


Fertility:

What every Potential Grandparent and Parent Needs to Know



Victoria Maizes MD
Executive Director
Arizona Center for Integrative Medicine
Professor of Medicine, Family Medicine and Public Health
University of Arizona

Caring for Pregnant Women

Imagine:

- ⌘ Freshly prepared, whole, mostly organic food with mercury free fish
- ⌘ Free multivitamins and supplements
- ⌘ In a supportive, low stress setting within a healthy environment and guaranteed job security

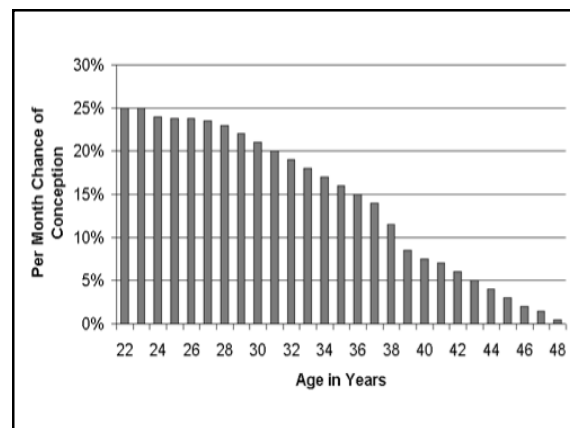


Challenges to fertility and health

- ⌘ Delayed child bearing
- ⌘ Obesity
- ⌘ Dietary changes
- ⌘ Environmental pollutants
- ⌘ Psychological stress


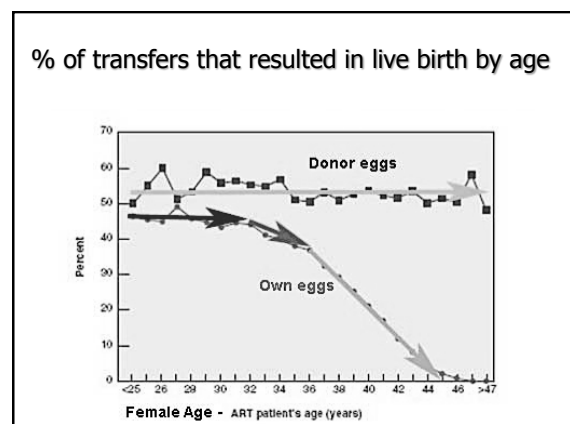


Human Reprod Update 13(3) 209-223 2007



Can ART solve all?

- ⌘ IVF was 47% effective overall in women who received three IVF cycles
- ⌘ Women in their twenties: 58% success
- ⌘ Women aged 40-44: 22% success

The Nurse's Health Study II on Fertility:

- ⌘ Onset 1989
- ⌘ 116,000 female RNs ages 24–42
- ⌘ Diet first measured in 1991 and updated every 4 years
- ⌘ 18,555 married women attempting to conceive; 438 women reported ovulatory infertility

Epidemiology • Volume 20, Number 3, May 2009

Macronutrients and Infertility

- ⌘ Carbohydrates
 - ⌘ High glycemic index (GI) doubled risk
- ⌘ Protein
 - ⌘ Animal protein increased risk by 40%
 - ⌘ Vegetable protein reduced risk
- ⌘ Fats
 - ⌘ Transfats increased risk
 - ⌘ Whole fat dairy reduced risk



A prospective study of dietary carbohydrate quantity and quality in relation to risk of ovulatory infertility. Chavarro JE. et al. European J of Clin Nutrition. 63(1):78-86, 2009 Jan.

2004 EPA warning

- ⌘ Do not eat shark, swordfish, king mackerel, or tilefish because they contain high levels of mercury
- ⌘ Eat up to 12 ounces (2 average meals) a week of fish and shellfish that are lower in mercury
 - ⌘ Shrimp, canned light tuna, salmon, pollock, and catfish.
 - ⌘ Albacore ("white") tuna maximum 6 ounces per week
- ⌘ Check local advisories about the safety of fish caught locally

Fish facts

Avon Longitudinal Study of Parents and Children (ALSPAC) - 11,875 pregnant women FFQ assessing seafood consumption at 32 weeks' gestation.

- ⌘ Compared developmental, behavioral, and cognitive outcomes of the children (aged 6 mos - 8 yrs) in women consuming none, some (1-340 g per week), and >340 g per week.
- ⌘ Maternal seafood intake during pregnancy <340 g per week associated with children in the lowest quartile for verbal IQ
 - ⌘ (no seafood consumption, odds ratio 1.48, CI 1.16-1.90; some, 1.09, 0.92-1.29; overall trend, $p=0.004$)



Hibbeln JR. et al. Maternal seafood consumption in pregnancy and neurodevelopmental outcomes in childhood (ALSPAC study): an observational cohort study. Lancet. 2007 Feb 17;369(9561):578-85

Mercury Levels

Highest	Higher	Low	Lowest
AVOID	Eat no more than three 6-oz servings a MONTH	Eat no more than six 6-oz servings per MONTH	Enjoy two 6-oz servings each WEEK
Kajiki (swordfish) Saba (mackerel) Shark Tilefish	Ahi (yellowfin tuna) Buri (adult yellowtail) Hamachi (young yellowtail) Inada (very young yellowtail) Kanpachi (very young yellowtail) Katsuo (bonito) Maguro (bigeye, bluefin or yellowfin tuna) Makiki (blue marlin) Masu (trout) Meji (young bigeye, bluefin* or yellowfin tuna) Shiro (albacore tuna) Toro (bigeye, bluefin or yellowfin tuna)	Kani (crab) Seigo (young sea bass) Suzuki (sea bass)	Aji (horse mackerel) Akagai (ark shell) Anago (conger eel) Aoyagi (round clam) Awabi (abalone) Ayu (sweetfish) Ebi (shrimp) Hamaguri (clam) Hamo (pike conger; sea eel) Hattahata (sandfish) Himo (ark shell) Hokkigai (surf clam) Hotategai (scallop) Ika (squid) Ikura (salmon roe) Kabashira (shellfish) Kaiware (daikon-radish sprouts) Karei (flatfish) Kohada (gizzard shad)
			Masago (small egg) Minugai (surf clam) Noni-tama (egg) Sake (salmon) Sawara (spanish mackerel) Sayori (halfbeak) Shako (mantis shrimp) Tai (sea bream) Tairagai (razor-shell clam) Tako (octopus) Tamago (egg) Tobikko (flying fish egg) Torigai (cockle) Tsubugai (shellfish) Unagi (freshwater eel) Uni (sea urchin roe)

Choosing healthier fish

- ⌘ Smaller fish, plant eating
 - ⌘ Less bioaccumulation of mercury and PCBs
- ⌘ Omega 3 rich fish
 - ⌘ Sardines, wild salmon, herring, black cod
- ⌘ Resources
 - ⌘ Monterey Bay Aquarium
 - ⌘ Institute for Agriculture & Trade Policy iatp.org

Eat less

- ⌘ Animal protein
- ⌘ Pesticide laden foods
- ⌘ Alcohol

Eliminate

- ⌘ Sodas
- ⌘ Trans fats
- ⌘ High mercury fish



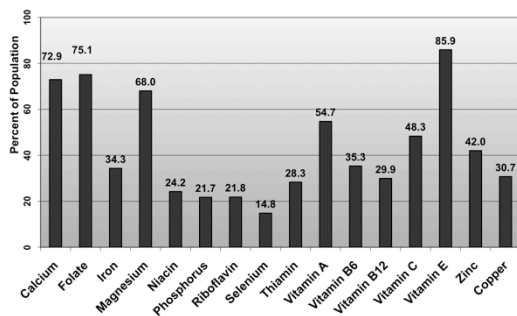
Reasons to Take Multi-vitamins

- ⌘ NHS: 41% lower risk of infertility
- ⌘ Fewer miscarriages
- ⌘ Fewer birth defects
- ⌘ Less pediatric cancer
- ⌘ Less autism



Use of multivitamins, intake of B vitamins, and risk of ovulatory infertility.
Chavarro JE. *Et al. Fertility & Sterility*. 89(3):668-76, 2008 Mar.
Role of micronutrients in the periconceptional period. Cetin I. *et al Human Reproduction Update*. 16(1):80-95, 2010 Jan-Feb.
Roth, C. *et al JAMA*. 306(14):1566-1573, October 12, 2011.
Schmidt, RJ *et al Prenatal Vitamins, One-carbon Metabolism Gene Variants, and Risk for Autism Epidemiology*: 2011(22) 4:476-485

Percent of U.S. Population Not Meeting the DRI For Specific Nutrients



<http://www.ba.ars.usda.gov/cnrg/services/cnmapfr.html>

Supplements in young women

- ⌘ 2011 National Health and Nutrition Examination Survey (NHANES):
- ⌘ Only 34% of women ages 20-39 get the recommended amount of supplemental folic acid



Multivitamin ingredients:

- ⌘ Vitamin A: max 2500 IU as Vitamin A palmitate or acetate, or retinol palmitate. Up to 15,000 IU of beta carotene is allowable
- ⌘ Iron 18 mg
- ⌘ Iodine 150 mcg
- ⌘ Folic acid 400 or more mcg
- ⌘ Vitamin D 1000 IU
- ⌘ Vitamin E 200-400 IU mixed tocopherols are best
- ⌘ Vitamin B₁₂ 2.4 mcg
- ⌘ Trace minerals: small amounts of copper, zinc, magnesium, potassium, and calcium



Iron and Fertility:

- ⌘ NHS: Women who consumed iron supplements had a significantly lower risk of ovulatory infertility than those who did not (RR 0.60, CI 0.39-0.9)
- ⌘ Ideal dose appears to be 40-80 mg of iron
- ⌘ Heme iron intake did not reduce ovulatory infertility



Chavarro JE. *Et al. Iron intake and risk of ovulatory infertility, Obstetrics & Gynecology*. 108(5):1145-52, 2006 Nov.

Iodine intake recommendations:

- ⌘ WHO: 150 mcg/d for adults & adolescents, 200 mcg/d for pregnant or lactating women
- ⌘ IOM recommends 150 mcg/d for adults, 220 mcg/d for pregnant women, and 290 mcg/d for lactating women
- ⌘ Historical levels:
 - ⌘ NHANES I (1971-1974) - median urine iodine was 320 mcg/L, reflecting adequate dietary iodine intake
 - ⌘ NHANES III (1988-1994) - median urinary iodine had fallen to 145 mcg/L
 - ⌘ NHANES 2001-2002 iodine intake 167.8 mcg/L

Iodine

- ⌘ Not all multivitamins contain iodine. Those that do typically contain 150 mcg of iodine per tablet
- ⌘ Replacement of iodine
 - ⌘ use iodized salt in cooking and at the table
- ⌘ Food sources include:
 - ⌘ Milk
 - ⌘ Egg yolks
 - ⌘ Saltwater fish
 - ⌘ Garlic
 - ⌘ Lima beans and soybeans
 - ⌘ Mushrooms
 - ⌘ Seaweed, dulse and kelp
 - ⌘ Sesame seeds
 - ⌘ Asparagus, spinach, summer squash, Swiss chard, turnip greens



Fertility in men

- ⌘ Obesity
 - ⌘ alterations in hormonal profiles (reduced inhibin B and androgen levels accompanied by elevated estrogen levels)
 - ⌘ increased scrotal temperature
 - ⌘ contributes to erectile dysfunction
 - ⌘ reduces semen quality
 - ⌘ changes sperm proteomes



*Cabler S. et al Asian Journal of Andrology. 12(4):480-9, 2010 Jul.
Du Plessis SS. Et al Nature Reviews Urology. 7(3):153-61, 2010 Mar.*

Fertility in men

- ⌘ 80% of men don't get 5 servings of fruits and vegetables per day



*Cabler S. et al Asian Journal of Andrology. 12(4):480-9, 2010 Jul.
Du Plessis SS. Et al Nature Reviews Urology. 7(3):153-61, 2010 Mar.*

Cochrane Review of Anti-oxidants in Men

- ⌘ 30-80% of male subfertility due to effects of oxidative stress on sperm
- ⌘ 34 RCTs, 2876 couples
 - ⌘ antioxidant supplements (single or combined) taken by the male partner of a couple seeking fertility assistance compared with placebo, no treatment, or another antioxidant
- ⌘ Outcomes:
 - ⌘ *Live birth*: 3 trials. Antioxidant use associated with increase in live birth rate (OR 4.85, 95% CI 1.92 to 12.24; P = 0.0008)
 - ⌘ *Pregnancy rate*: 15 trials. 96 pregnancies in 964 couples. Antioxidant use was associated with increased pregnancy rate (OR 4.18, 95% CI 2.65 to 6.59; P < 0.00001)

*Showell MG, et al. Antioxidants for male subfertility.
Cochrane Database of Systematic Reviews 2011, Issue 1.*

Supplement Wisely:

- ⌘ Multivitamin
- ⌘ Iron (women only)
- ⌘ Folic acid
- ⌘ Vitamin C
- ⌘ Iodine
- ⌘ Vitamin D
- ⌘ Omega 3



The 1st environment



Average baby has > 200 environmental chemicals in umbilical blood at birth

<http://www.ewg.org/reports/bodyburden2/execsumm.php>

Environmental influences

- ⌘ Endocrine disruptors
 - ⌘ Pesticides
 - ⌘ Plastics
 - ⌘ BPA
 - ⌘ Phthalates
- ⌘ Environmental Working Group – ewg.org
- ⌘ UCSF – Program on Reproductive Health and the Environment:
prhe.ucsf.edu/prhe/pubs/shapingourlegacy.html



Does changing your diet help?

- ⌘ 25 people, 5 days, vegetarian diet, at a Buddhist temple
- ⌘ Measured levels of urinary excretion of antibiotic residues, phthalate metabolites and oxidative stress biomarkers
- ⌘ Reduction in antibiotics and phthalates and oxidative stress biomarker



Ji, K, et al. 2010. Influence of a five-day vegetarian diet on urinary levels of antibiotics and phthalate metabolites: *Environmental Research*. 2010

2011 BPA study

- ⌘ Bisphenol A
 - ⌘ Used in plastics and liners of cans
 - ⌘ 90% of us have BPA in our urine when it is tested.
 - ⌘ Increases the risk of breast and prostate cancer, obesity, infertility, diabetes, and ADHD
- ⌘ Pilot study of 5 SF families
 - ⌘ Freshly prepared catered meals with minimal use of canned foods
 - ⌘ Urinary levels of BPA measured
 - ⌘ Levels dropped by 66% in 3 days



April 2011, *Environmental Health Perspectives*

Environmental Health Recommendations

- ⌘ Stainless steel water bottles
- ⌘ Glass or ceramic food containers
- ⌘ Plastic wrap made of LDPE (low density polyethylene)
- ⌘ Organic food
 - ⌘ Dirty dozen and clean fifteen
- ⌘ Cosmetics database
www.cosmeticsdatabase.com



Special diets and detox?

- ⌘ Stop consuming unhealthy foods
- ⌘ Avoid environmental pollutants
- ⌘ Increase excretion with fluids, fiber, saunas, cruciferous vegetables
- ⌘ Consider elimination diet
- ⌘ Consider celiac testing
- ⌘ Think about herbal therapy like milk thistle
- ⌘ Consider testing for mercury

Stress management

- ☯ Mind body groups
- ☯ Hypnosis
- ☯ Meditation
- ☯ Breath work
- ☯ Guided imagery



Domar AD. Et al The impact of group psychological interventions on distress in infertile women. *Health Psychology*. 19(6):568-75, 2000 Nov.

TCM and fertility

- ☯ Acupuncture increases success of embryo transfer
- ☯ Herbs
- ☯ Meditation
- ☯ Qi gong

Integrative Approaches

