies than women who only had WIC benefits during pregnancy



<http://www.cdph.ca.gov/programs/relatedpages/WICspanish.aspx>

LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

## INDONESIA INTERVENTION

- Couples received information on iron and folate supplementation when they applied for a marriage license.
- 98% surveyed bought the supplements
- 56% took at least 30 tablets
- Incidence of iron deficiency in this group decreased by half.



LAMAR UNIVERSITY

---

---

---

---

---

---

---

---



COLLEGE OF EDUCATION & HUMAN DEVELOPMENT

**LAMAR UNIVERSITY®**

MEMBER THE TEXAS STATE UNIVERSITY SYSTEM™



**SPECIFIC CONDITIONS AFFECTING  
HEALTH, WELL-BEING, AND  
REPRODUCTIVE OUTCOME**

Nutrition through the Life Cycle

---

---

---

---

---

---

---

---

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

## PRE-EXISTING DIABETES

- Blood sugar must be under tight control at time of conception
- High blood glucose in embryonic period is teratogenic
  - 2-3 times the risk of birth defects
  - Higher risk of miscarriage



LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

---

---

---

---

---

---

- Type 2 (90-95% of all diabetics)
  - Insulin produced, but cells resistant
  - Traditionally older at onset
  - Overweight or obese
- Preconception screening for type 2
- Intervention:
  - Exercise
  - Weight loss
  - Diet



<http://www.olympicclub.com/risks-areas/blog/05/21/11/ox-14b-the-why-14b-s-combat-effects-of-type-2-diabetes/>

LAMAR UNIVERSITY

---

---

---

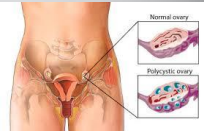
---

---

---

## POLYCYSTIC OVARIAN SYNDROME (PCOS)

- 5-10% of women have PCOS
- Absence of ovulation
- Menstrual irregularities
- Outer layer of ovaries is thick and hard – follicles cannot develop
- Having PCOS means increased risk of:
  - Fertility problems
  - Gestational diabetes
  - Type 2 diabetes
  - Cardiovascular disease



<http://neonmenshealth.gov/publications/our-publications/fact-sheet/polycystic-ovary-syndrome.cfm>

LAMAR UNIVERSITY

---

---

---

---

---

---

## PCOS

### • Symptoms and signs

- Women tend to be obese (or have a lot of central body fat), have excess body hair and acne
- High triglycerides, cholesterol
- Low HDLs
- High androgens



<http://malehypothalamic-compulsive-ovarian-disease...-a-rare-epidemic/>

LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

## ACANTHOSIS NIGRICANS

### • Insulin resistance appears to be a major factor in most cases

- Excess insulin stimulates ovaries to produce androgens
- Excess insulin raises triglycerides and lowers HDLs



<http://healthline.blogspot.com/2012/12/acanthosis-nigricans.html>

LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

### • Treatment

- Drugs to increase insulin sensitivity
- Drugs to stimulate ovulation
- Weight loss and exercise to
  - Increase insulin sensitivity
  - Lower blood glucose
  - Lower blood insulin levels
  - Improve lipid profile

LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

## PKU (PHENYLKETONURIA) MOTHER

- Inherited disorder
- Phenylalanine accumulates in the bloodstream
- Embryo will have central nervous system and heart damage



LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

- An untreated PKU mother
  - 92% chance of mental disability in newborn
  - 73% chance of microcephaly



<http://www.childrensmicro.org/pictures1.html>

LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

### • Intervention

- Must happen prior to conception
- Very restrictive, complicated diet
- Women who comply with diet are likely to have babies with normal intelligence



<http://stores.phenylade.com/Detail.asp?Item=305>

LAMAR UNIVERSITY

---

---

---

---

---

---

---

---

## HERBAL SUPPLEMENTS

- Used to relieve PMS, increase fertility in both men and women
- Some work; some don't
- Definitely should be reported to health care provider.



<http://www.dietdoctor.com/blog/herbal-and-natural-supplements-to-enhance-sexual-pleasure>

---

---

---

---

---

---

---