Understanding Infertility (and fertility)

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Disclaimer: This presentation is for educational purposes to provide a basic introduction on this topic. It is not a substitute for qualified medical care.

Opening

- More young people are trying to start their families and running into road blocks.
- Infertility is becoming a major health issue. It is now affecting 6 to 8 million Americans and it is also increasing world wide.
- A number of factors affect fertility. It can be related to two basic factors. One is the quality of the eggs and sperm. Two is the quantity of the sperm in the male. The third factor has to do with physical abnormalities, which is outside the scope of this presentation.
- Think about the case of Henry VIII and his desire for a son. Queen Catherine of Aragon and Anne Boleyn were only able to give him daughters, and no living son. Did they have fertility issues? Yes. Who was the one with fertility issues and responsible for determining the fetus' sex?

Overview

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- Fertilization Process
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- Male Role in Reproduction
- More About the Sperm
- Male Anatomy
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- Sexual Transmitted Diseases
- Environmental Chemicals that Affect Fertility (5 slides)
- Foods to Boost Fertility
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Addendum

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- Glossary
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- Other Issues Regarding Fertility/Infertility
- Prescription Drugs that Affect Fertility
- Reasons to Seek Medical Attention
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Defining Infertility

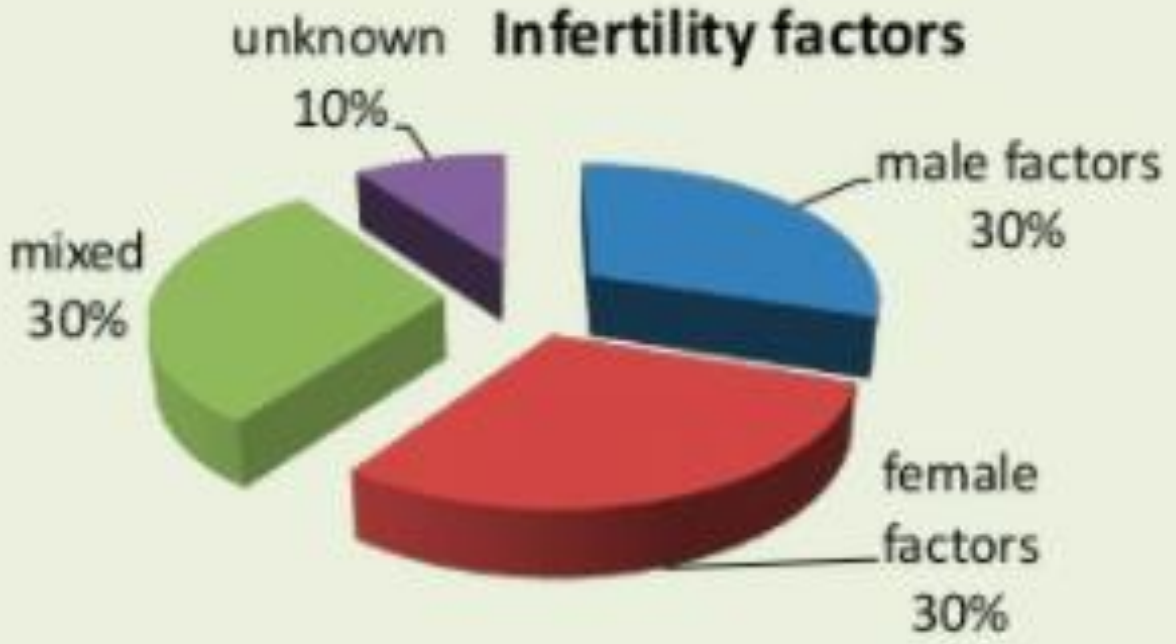
- When a couple under the age of 35, tries one year without success to start their family, that is considered infertility
- When a couple over the age of 35, tries six months without success, that is considered infertility
- Infertility affects various groups differently
- With aging, fertility declines, definitely more true for women. Men are able to remain fertile for a much longer period of time.
- Secondary infertility is trouble getting pregnant the second or third time around, when you already have had one or two babies and didn’t have problems conceiving.
- Subfertility occurs when a couple can conceive but not in the expected time frame

Causes of Infertility

- About 1/3 are with the women
- About another 1/3 are with the men
- 10% to 15% of infertility is a combination between male and female factors
- The remaining 20% is unexplained (can check out genetics)
- The figures vary slightly depends on whom you ask

- Female factors 30%
- Male factors 30%
- Mixed 30%
- Unexplained 10%

Source: The management of infertility across the primary care by Dr. Saber Lahmidi, November 21, 2013 powerpoint from Slideshare



Issues with Infertility with Women

- One, no ovulation or irregular ovulation
- Two, tubal disorders, tubes are blocked or infected
- Three, uterine issues with fibroids, polyps or adhesions

- Note #1: Endometriosis is when endometrial tissue (tissue lining the uterus normally shed during menstruation) is found adhered to organs outside the uterus.
- Note #2: Older eggs tend to have more chromosomal and metabolic abnormalities. This occurs, too, when men become older.

Issues with Infertility in Men

- One, is low sperm count
- Two, decreased sperm motility (movement)
- Three, abnormally shaped sperm
- Four, no sperm at all in the ejaculate

Menstrual Cycle

- The menstrual cycle can vary from 25 to 31 days
- If periods are irregular, there can be more issues in identifying the ovulation period (it is generally midway in the menstrual cycle)
- Issues with the menstrual cycle include:
  - Skipping periods
  - Heavy bleeding
  - Scant periods
  - Painful periods (can be caused by endometriosis)

Role of Hormones in Fertility

- Four female hormones
  - The hypothalamus in the brain regulates the nervous and endocrine system
  - The pituitary releases these two hormones:
    - Follicle (FSH)
    - Luteinizing (LH)
  - The ovary releases besides the egg:
    - Estrogen
    - Progesterone

Fertilization Process

- Menstrual phase – 3 to 7 days. The old uterine lining breaks down
- Follicular/Proliferative phase-
  - Day 1 – Pituitary gland releases the FSH (follicle) hormone
  - Cells surrounding each egg secretes a liquid, forming a follicle, a fluid filled sac. Each follicle contains an immature egg. One follicle continues to develop.
  - LH (Luteinizing) hormone plays a role
  - The growing follicle begins producing estrogen
  - The ovary also produces estrogen and the uterine lining thickens

Source: Getting Pregnant for Dummies, pages 29-31 (next two slides)

Fertilization Process continued

- Ovulation
  - The follicle opens, the egg is released and is picked up by one of the fallopian tubes
  - If a sperm joins the egg, it will travel through the fallopian tubes to the uterus.
  - The uterine lining is now thick enough to support embryo implantation
  - Proteins help guide the embryo to the correct spot
- Luteal Phase
  - Produces progesterone and some estrogen
  - These hormones help with the embryo implantation
  - If not pregnant, the corps luteum collapses and menstruation begins roughly two weeks after ovulation

More on the Fertilization

- At ovulation, the cervix and vagina are filled with cervical mucus
- Sperm travels through the cervix
  - Into the cervical mucus
  - Through the endometrial canals in the uterine lining
  - Into the fallopian tubes
- Sperm can live in the cervical mucus from 48 to 72 hours
- Implantation
  - Blastocyst stage on day 5 or 6
  - Moves to the uterus and is attached to the uterine lining
- Egg has a 24 hour timeline for fertilization
- Want the sperm to be present before the egg is released

Female Anatomy

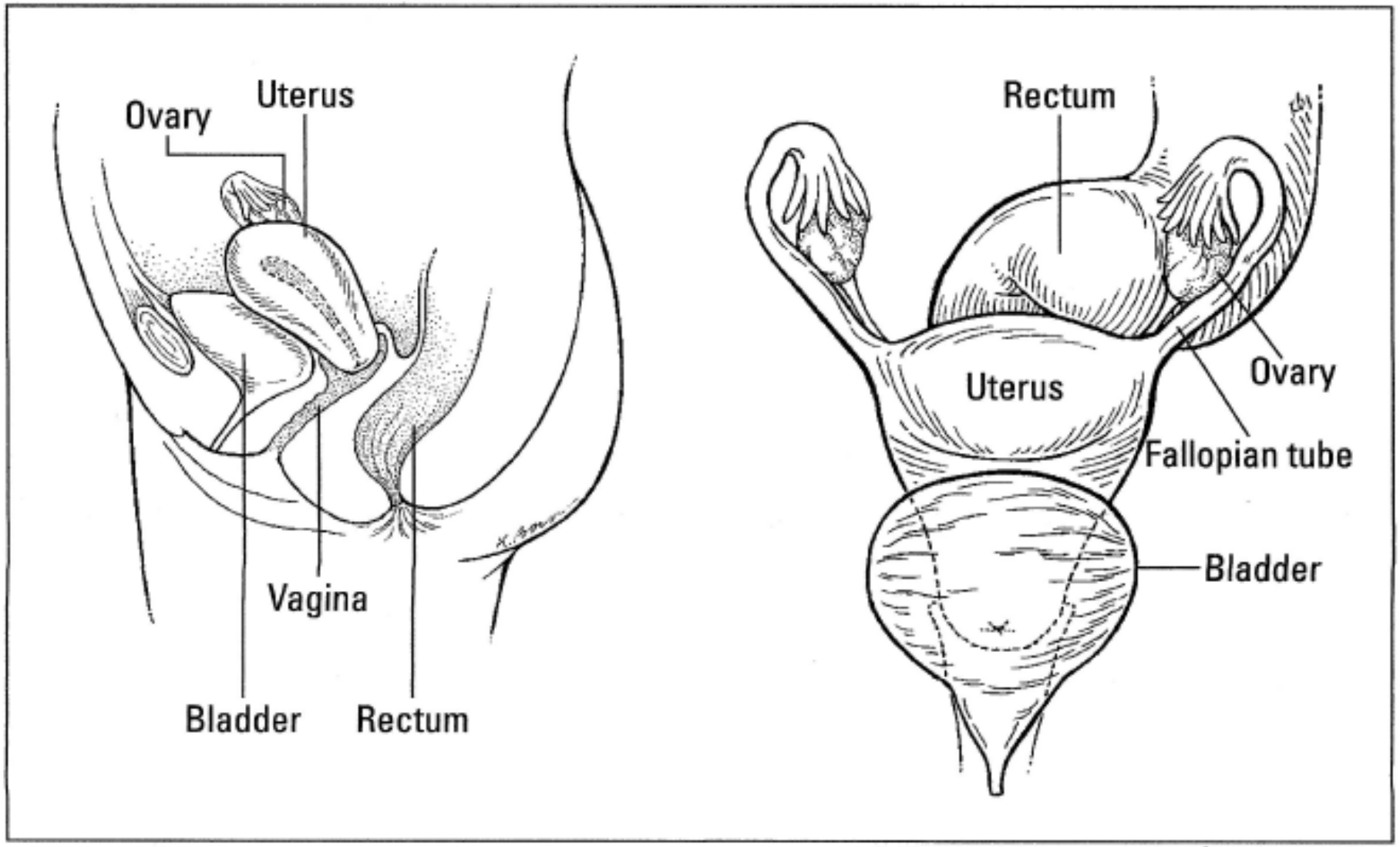


Illustration by Kathryn Born

Source:
Getting Pregnant for Dummies, page 22

Male Issues

- The issue with the penis, what matters is function, not size
- The scrotum and testicles are where the sperm is produced and stored
- Enough sperm needs to be made
- Mobility issues with sperm (referred to as motility, the tail enabling the sperm to travel)

- Note #1: 10% of men between 18 and 59 have experienced erectile problems in the past year.
- Note #2: 10% of men between 40 and 70 have complete erectile issues/function.
- Note #3: For men, testicular cancer-semen samples can be frozen before surgical removal of both testes and chemotherapy (it is called cryobiology)

Male Role in Reproduction

- Sperm is produced in the testes, so is testosterone
- Sperm mature as they travel through the epididymis
- Sperm is stored in the epididymis
- During orgasm, stored sperm move into the ejaculatory ducts where fluid is added
- Semen is travels through the uterus and enters the fallopian tubes
- Once, the sperm comes near the oocyte, sperm binds to the shell of the egg, enzymes are released by the egg, changing the oocyte so no other sperm cannot fertilize it
- From 40 million, only 100 to 1,000 sperm make it to the fallopian tubes
- Two hormones, FSH and LH influences the testes

Getting Pregnant for Dummies, pg 208

More about the Sperm

- Sperm starts out in the seminiferous tubules
- Immature germ cells, they are called spermatocytes
- It takes 76 days for an immature spermatocyte to become a mature sperm cell
- Develop with the following components
  - Head of the sperm is the acrosomal cap
  - Develops with a head, midpiece, and a tail
  - Contains enzymes that help the sperm to penetrate the zona pellucida, the egg's protective shell
- Each ejaculate contains 60 to 150 million moving sperm

Male Anatomy

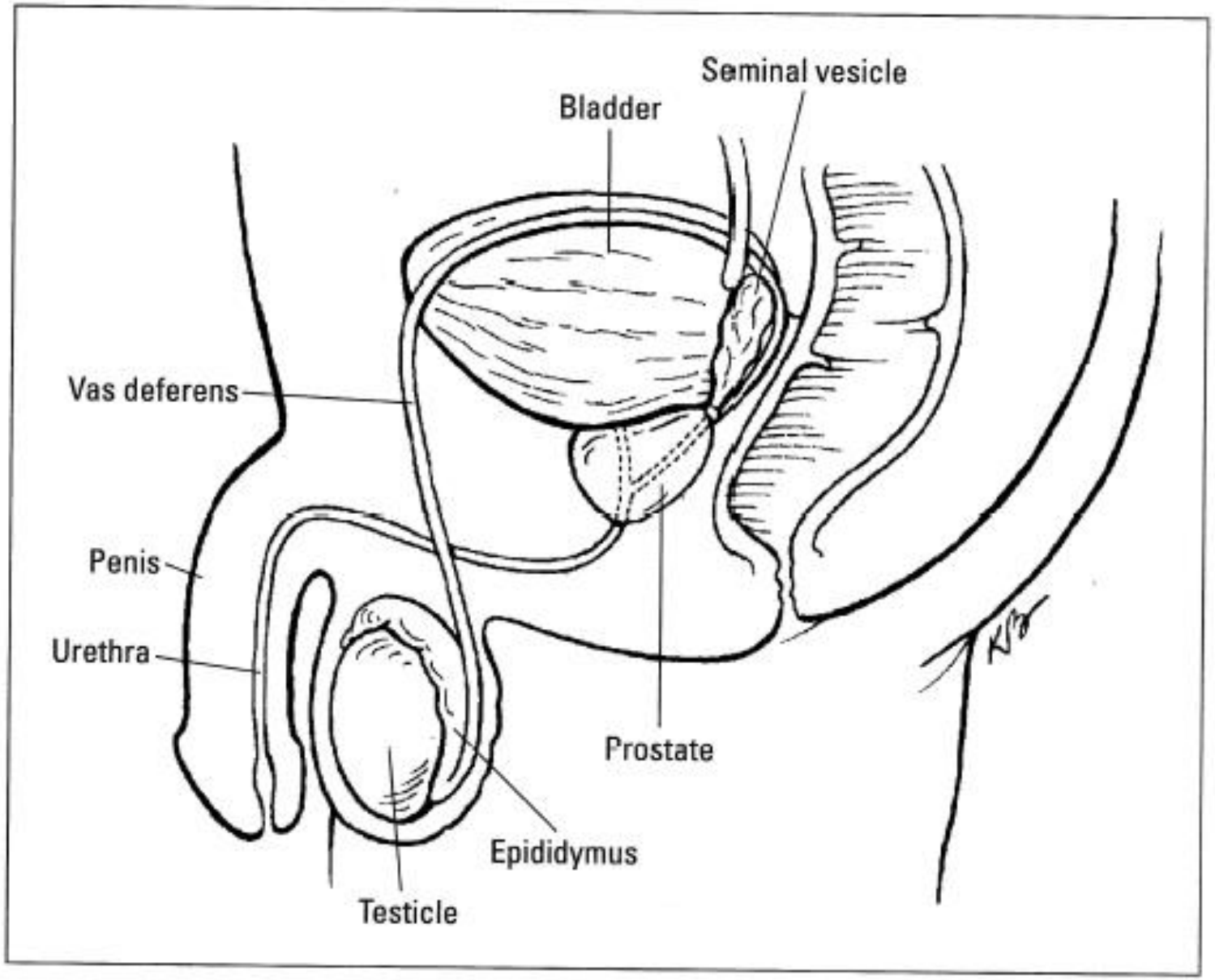


FIGURE 2-2: The male reproductive organs.

Source:
Getting Pregnant for Dummies, page 33

Conception

- Once a sperm enters the egg, the outer coating of the egg hardens, so that no other sperm can enter the egg
- During ejaculation, only 100 to 1,000 sperm make it up the fallopian tubes
- Sex needs to be done during the ovulation phase
- Signs of ovulation
  - The mucous becomes very thin, clear, and stretchy
  - Other times, the cervical mucous is acidic
  - Note: Can use a tool known as the ovulation predictor or watch the calendar
  - If your period is 28 days, day 14 would be the ovulation phase

Sexual Transmitted Diseases

- As many as 13 million Americans may have STD infections. STIs can cause PID (Pelvic inflammatory disease in women)
- Sexual Transmitted Disease include:
  - Chlamydia (has no symptoms)
  - Cyto megalovirus (CMV)
  - Genital Herpes (can cause implantation problems in women)
  - Gonorrhea (Gonorrhea has no symptoms in women, but do in men, causing male infertility)
  - HIV (Need to make sure that the fetus doesn't get infected)
  - HPV – Human Papilloma Virus
  - Syphilis (The key is early detection. There are three levels: primary, secondary and tertiary)
  - Trichomoniasis
  - Urea plasma and mycoplasma
  - Zika

  Note: Henry VIII may have had syphilis, which affected his queens and children.

Environmental Chemicals that Affect Fertility

- Bisphenol-A or BPA
  - An endocrine disruptor
  - Can prevent eggs from maturing and releasing properly
  - Cause abnormalities in mature eggs, increasing the risk for miscarriages or birth defects
  - Use unprocessed foods
  - Source: https://www.rrc.com/infertility-linked-to-common-chemicals-what-you-should-look-out-for/

- Dioxin
  - Not listed on ingredient labels
  - Derived from petroleum sources
  - Lowers sperm count and affects sperm quality
  - Found in tampons, meat, and dairy products
  - Source: The Filthy Five of Toxic Chemicals by Nicole Thompson https://www.womensvoices.org/2014/11/07/the-filthy-five-of-fertility-and-toxic-chemicals/

Note #1: Agent Orange contained Dioxin.

Note #2: This is just a sampling of the main chemicals that are known to affect fertility, listed in alphabetical order. This is not by all means all of them. Also, long term exposure in minute amounts to multiple chemicals can also play havoc with trying to start a family as well as our health.

Environmental Chemicals that Affect Fertility

- Glycol Ethers
  - Lower sperm counts
  - Shrunken testicles
  - Found in paints, perfumes, soaps, cosmetics, and foods
  - Source: The Filthy Five of Toxic Chemicals by Nicole Thompson https://www.womensvoices.org/2014/11/07/the-filthy-five-of-fertility-and-toxic-chemicals/
- Lead
  - Linked to lower sex hormone levels
  - Linked to miscarriage
  - Reduced fertility in men and women
  - Delays in puberty onset in girls
  - In many cosmetic products
  - Source: The Filthy Five of Toxic Chemicals by Nicole Thompson
  - https://www.womensvoices.org/2014/11/07/the-filthy-five-of-fertility-and-toxic-chemicals/
  - Note: Lead is a heavy metal.

Environmental Chemicals that Affect Fertility

- Mercury
  - Used everywhere, in batteries, paints, light bulbs, and disinfectants
  - Linked to higher rates of infertility and miscarriage
  - Higher levels of impotence in men
  - Avoid fish high in mercury (check Health Fish List from NRDC)
  - Source: https://www.rrc.com/infertility-linked-to-common-chemicals-what-you-should-look-out-for/
  - Note: Mercury is also a heavy metal like lead.
- Non-Stick Chemicals
  - Used on non-stick cookware
  - Linked to both male and female infertility
  - Affects in utero exposure, resulting in t heir infertility
  - Avoid non-stick surfaces and avoid restaurants that use them in their kitchens
  - Source: https://www.rrc.com/infertility-linked-to-common-chemicals-what-you-should-look-out-for/

Environmental Chemicals that Affect Fertility

- Nonylphenol ethoxylates (NPEs)
  - A potent endocrine disruptor
  - Causes feminization of aquatic life
  - Decreases male fertility
  - Decreases survival in young fish
  - Found in laundry detergents, all-purpose cleaners, used in paints, pesticides, personal care products, and plastics
  - Source: The Filthy Five of Toxic Chemicals by Nicole Thompson

- Perfluorinated chemicals known as PFCs
  - It took women longer to get pregnant
  - Two types of PFCs
    - PFOS-Perfluorooctane sulfonate
    - PFOAs-Perfluorooctanoate
  - Avoid non-stick cookware
  - Quite persistent in the environment
  - Found in every day items
  - Source: Title: Common Chemicals May Affect Fertility by Kathleen Doheny, posted Jan. 28, 2009. https://www.webmd.com/infertility-and-reproduction/news/20090128/common-chemicals-may-affect-fertility#1

Environmental Chemicals that Affect Fertility

- Pesticides
  - Used to kill pests, so that it is understandable that it would affect humans
  - Linked to endometriosis and miscarriages
  - Increase levels of estrogen can affect the reproductive hormonal function
  - Affects sperm count and motility
  - Try to get organic food
  - Source: https://www.rrc.com/infertility-linked-to-common-chemicals-what-you-should-look-out-for/

- Phthalates
  - Lowers sperm count and mobility
  - Cause testicular cells to die earlier than they should
  - Birth defects in the male reproductive system
  - Thyroid irregularities
  - Found in plastic food containers

  - Source: : Title: The Filthy Five of Toxic Chemicals and Fertility by Nicole Thompson, https://www.womensvoices.org/2014/11/07/the-filthy-five-of-fertility-and-toxic-chemicals/

Note: Another chemical is Atrazine, which has turned male frogs into female frogs. It raises questions on its effect on humans.

Foods to Boost Fertility

- Plant based food diet
  - Fruit
  - Vegetables (especially complex carbs)
  - Herbs
  - Spices
- High Quality Dairy
  - Live culture yogurt
  - Kefir
  - Organic goat and cow cheeses
- Oils
  - Raw olive oil
  - Avocado oil
  - Coconut oil

Note: Use organic sources when possible. Remember the dirty dozen and clean fifteen by EWG.

Note: These foods reduce oxidative stress.

Foods (to avoid) that Affect Fertility

- Alcohol – can interfere with ovulation, egg movement in the fallopian tubes and healthy implantation
- Artificial sweeteners
- BHA-mimics estrogen and confuses the body's natural estrogen receptors
- Candy
- Coffee
- MSG – monosodium glutamate
- Pasta
- Peas
- Potatoes
- Processed meat – hot dogs, salami, bologna, and luncheon meats
- Rare red meat
- Rice
- Soda
- Wheat bread
- White Flour

Source: Dr. Lisa Watson, ND

Recommendations to Improve Outcome (Lifestyle changes)

- One, give up smoking (for both women and men)
- Avoid heavy alcohol consumption
- Say no to recreational drugs (and limit prescription drugs)
  - Cocaine
  - Marijuana – lowers sperm count
- Avoid anabolic steroids
- Quality of Your Nutrition and Diet (both food and supplements)
  - Minimize processed foods with a lot of additives
  - Supplements need to come from reputable sources
- Reasonable Exercise

- Note #1: It would be a good idea to remove dental fillings containing mercury prior to starting a family, especially in women.
- Note #2: It is also a good idea to space your children, to give the mother's body time to rebuild its nutritional status. Three years is an optimum length of time.

Recommendations to Improve Outcome (Weight Issues)

- Being overweight leads to excess fat cells and excess levels of estrogen. Elevated estrogen levels can cause your body to react as if it is on birth control, preventing ovulation.
- Being underweight is associated with increased insulin levels. Elevated insulin levels causes the ovaries to overproduce male hormones (testosterone), and blocking the release of the egg.
- One third of the body's estrogen is produced in fat cells.

Source: Dr. Lisa Watson, ND

Medical Testing Basics

- Check blood levels
- Check thyroid function
- Run a chemistry panel
- Check blood count
- Check medications, especially prescription medications. Include over the counter medications, too.

- Note: If your physician spots problems, additional testing may be required. In some people, in both men and women, there can be physical abnormalities which is another whole topic.

Addendum

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- Antioxidants, Role of
- Bibliography
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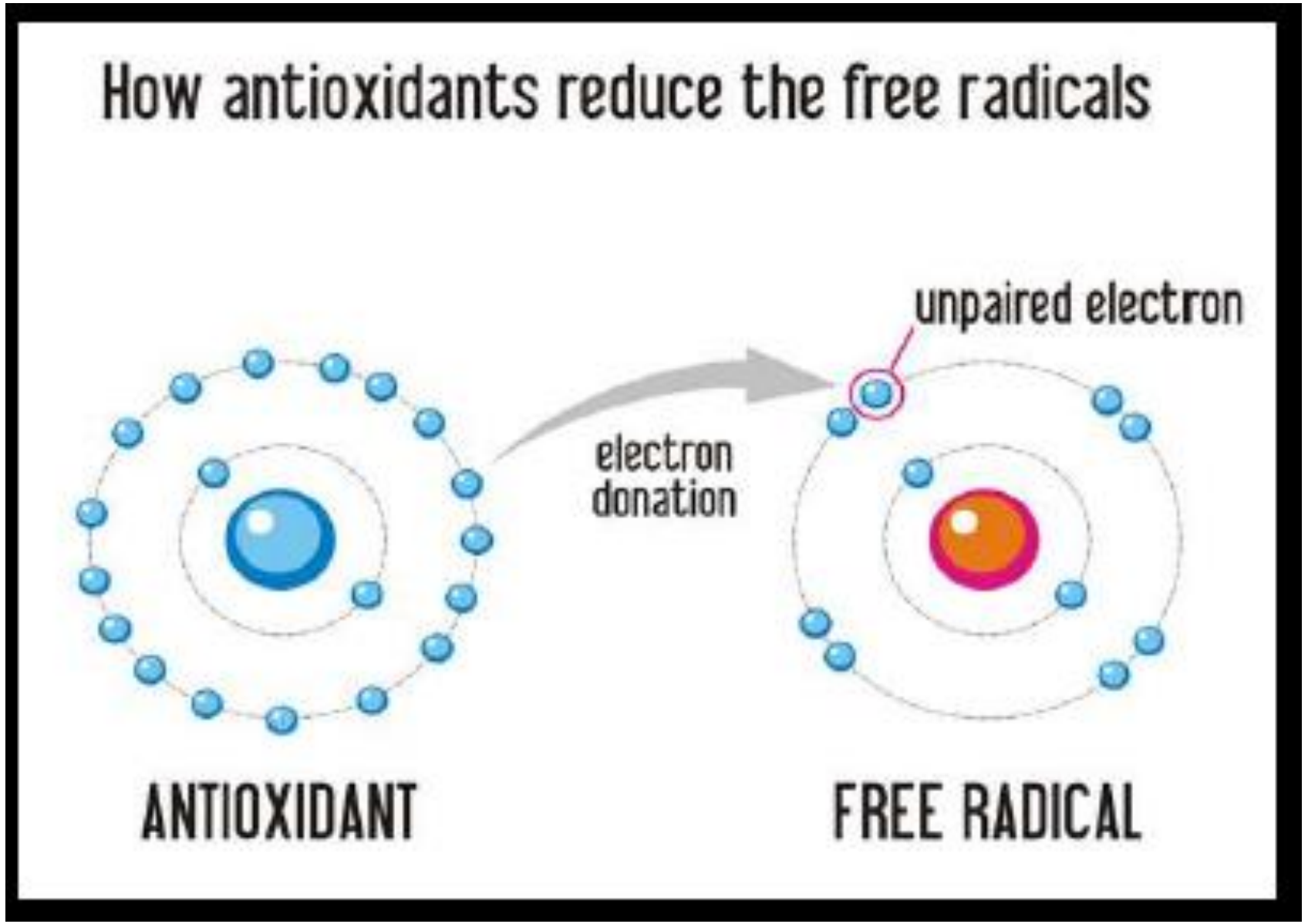
- Slides Listing Various Nutrients Helpful for Fertility

Addendum: Antioxidants, Role of



Source: Dr. Niranjan Chavan, MD

Addendum: Bibliography

- The Baby Solution: Your essential resource for overcoming Fertility (2006) by Daniel Kenigsberg, MD with Laura Hartman. (Publisher: Penguin Group/Avery)
- Getting Pregnant for Dummies (2020) by John S. Rinehart, MD, PhD, JD, Lisa A. Rinehart, RN, BSN, JD, and Sharon Perkins, RN. (Publisher: John Wiley & Sons)
- The Thyroid Solution: a revolutionary mind-body program for regaining your emotional and physical health (2007)by Ridha Arem, MD. (Publisher: Ballantine Books)

Addendum: Bibliography continued

- Title: Common Chemicals May Affect Fertility by Kathleen Doheny, posted Jan. 28, 2009. https://www.webmd.com/infertility-and-reproduction/news/20090128/common-chemicals-may-affect-fertility#1
- Title: The Filthy Five of Toxic Chemicals and Fertility by Nicole Thompson, https://www.womensvoices.org/2014/11/07/the-filthy-five-of-fertility-and-toxic-chemicals/
- Title: Infertility Linked to Common Chemicals (What You Should Look Out For) https://www.rrc.com/infertility-linked-to-common-chemicals-what-you-should-look-out-for/
- Title: Atrazine & birth defects, another link, by Pesticide Action Network, http://www.panna.org/blog/atrazine-birth-defects-another-link

Addendum: Bibliography continued (Slideshare.net Powerpoints/pdf documents)

- Slideshare/Powerpoints from slideshare.net
  - Enhancing Fertility Naturally, presented by Dr. Lisa Watson and the Integrative Health Institute, no date, 123 slides-An excellent presentation and it covers lifestyle changes.
    - Website: www.drlisawatson.com
    - Email:drlisa@drlisawatson.com
  - Micronutrient in Female Infertility by Dr. Niranjan Chavan, MD., 44 slides
    - Website: https://drniranjanchavan.com/
  - Role of Micronutrients in Male Infertility by Dr. Shashwat Jani, M.S.
    - Consultant Assistant Professor
    - SMT, N.H.L. Municipal Medical College
    - Sheth V.S. General Hospital, Ahmedabad, India
    - Email: drshashwatjani@gmail.com

Addendum: Diseases that affect fertility

- Diabetes can cause problems
- Endometriosis – growth of endometrial tissue (pieces) outside the uterus
- Heart Attacks
- Hypertension and other vascular diseases
- Hypothyroidism or Hyperthyroidism (Thyroid issues is covered in this powerpoint)
- Leukemia
- Liver Cirrhosis

Addendum: Disease that affect fertility continued

- Lupus and other immune disorders can cause problems
- Polycystic ovary syndrome (PCOS) – 5 to 10% of the women have it, overabundance of insulin causes the ovaries to make to much androgens (male hormones) and leads to:
  - Discoloration of the skin under the arms, breasts, and groin areas
  - Excess facial hair
  - Acne
  - Thinning hair
- Renal Failure
- Sickle cell anemia
- Note: Some surgeries can also affect fertility. In some people, physical deformities in the reproductive organs can also play a role.

Addendum: Electromagnetic Radiation Exposure

- Another area worth exploring would be the impact of electromagnetic radiation on fertility. With computers, WIFI towers, now 5G, microwave radiation, dirty electricity, we are increasingly being exposed to higher levels of electromagnetic radiation. Dr. Lisa Watson, a Canadian naturopathic physician, touches on this topic.

Addendum: Glossary

- Amenorrhea – absence or abnormal stoppage of the menses/periods
- Antioxidants – Are biological chemical compounds that reduce oxidative damage. They include vitamins, minerals, and polyunsaturated fatty acids (PUFAS).
- Azoospermia – means no sperm
- Blastocyst – The blastocyst is a structure formed in the early development of mammals. It possesses an inner cell mass (ICM) which subsequently forms the embryo.
- Cryopreservation – a method of freezing sperm or eggs for later fertilization
- Embryo – initial stage of the fertilized egg, egg fertilized by the sperm
- Endocrine disrupters – substances that can be confused with actual hormones by our bodies, and will not perform the same way as the real hormone

Addendum: Glossary continued

- Follicles – Fluid filled sacs in the ovaries that contain the eggs that will ripen and are released through ovulation, also one will mature/ripen
- Menstrual cycle has two cycles:
  - Ovarian cycle, times the ovulation
  - Uterine cycle which prepares the uterus to receive and nurture, fertilize the egg, and clean off the uterine lining which result in menstruation
- Miscarriages – Can occur because of chromosomal abnormalities (which increases with age and more exposure to environmental toxins)
- Motility – the ability to move spontaneously, or the rate or degree of such movement (biology)
- Oligomenorrhoea – infrequent menstrual flow or irregular periods
- Oligospermia – Means poor sperm quality

Addendum: Glossary continued

- Oocyte –developing egg cell in one of two stages
- Ovulation kits measure the LH (luteinizing hormone) - It rises 24 to 36 hours before ovulation
- Oxidative Stress – act of oxidizing, affect the number of atoms (loss of an electron), Oxidative stress is one of the factors related to the pathogenesis of fertility disorders, such as idiopathic infertility, polycystic ovarian syndrome, and endometriosis. (Source-Dr. Chavan)
- Pelvic Inflammatory Disease (PID) – Complication from a sexual transmitted disease, result of chlamydia trachomatis or Neisseria gonorrhea of the cervix or vagina, spreads to the endometrium, fallopian tubes , ovaries, and adjacent structures
- Polycystic Ovarian Syndrome (PCOS) – One characteristic is insulin resistance, leads to increased testosterone levels and hormone imbalance

Addendum: Glossary continued

- Reproductive endocrinologist and infertility specialist – a doctor that specializes in fertility issues
- ROS – Reactive Oxygen Species – Damages the DNA of oocytes and spermatozoa, resulting in defective fertilization. Also causes apoptosis (cell death), leading to implantation failure, abortion (caused by the body), and embryo fragmentation
- Spermatozoa-plural of spermatozoon, a mature male germ cell, another word for sperm
- Traditional Chinese Medicine (TCM) – An approach towards wellness and based on hundred of years of practice, and is more holistic and seeks balance. Acupuncture, part of Traditional Chinese Medicine, has been found to increase fertility outcomes.

Addendum: Hormones Responsible for Reproduction

- Estradiol – produces by the ovaries, influences ovulation
  - With progesterone, prepares the uterine lining for implantation and for the embryo
- Progesterone – produced by the ovaries after ovulation
  - Progesterone helps with the uterine lining's development to support the early embryo
- Follicle stimulating hormone (FSH)
  - Stimulates the ovary to develop resting follicles, which in turn produces estradiol and mature eggs. The pituitary gland produces FSH.
- Luteinizing hormone (LH)
  - Stimulates the ovaries to produce estradiol, completing egg maturation and triggering the release of an egg or eggs in ovulation (Kenigsberg, page 24)

Note: As hormones play a major role in the reproductive process, endocrine disruptors can play havoc with this process.

Addendum: Medical Testing, Additional

- Baseline Blood Tests
- Test on Egg quality
- Estradiol
- Follicle Stimulating Hormone (FSH)
- Luteinizing Hormone (LH)
- AMH
- Progesterone
- Prolactin
- Thyroid tests(over or under active)
- DHEA-Sr
- Fasting Insulin
- Immune Disorders
- Anti-phospholipids antibodies (APA)
- Antinuclear Antibodies (ANA)
- Antithyroid Antibodies (ATA)
- Antivarian Antibodies (AOA)
- Vitamin D
- Infectious Diseases

Source: Getting Pregnant for Dummies, page 185-190

Addendum: Other Issues Regarding Fertility/Infertility

- Ovulation is only 2 to 3 days
- Quality of egg matters
- Egg last 18 to 24 hours after release
- Sperm can last two to 3 days
- Can take basal temperature, progesterone causes an increase in the body's temperature
- Cervical mucous increases in amount and becomes thinner during ovulation
- A product called TesTape, a yellow paper to test the cervix, turns color olive before ovulation, dk green or dk blue w hen cervical mucous is alkaline (page 102)
- Saliva test (page 106) dummies book
- Mornings best time for intercourse (and not doing it the previous evening)
- Avoid tampons that can contain dioxin (use organic ones)

Addendum: Prescription Drugs that affect fertility

- Antibiotics such as erythromycin or gentamycin or antifungal medication such as ketoconazole, anabolic steroids, methotrexate, they affect the sperm
- Certain blood pressure medications can affect sperm function
- Over the counter medication like NSAIDs (including ibuprofen) can affect ovulation and increase bleeding. Aspirin can increase bleeding Source: Dummies, page 76
- Testosterone injections can lower sperm count

Addendum: Reasons to seek medical attention

Women

- Ectopic pregnancy
- Irregular periods
- Painful periods
- Pelvic inflammatory disease (PID)

Men

- Mumps as a child
- Trauma to testicles
- Undescended testicles
- Vasectomy

Addendum: Supplements for Better Sperm Production

- Zinc
- B12
- Vitamin C
- Vitamin E
- Selenium
- L-Carnitine
- L-Arginine
- Folic Acid
- Coenzyme Q10

- Source: Dummies, p. 159
- Role of these nutrients are covered in more detail in this addendum.

Addendum: Thyroid Issues

- The thyroid is a master gland, with a role in all areas of the body.
- Thyroid issues can affect infertility as well as depression and affect desire for sex
- Stress, depression, anxiety, tiredness, and other emotional or mental states can mask a thyroid imbalance
- As many as 30 million people have a thyroid disorder, with 10 million women with low grade thyroid imbalance and another 10 million remain undiagnosed
- Next three slides cover symptoms on the thyroid's effect on infertility, mental health, and other symptoms.

Source: The information is from Thyroid by Ridha Arem, MD, various pages on these four slides.

Addendum: Thyroid's Effect on Fertility

- 1. regulates the production of sex hormones (estrogen and progesterone)
- 2. Hormonal cycle affecting ovulation
- 3. Can prevent ovulation
- 4. Can lead to deficit of progesterone needed for the implantation of the embryo
- 5. One out of every six couples are experiencing infertility (pg 211)
- 6. Any woman experiencing infertility, needs to have their thyroid checked
- 7. Higher rate of miscarriages in women with thyroid imbalances and more birth defects
- 8. Postpartum depression now affects one in four women-need to check the thyroid (pg 220)
- 9. Pregnancy places considerable demands on the thyroid (pg 274)
- 10. Can affect sex drive/libido

Addendum: Thyroid's Effect on Mental Health

- Can contribute to depression
- Can play a role in panic attacks and bipolar (pg. 61)
- Crippling anxiety
- Memory and concentration issues
- Overwhelmed and exhausted

Addendum: Thyroid's Effect on Other Symptoms

- Can affect weight
- Carpal tunnel
- Constipation
- Decreased movement of gastrointestinal tract
- Elevated triglycerides
- Feet swelling
- High blood pressure
- High cholesterol
- High homocysteine (take folic acid)
- Inflammation in blood vessels
- Lowers defense against infections
- Numbness, sensation of pins and needles in hands and feet
- Viral and fungal infections

Addendum: Slides Listing Various Nutrients Helpful for Fertility

- Next four slides list a number of nutrients. Many of them are micronutrients (nutrients in very small amounts). We also have a few herbs that affect fertility, either in women, men or both.
- The source for this information comes from three different sources:
  - One, Dr. Lisa Watson, MD (from Canada) and www.drlisawatson.com
  - Two, Dr. Shashwat Jani, MS (from India)
  - Three, Dr. Niranjan Chavan, MD (from Mumbi) and https://drniranjanchavan.com/
  - These doctors have posted their PowerPoints in SlideShare, a website that people can post their PowerPoints.

Nutrient Micronutrient	Women	Men
American Ginseng (herb)	no information	Can improve male libido, sperm motility, decrease sperm defects (Source-Watson)
Arginine (amino acid)	Improves endometrial blood flow (Source-Niranjan Chavan)	Improves sperm county and motolity with supplementation (Source-Shashwat-Jani)
Black Cohosh (herb)	Normalize hormonal activity especialy estrogen, anti-spasmodic (Source-Watson)	no information
Calcium (mineral)	Deficiency results in reduced estrogen levels, affects egg production and ovulation (Source-Watson)	no information
Chasteberry - Vitexagnus-castus (herb)	Helps balance LH and FSH, ultimately estrogen and progesterone, helps with PMS and irregular menstrul cycles (Source-Watson)	no information
Coenzyme Q10	Results in more mature eggs and healthier embryos; protects eggs from free radical damage (Source-Watson)	Improves sperm motility by providing energy through ATP generation in mitochondria, improves cellular energy (Source-Jashwat Jani)
Folate (B vitamin)	Decreases spinal defects, enhance fertility (Source-Watson) Supplementation resulted in increased clinical pregnancy rate (Source-Shashwat Jani)	Helps with sperm count, needed for rapidly dividing cells, including sperm (64% of the men don't get enough folate) (Source-Watson) Adequate folic acid intake results in decreased frequency of sperm DNA abnormalities (Source-Shashwat Jani)

Nutrient Micronutrient	Women	Men
Glutathione	no information	Essential for foration of phospholipid hydroperoxide glutathione peroxidase (Source-Shashwat Jani)
Iron (mineral)	Deficiency disrupts the menstrual cycle; iron important for fetal health, prevents pregnancy complications (Source-Watson) Iron supplementation along with multi-vitamin results in lower risk of ovulatory infertility (Source-Shashwat Jani)	no information
L-Carnitine	Helps with weight loss, glucose tolerance, insulin function and fatty acid metabolism, helps PCOS women, improving both ovulation and pregnancy rates. (Source-Shaswat Jani) Improvement in the blastocyst development rate by preventing lipid peroxidation (Source-Niranjan Chavan)	Found low in infertile men, improves sperm motility not sperm count (Source-Watson) Improves sperm motility by providing energy to the sperm cell through fatty acid metabolism, needed in epididymal tissues, seminal plasma and spermatoza, helps with sperm maturation, needed for cellular energy (Source-Shashwat Jani)
Lycopene	no information	Increases sperm count and improves morphology by reducing oxidative damage to sperm DNA and lipids (Source-Shaswat Jani)
Melatonin	Protects eggs against oxidative damage, supplementation can lead to high numbers of mature eggs and higher q uality embryos, and helps with progesterone levels (Source-Watson) Regression of emdometriotic lesions, increase the number of fertilized embryos (Source-Niranjan Chavan)	no information

Nutrient Micronutrient	Women	Men
N-Acetyl Cysteine	Improves insulin sensitivity in PCOS, when used with folate, decreases the risk of miscarriage for women with recurring pregnancy losses (Source-Watson) Needed for fertile cervical mucus and ovulation (Source-Niranjan Chavan)	no information
Polyunsanturated Fatty Acids	Influence prostaglandin synthesis and steroidognenesis and is part of the cell membranes of the sperm and oocyte (Source-Niranjan Chavan)	no information - see the one for women
Selenium (mineral)	Selenium with magnesium supplementation resulted in increased levels of RBC-Mg and serum glutathione peroxidase, and improved fertility rates (Source-Shashwat Jani)	Essential to sperm production, motility, and function, helps balance male hormones (Source-Watson) Deficienices of selenium can lead to instability of the mid-piece, resulting in defective sperm motility (do not consume in excess)(Source-Shashwat Jani)
Vitamin A	no information	Essential to sperm production, deficiencies of Vitamin A have been linked to male infertility (Source-Watson)
Vitamin B6	Increases levels of serotonin and dopamine, 2 transmitters that influence the production of LH and FSH (source-Watson)	no information

Nutrient Micronutrient	Women	Men
Vitamin B12	no information	Needed for cellular replication, especially for RNA and DNA, deficiency states have been associated with decreased sperm count and motility, works in just 20% of infertile men (Source-Shashwat Jani)
Vitamin C	no information	An anti-oxidant, found in high concentrations in semen (Source-Watson) Reduced DNA damage, increased rates blastocyst development, improved sperm progressive motility (Source-Niranjan Chavan)
Vitamin D	Deficiency can contribute to infertility (Source-Watson) Supplementation resulted in increased clinical pregnancy rate (Source-Shashwat Jani)	no information
Vitamin E	Increased endometrial thickness (Source-Shashwat Jani and Niranan Chavan) Benefit to women with PCOS in lowering hyperandrogenism (Source-Niranjan Chavan)	Decreases malondialdehyde concentation and improves sperm motility (few studies) (Source-Shashwat Jani)
Zinc (mineral)	Very strong anti-oxidant (Source-Niranjan Chavan)	Very strong anti-oxidant (Source-Niranjan Chavan) Deficiency results in decreased testosterone levels and sperm count, zinc has anti-apoptic and anti-oxidant properties (Source-Shashwat Jani)

Note: Dr. Niranjan Chavan, MD list a number of enzymes with antioxidant properties. They include: catalase, glutathione oxidase, glutathione peroxidase, and superoxide dismutase.

Conclusion

- As we conclude this presentation, fertility issues becomes everyone's concern. It is not just a problem in the United States, it has become a world wide problem. According to Dr. Chavan, as many as 186 million people may be experiencing infertility issues world wide.
- It also points out to our lack of leadership in supporting health as a prime priority as well as the need for universal health care in the United States.
- The constant attacks on Planned Parenthood does not reflect well on our legislators (and voters) that focus too much on abortion issues, when there are other pressing health issues, including the health issues facing American children.
- Healthy parents as well as healthy children should be every society's top priority. It is our future.
- This presentation was designed to basically highlight issues regarding infertility. The resources listed in the bibliography provide more information.

Addendum B: Added Information

- Dr. Niranjan Chavan, MD mentions the role of myo-inositol, a member of the B vitamin family. It helps ovarian function and decreases hyperandrogenism (excessive levels of testosterone in women) and insulin resistance. Source is a PowerPoint called Micronutrients in Female Infertility in Slideshare.net.