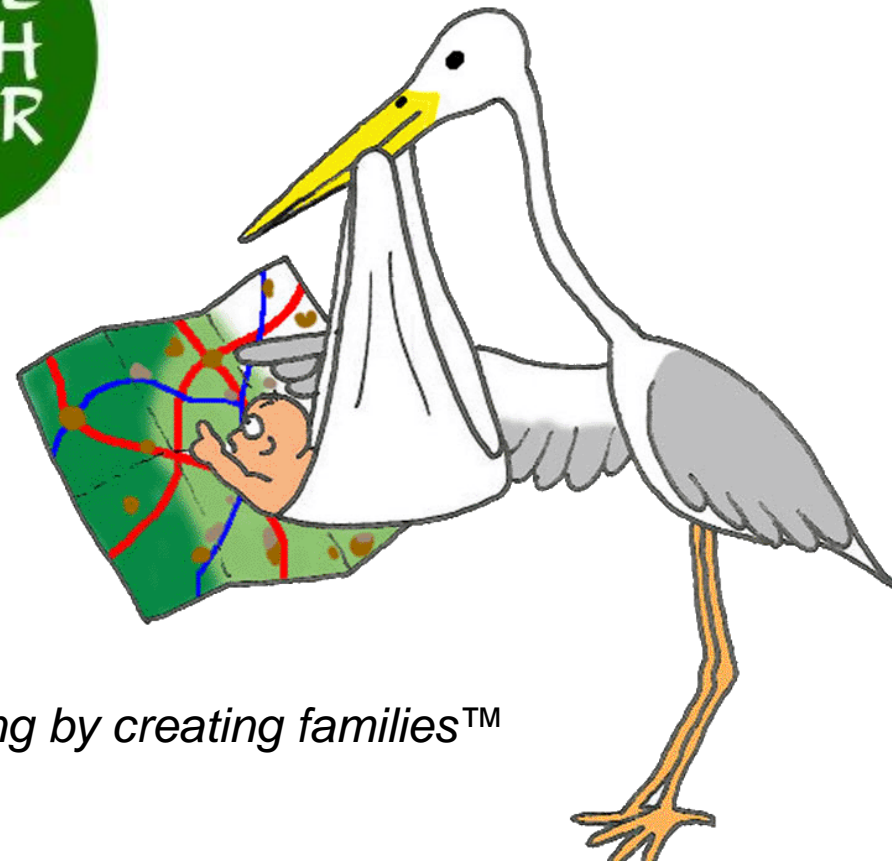


# Dynamic Fertility Series

Providing the Best of East and Western Medicine



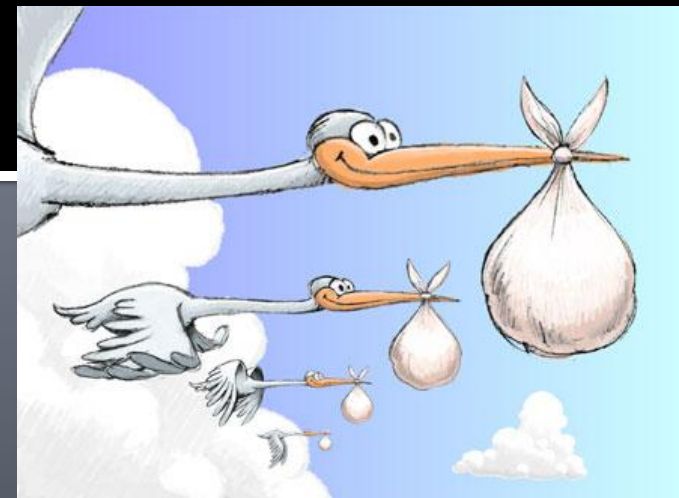
*Healing by creating families™*

**Paul C Magarelli, M.D., Ph.D.**  
**Board Certified**  
**Reproductive Endocrinologist &**  
**Infertility Specialist**

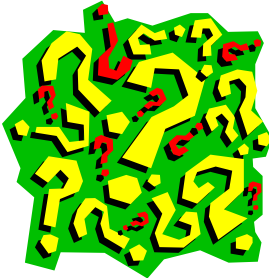
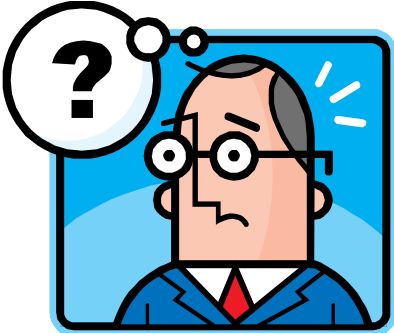
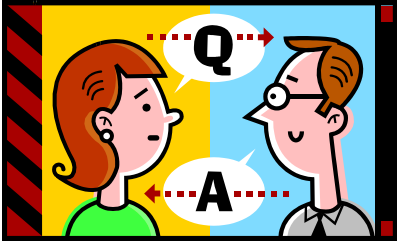


**Reproductive Medicine & Fertility Centers**  
**265 Parkside Drive, Suite 200**  
**Colorado Springs, CO 80910**

719-475-2229  
[info@RMFCFertility.com](mailto:info@RMFCFertility.com)



# What questions can I answer for you?



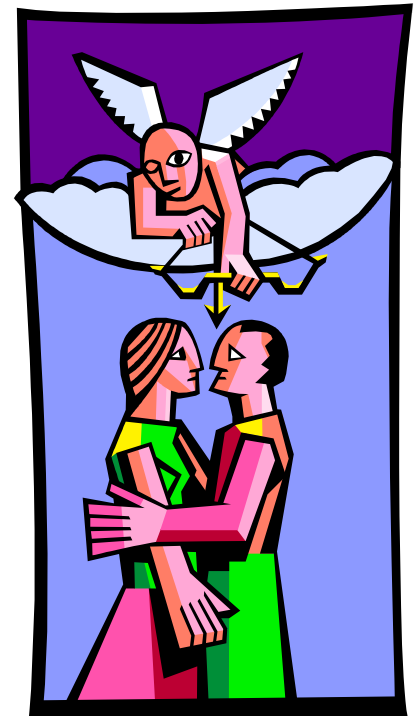
# What can we do to help you create a baby?

- Tell you what's wrong
  - Lab Tests
  - Physical Exam and Ultrasound
- Give you choices and what each choice will entail
  - Treatment Consult
- Tell you the FULL costs
  - Financial Consult
- Help you with financials
  - Payment plans (only practice still doing this!)
  - Discounts for Military
  - Coupons worth 100's of dollars
  - Education seminars worth \$ 1,000 dollars

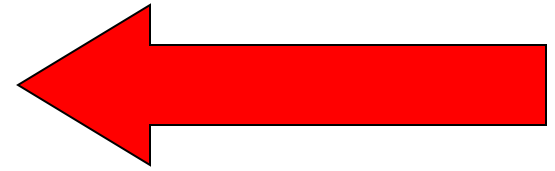


# Today's Fertility rituals!

- Sex, then more sex, then timed sex, then more sex, then resentful sex, then planned sex, then concerned sex, then worried sex, then call friends, then more sex, then call MOM, then really worried sex, then begrudged sex, then call the doctor!

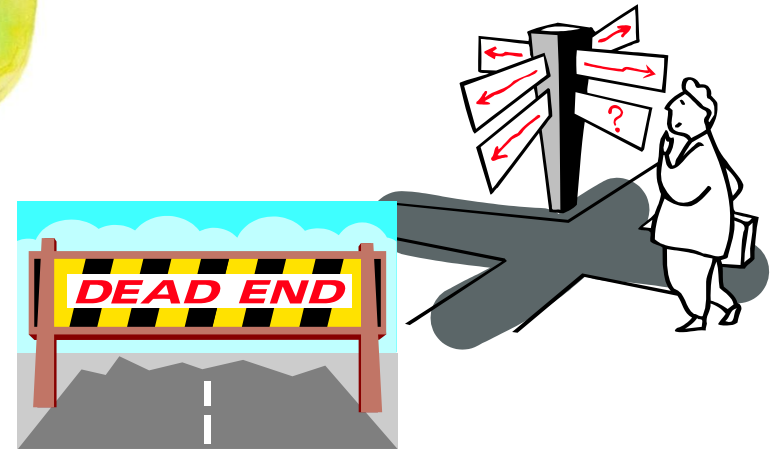


# Embrace the Journey!

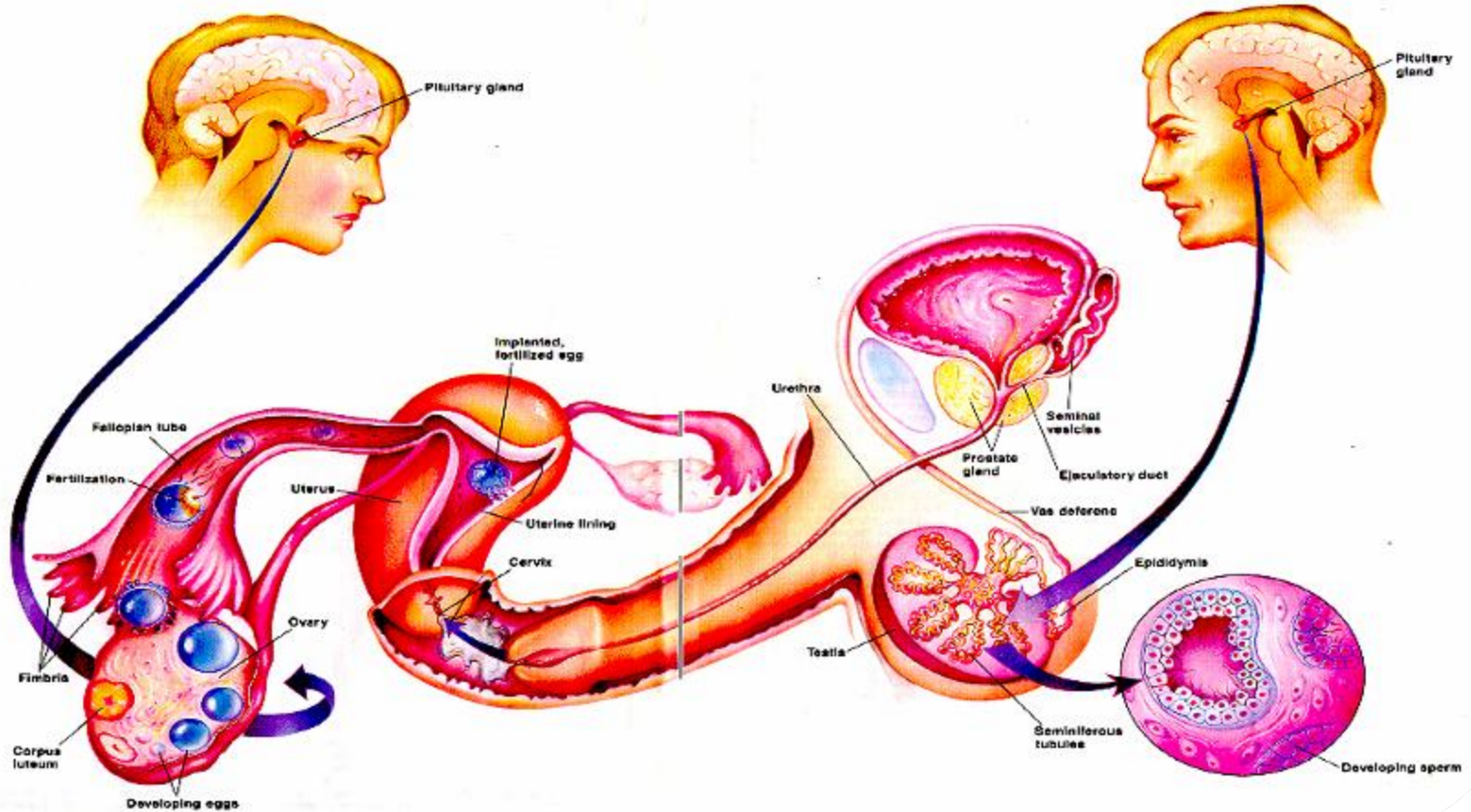


**Our job is to point the way!**

**Our job is to help you avoid  
dead ends!**



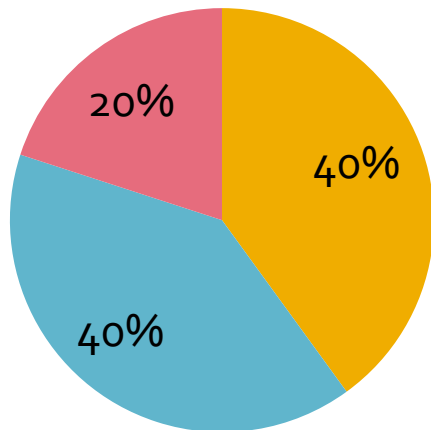
# Biology of Reproduction



# Causes of Infertility

## Causes of Infertility

■ Male ■ Female ■ Couple



### ■ Male

- Sperm Shape
- Sperm Motility
- Sperm Count
- Sperm Function
- Infection of Prostate
- Varicose veins in Testicles
- Genetics

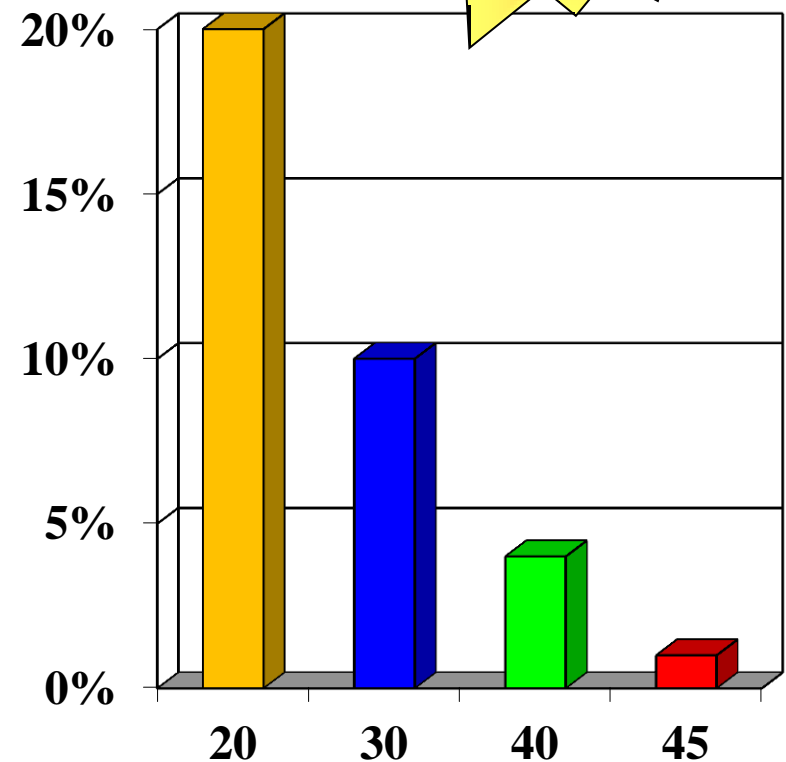
### ■ Female

- Eggs
- Uterus
- Fallopian Tubes
- Hormones
- Infections
- Genetics

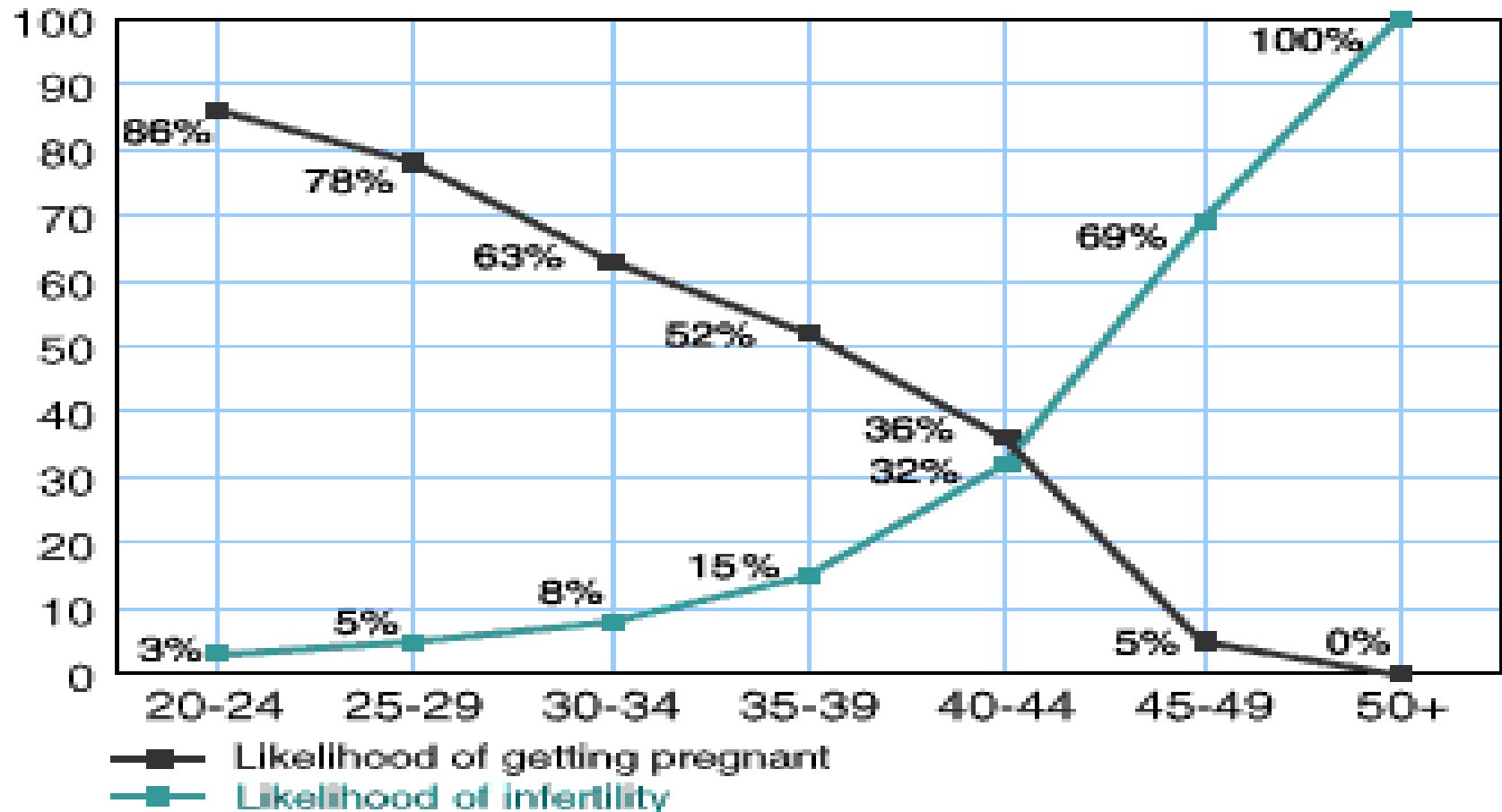


# What are your chances of getting pregnant by intercourse alone at age:

- Age 15
  - **20% per month**
- Age 30
  - **10% per month**
- Age 40
  - **3% per month**
- Age 45
  - **<< 1% per month**



# Chance of Getting Pregnant versus Chance of Being Infertile



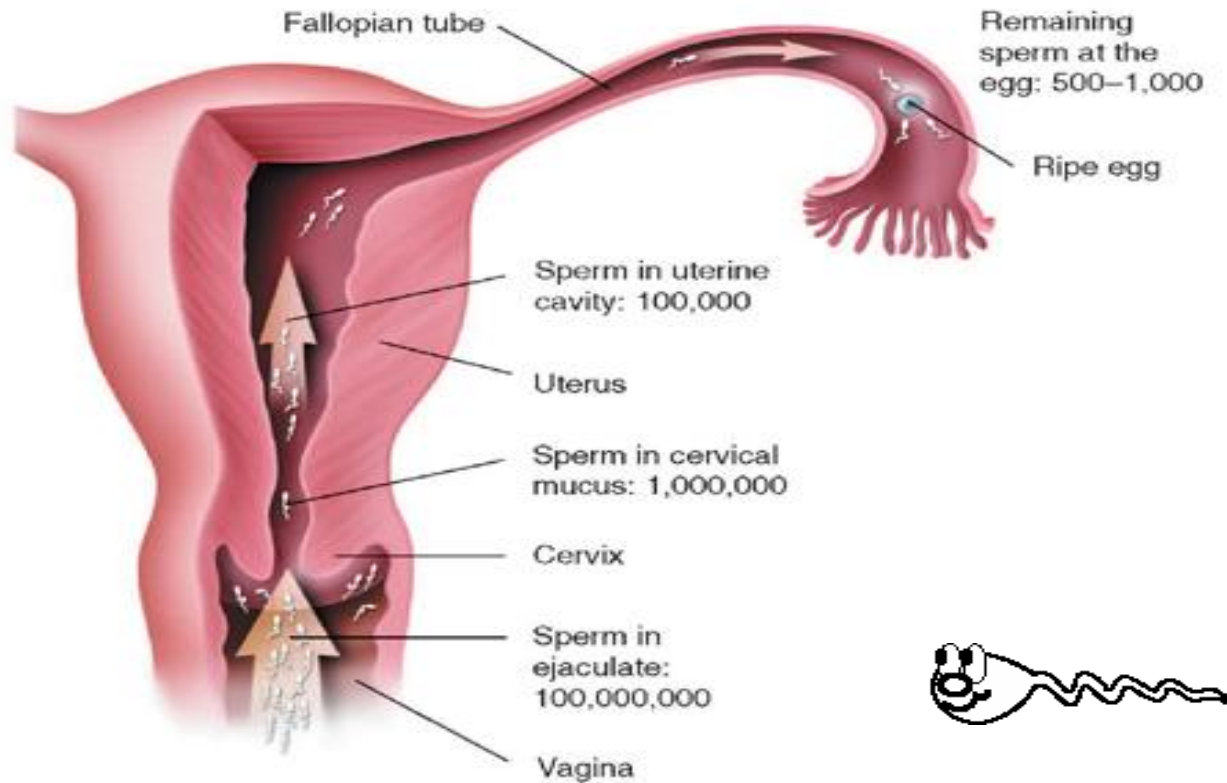
After 12 months of “trying”!!

**Question:**



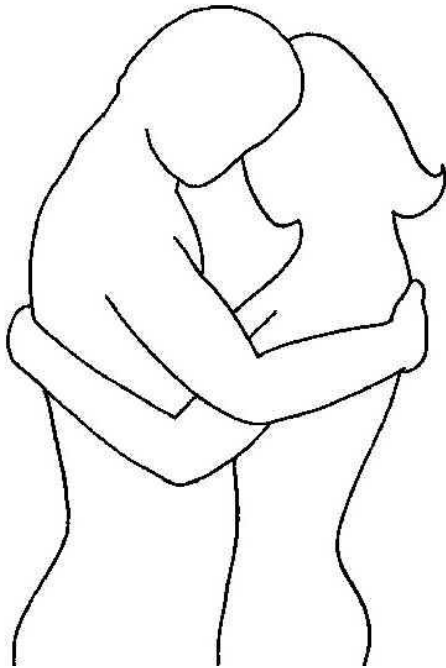
**How many sperm must be ejaculated to have “enough” to fertilize an egg?**

# Answer: Lots!



Of about 100 million sperm that are ejaculated, only around 500 to 1,000 remain by the time they reach the egg at the outer end of the fallopian tube.

# Why is it so hard to create a family?



search ID : tda0030

There's nothing about it in the bird book

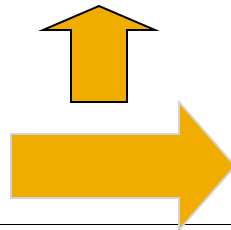
# Answer: Female Eggs, a limited resource!

7,000,000 eggs  
Before delivery

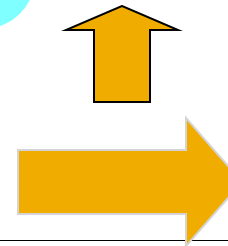


2,000,000 eggs  
Newborn

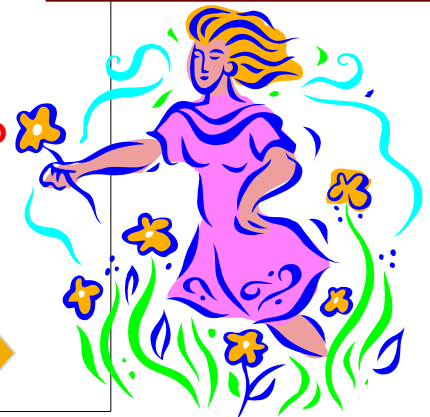
600,000/mo



10,000/mo



400,000 eggs  
at Puberty





**400,000 eggs  
at Puberty  
13 yo**

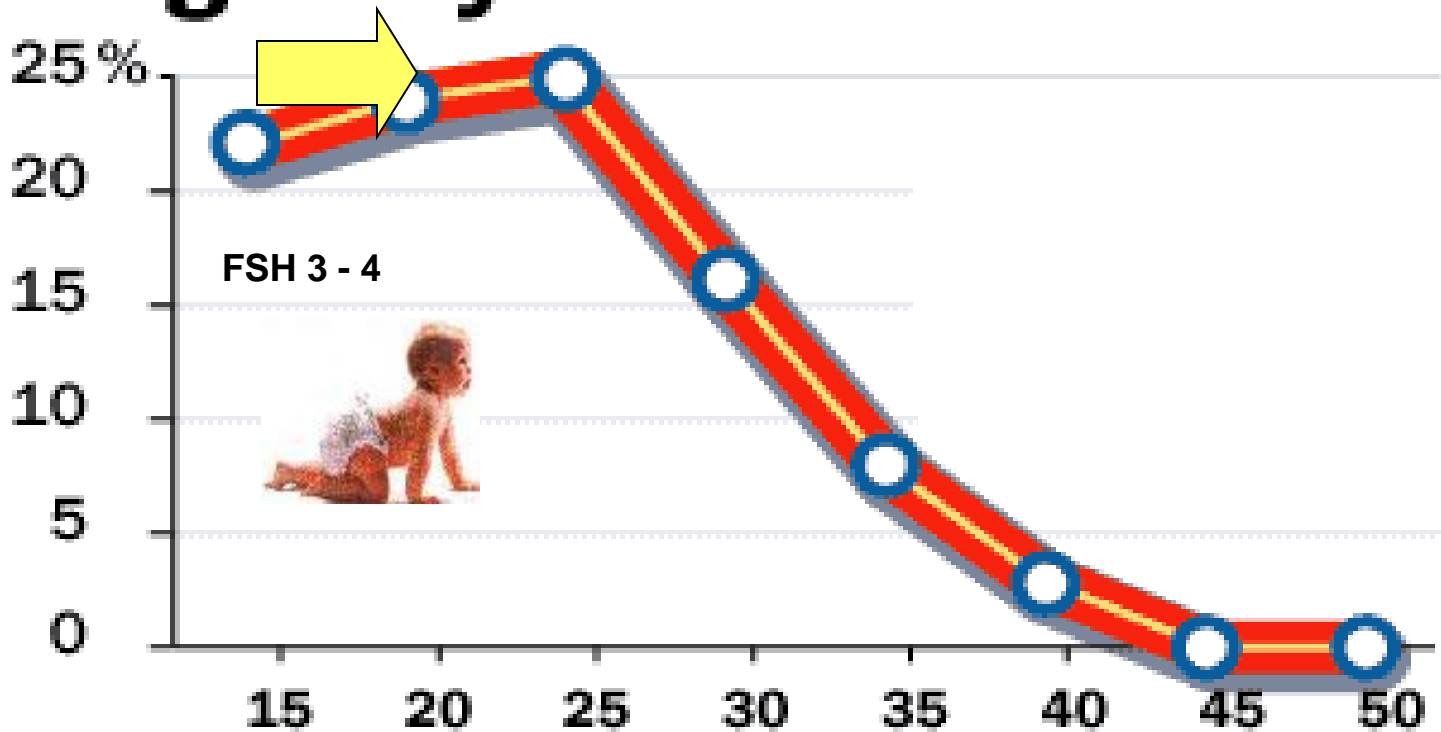
**We lose  
1000 eggs  
per month  
of each  
menstrual  
cycle, whether  
you ovulate or  
not or even if  
you are  
pregnant or on  
birth control  
pills!!**



**Zero (0) eggs  
at Menopause  
50 yo**

# Impact of Loss of Eggs

## Pregnancy Odds each month

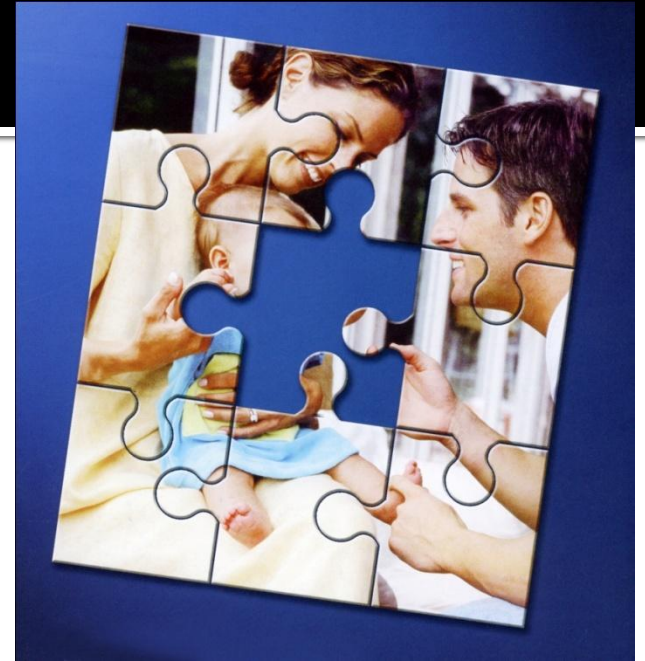


FSH 3 - 4



Age of Female Partner in Years



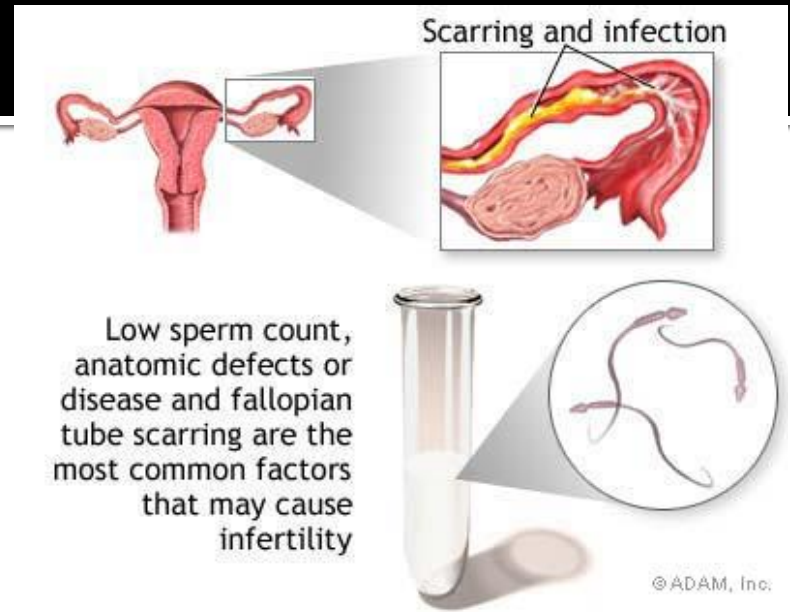


# The Four Questions

# Initial Infertility Workup

## Four Simple Questions

- Q1:
  - Are there sperm?
- Q2:
  - Are there eggs?
- Q3:
  - Can the sperm and egg meet?
- Q4:
  - Is there a safe place to grow a baby?



# Q1: Are there sperm?

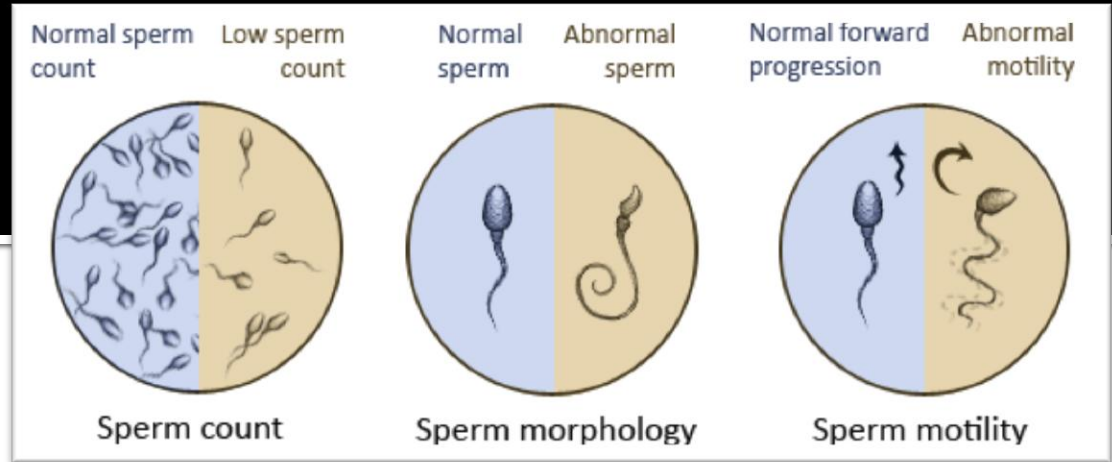
- **Semen Analysis**

- How was it designed?

- All fertile men in one room
- All infertile men in another
- Check sperm
- Divide them into Fertile and Infertile
  - If the man did not fall into the Fertile group he is designated as **Infertile**



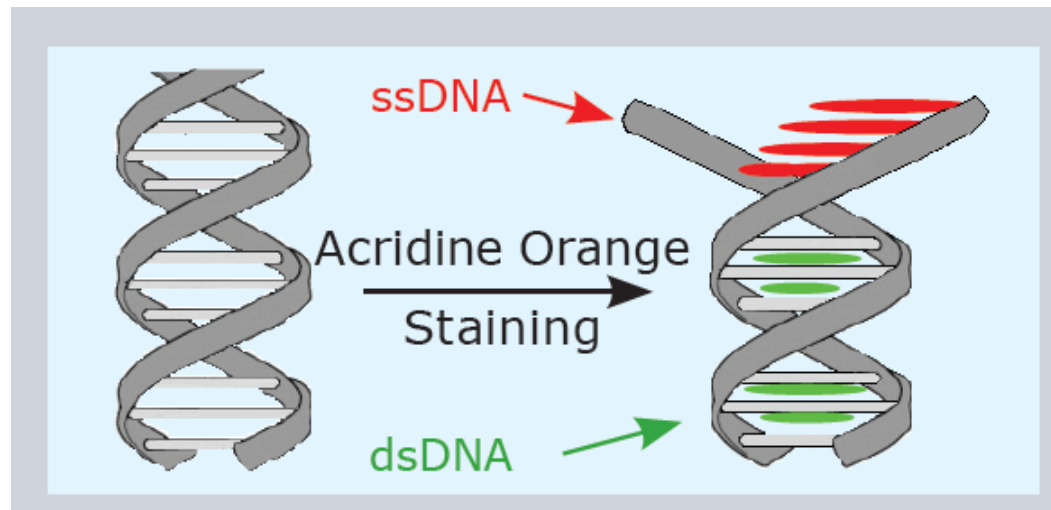
# Semen Analysis



- Count
  - Need minimum of 20,000,000 sperm for each cc or ml of ejaculate
    - **If 19,999,999 the male is INFERTILE**
- Motility
  - Need minimum of 50% "swimmers"
    - **If 49% the male is INFERTILE!**
- Morphology
  - Need minimum of 15% "normal" shaped sperm
    - **If 14% the male is INFERTILE!**

# What about Sperm Function?

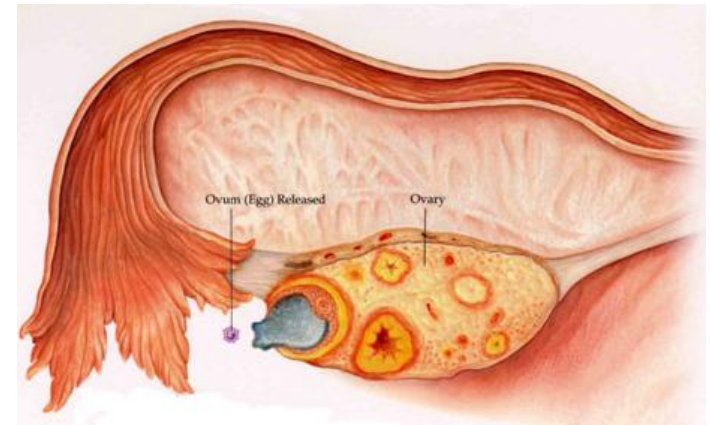
- Sperm DNA Fragmentation Assay (SDFA)
  - Can my sperm work using sexual intercourse?
  - Can my sperm work using IUI or Artificial Insemination?



# Q2: Are there Eggs?

How to test if eggs are available

- Day 3 FSH, Estradiol and LH serum levels
  - **If FSH < 7 mIU/ml**
    - normal ovarian reserve of eggs
  - **If 7 to 10**
    - reduced ovarian reserve
  - **If > 10**
    - marked reduced ovarian reserve
  - **If > 15**
    - very poor ovarian reserve, increased risk of miscarriages, blighted ovum
  - **If > 18**
    - unlikely to have eggs that will result in live birth



# Ovarian Assessment Report™

**SPECIMEN #:** 001244  
**PATIENT:** Ms. Jane Doe  
**DATE OF BIRTH:** 05/07/76

**PHYSICIAN:** Mr. Mohamed Menabawey  
**ADDRESS:** The London Bridge Fertility, Gynaecology and Genetics Centre  
 One St Thomas Street, London Bridge  
 London SE1 9RY United Kingdom  
**PHONE:** +44 (020) 7403 3363  
**FAX:** +44 (020) 7403 8552

**COLLECTED:** 10/08/08 **EST. TIME:** 9 am  
**RECEIVED :** 10/09/08 **EST. TIME:** 10 am

**PATIENT VALUES:** **AMH** 0.3 ng/ml **Inhibin B** 30 pg/ml

**FSH** 8 IU/L **LH** 2.2 IU/L **Estradiol** 30 pg/ml

**MENSTRUAL CYCLE DAY 3 RANGES:** DEPENDENT UPON CHOSEN CLINICAL OUTCOME

<10 **NORMAL** <2 **LOW** <12 **NORMAL**  
 10-12 **BORDERLINE** 2-10 **NORMAL** 12-126 **NORMAL**  
 >12 **HIGH** >10 **HIGH** >126 **HIGH**

## RESULTS

### EGG RETRIEVAL SCORE™

**5** **REDUCED**

**CHANCE OF SUCCESSFUL RETRIEVAL**

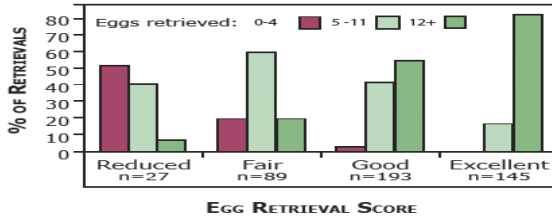
**RANGE**  
 0 to 5 reduced  
 6 to 10 fair  
 11 to 15 good  
 16 to 20 excellent

**COMPARED TO OTHER WOMEN 31 TO 35 YEARS OLD**  
**EGG RETRIEVAL SCORE IS**

**BELOW AVERAGE**

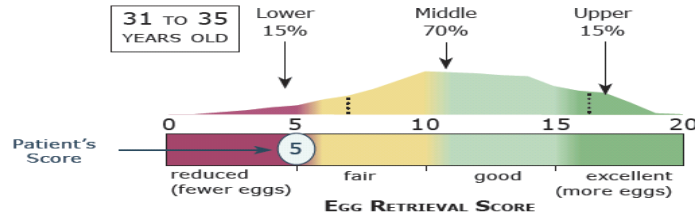
**COMMENTS:** The Egg Retrieval Score indicates that this patient has a reduced chance of retrieving 5 or more eggs through ovarian stimulation. Compared to others in this patient's age group, the Egg Retrieval Score is below average. Ovarian reserve testing alone should not be used as the sole determinant for treatment recommendations.

### OUTCOMES OF 454 EGG RETRIEVALS



The Egg Retrieval Score™, which ranges from 1 to 20, is an index derived from age along with blood levels of several menstrual cycle day 3 hormones including AMH, inhibin B, FSH, and estradiol. In the graph above, the number of eggs obtained per retrieval from 244 women undergoing 454 egg retrievals is displayed in categories defined by the associated Egg Retrieval Score™ (ERS): reduced, fair, good, and excellent. Within each category, column height represents the percent of retrievals resulting in 0 to 4 eggs, 5 to 11 eggs, or 12 or more eggs.

### EGG RETRIEVAL SCORES IN PATIENT'S AGE GROUP



Displayed in the graph above is a plot of the frequency (y-axis) of each Egg Retrieval Score (x-axis) in women of similar age to the patient receiving evaluation at a fertility clinic. The frequency distribution is divided into three sections by dotted lines to indicate below average (the lower 15%), average (middle 70%), and above average (upper 15%).

ReproSource Fertility Diagnostics™ has performed extensive clinical studies validating the OAR™. The FDA recently issued a draft guidance which states that a diagnostic index derived from multiple laboratory values should be submitted to the FDA to determine if the index and manner of reporting requires review and clearance. In compliance with this new guidance, the OAR™, which also utilizes for "Research Use Only" components for AMH and inhibin B detection, is being submitted to the FDA to determine if clearance is required. Diagnostic index reports that are determined by the FDA to require clearance should, until clearance is obtained, carry the label "For investigational use only. The performance characteristics of this product have not been established."

# Ovarian Assessment Report

**ReproSource**  
Fertility Diagnostics™  
The Source for Fertility Testing & Information™

## INTERPRETATION OF THE ERS™

The Ovarian Assessment Report™ provides the most advanced testing system available today using a single blood sample for assessing the available egg supply for retrieval through ovarian stimulation ("ovulatory egg supply"). The ERS™ takes complex information from multiple factors related to ovulatory egg supply and combines them into a single score.

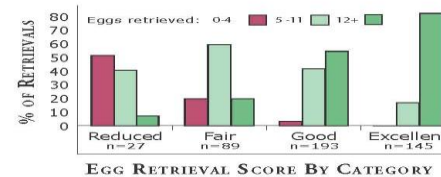
The ERS™ has been calibrated using research involving hundreds of women undergoing multiple egg retrievals<sup>1,2</sup>. The score allows patients and clinicians to better understand the chances of a successful egg retrieval which most fertility experts defined as yielding at least five eggs. However, this still does not mean that the eggs will be of sufficient quality to produce a healthy baby. Currently, age alone is the strongest single predictor of egg quality. How your age is related to chance of having good quality eggs is presented on the previous page of this report using a colored bar.

ERS™	CATEGORY
0 to 5	Reduced
6 to 10	Fair
11 to 15	Good
16 to 20	Excellent

The ERS™ ranges from 1 to 20 with chances of good egg supply increasing with higher scores. Above are ERS ranges divided into categories representing the chance of good egg supply.

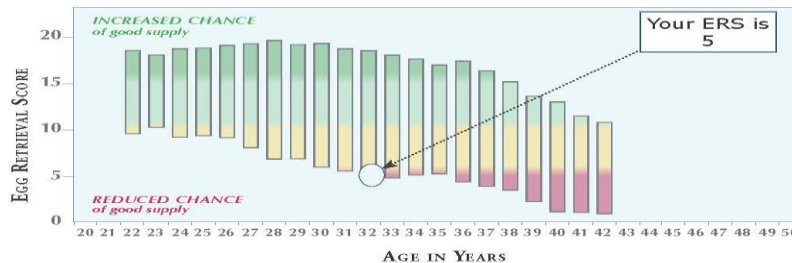
## GOLD STANDARD CLINICAL RESEARCH

### OUTCOMES OF 454 EGG RETRIEVALS



In the graph above, the number of eggs obtained per retrieval from 283 women undergoing 454 egg retrievals is displayed in categories defined by the associated Egg Retrieval Score (ERS): reduced, fair, good, and excellent. Within each category, the column height represents the percent of retrievals resulting in 0 to 4 eggs, 5 to 11 eggs, or 12 or more eggs<sup>1,2</sup>.

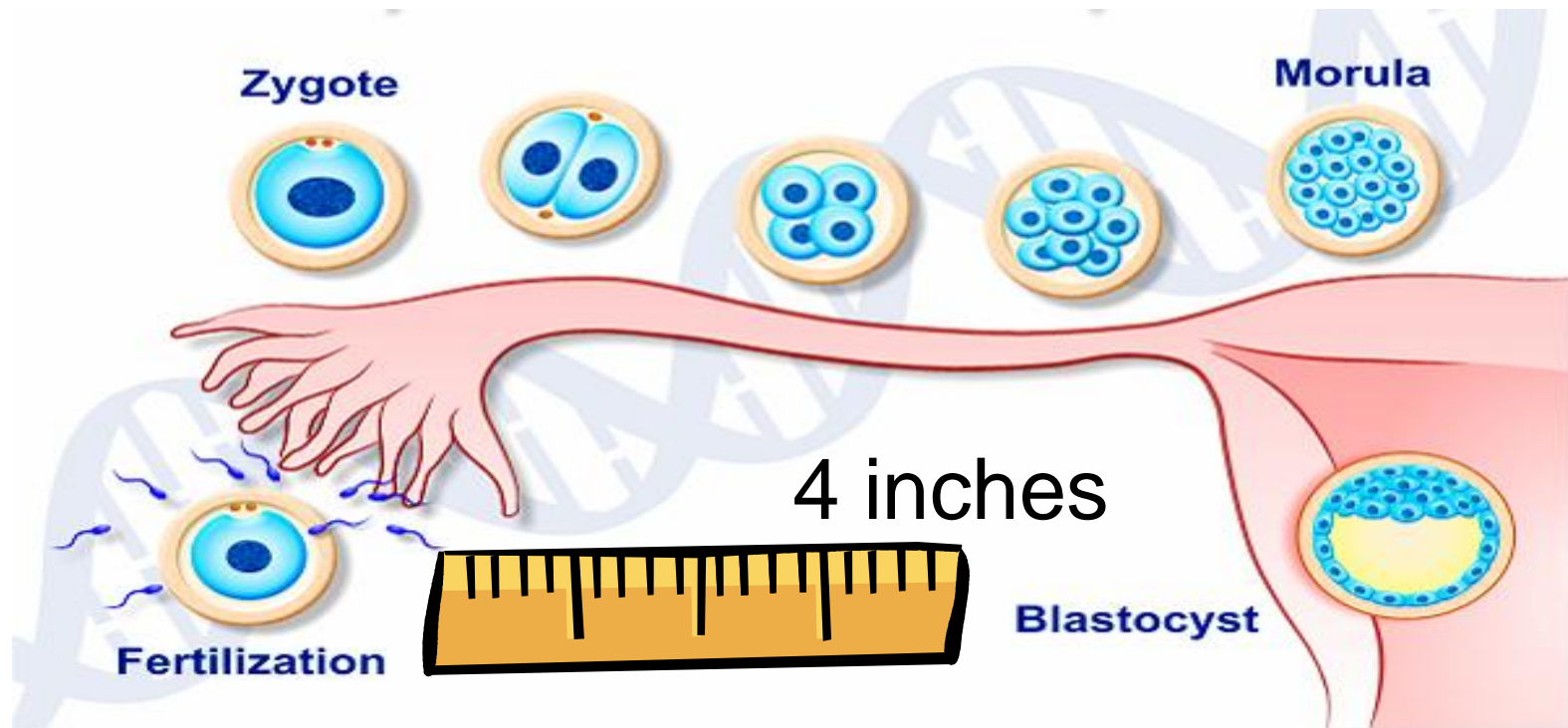
## YOUR EGG RETRIEVAL SCORE™ (ERS) COMPARED TO OTHERS



The graph to the left shows your ERS relative to other women being treated at fertility centers. Bars show two standard deviations above and below a rolling 5 year average ERS. Data is currently available for ages 22 through 42 years of age. Chance of good egg supply is indicated by color based upon the ERS: ERS 0 to 5 is red, ERS 6 to 10 is yellow, ERS 11 to 15 is light green, and ERS 16 to 20 is green.

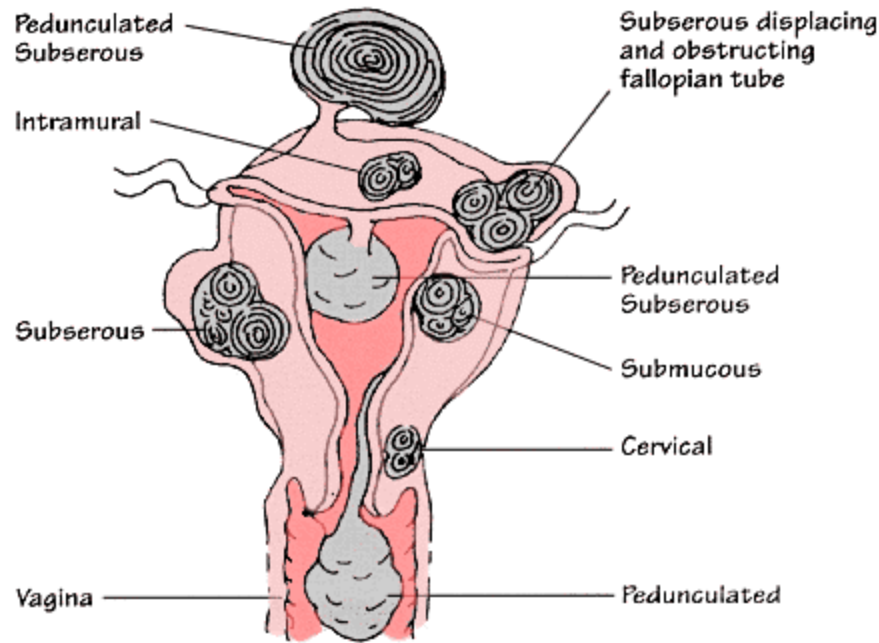


# Q3: Can the sperm and egg meet?

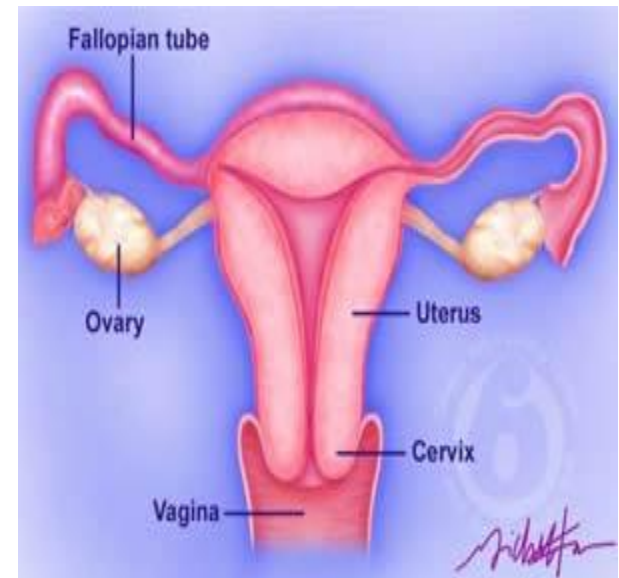


**\$ 600,000 to \$ 1,000,000**

# Q4: Is there a safe place for the baby to grow?

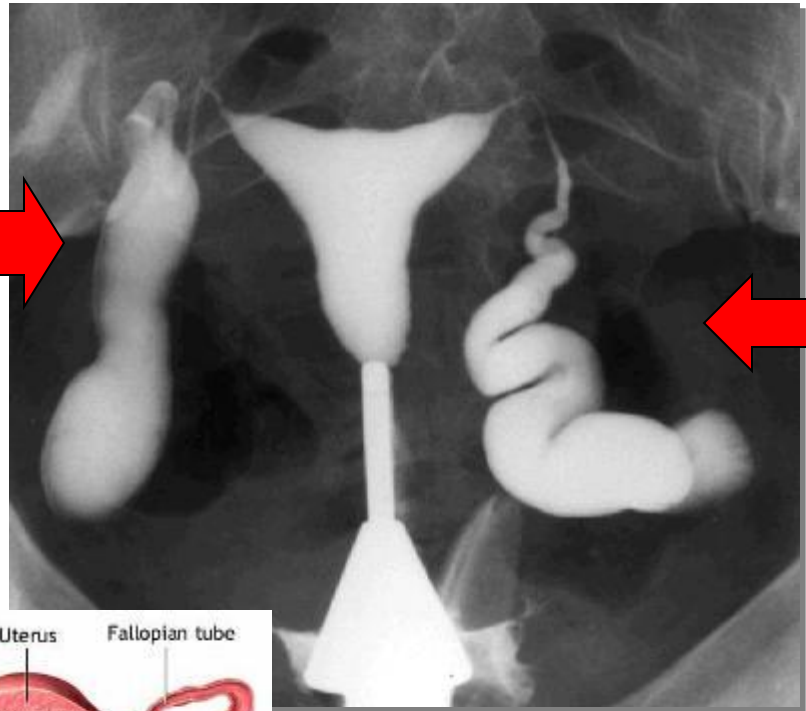


**Abnormal**

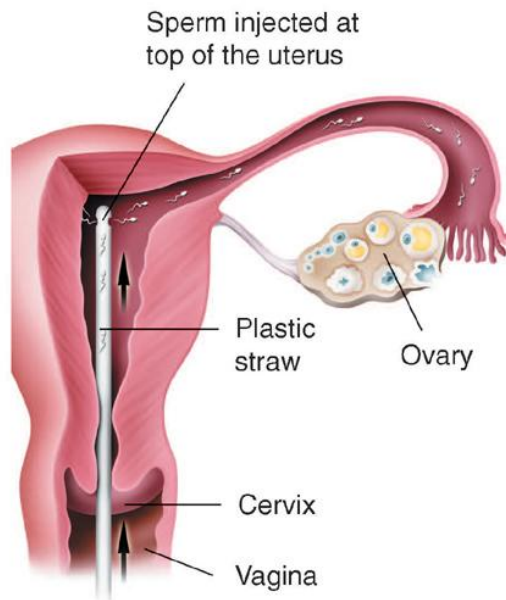


**Normal**

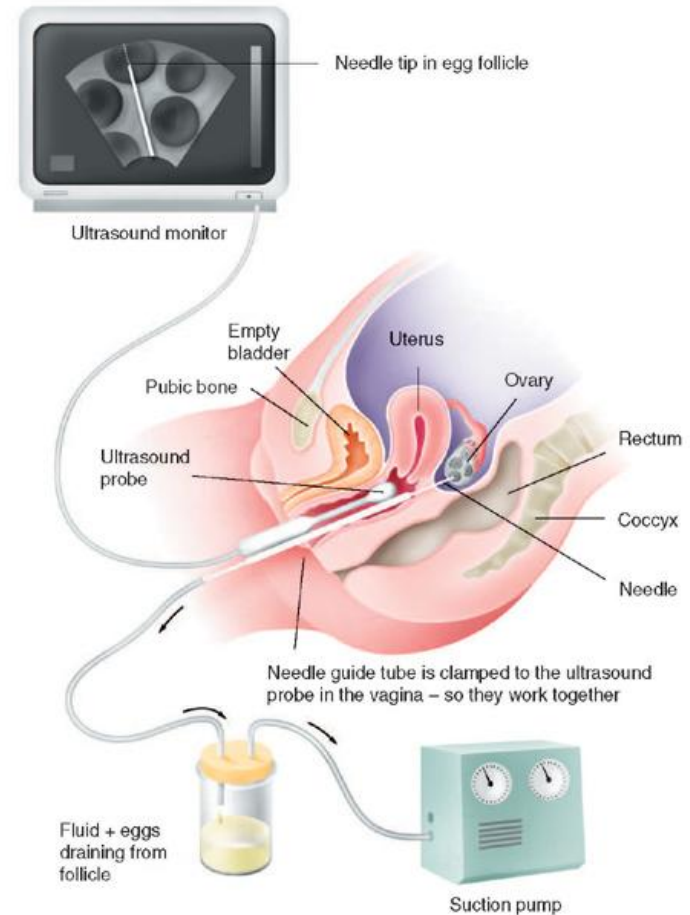
# Hysterosalpingogram:(HSG) “Dye Study”



# Infertility Treatments & Outcomes



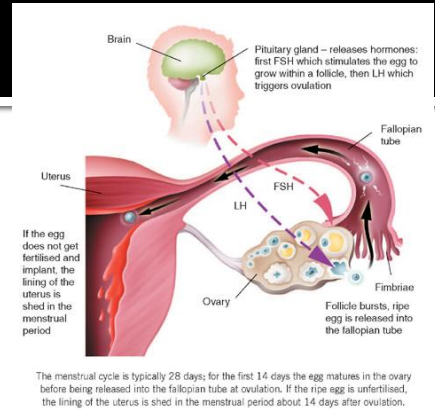
IUI (intrauterine insemination).



For most IVF and ICSI techniques, the woman's eggs are collected through the vagina using an ultrasound scanner to guide a needle into the follicles and draw off the fluid and eggs.

# Treatments for Infertility

1. **Timed Intercourse**
2. **Clomid therapy, aka Ovulation Induction** (can be used with injectable medications also, e.g., Follistim™)
3. **Intrauterine Insemination (IUI), aka Artificial Insemination**
4. **Surgery for Tubal Reversal**
5. **In Vitro Fertilization (IVF) - "Test Tube Baby"**



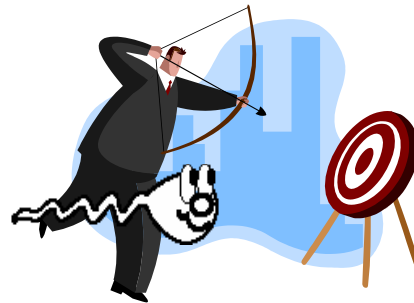
# Timed Intercourse: "natural"

Women: Egg, natural state



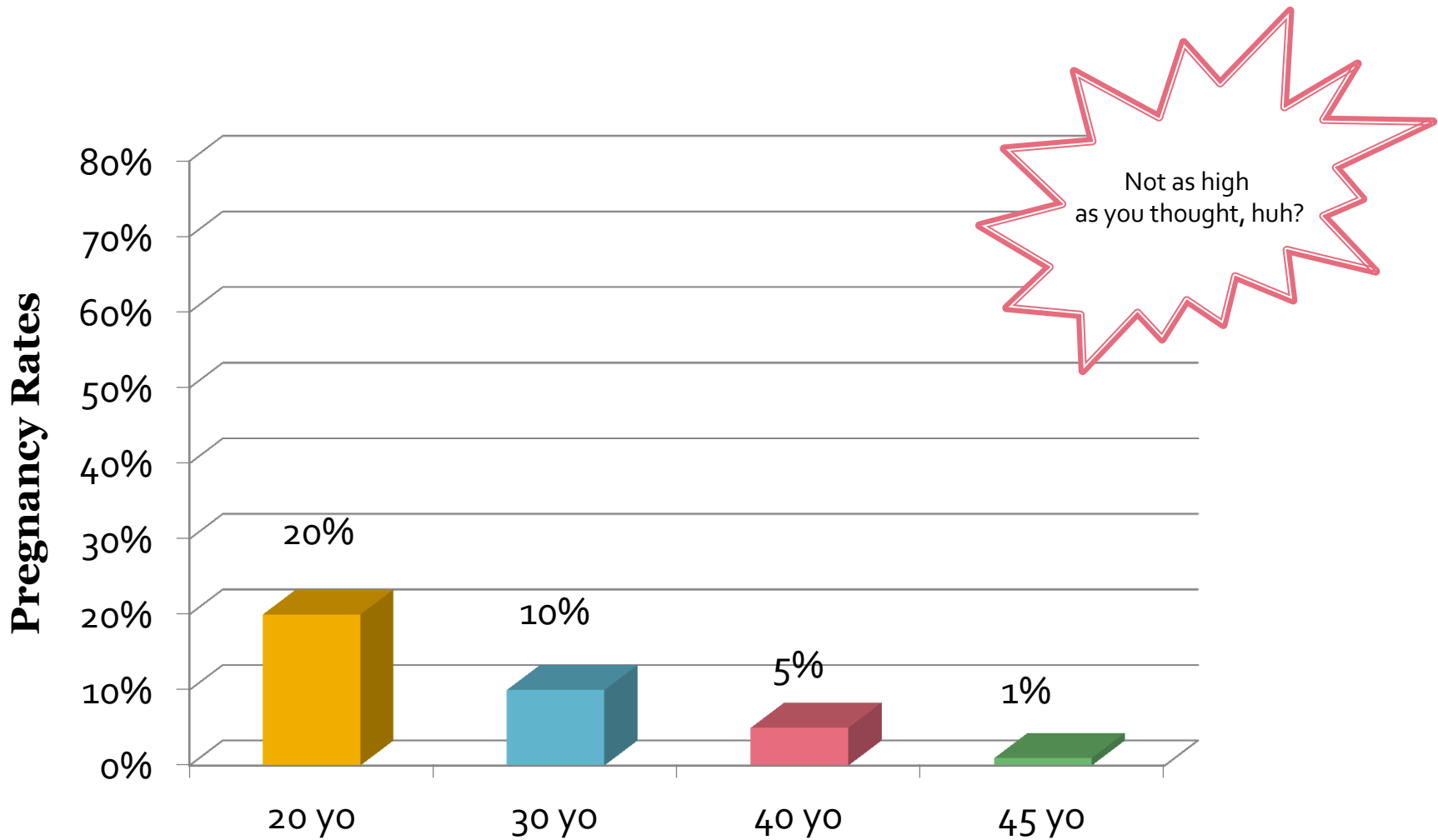
Men: Sperm, natural state

or

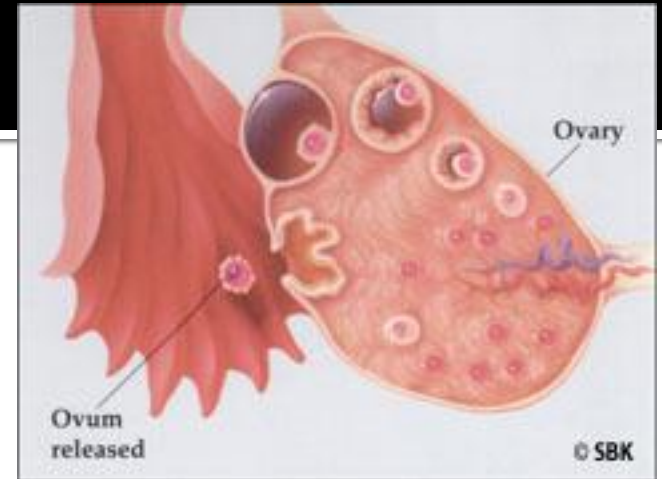


# Outcomes: Timed Intercourse or Sex

## Pregnancy Rates per Month



# Ovulation Induction: Eggs



versus

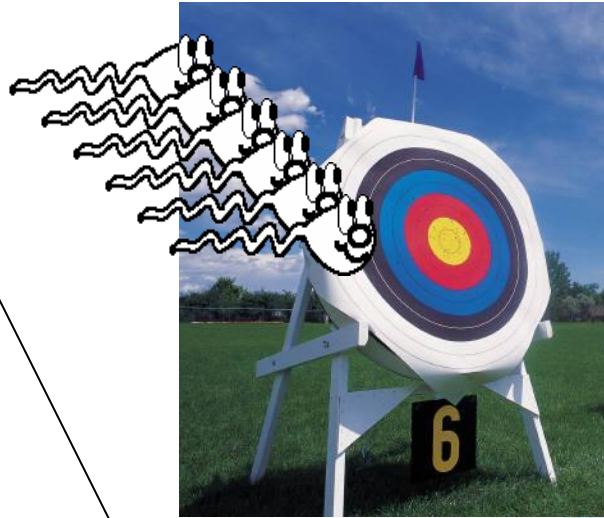
or



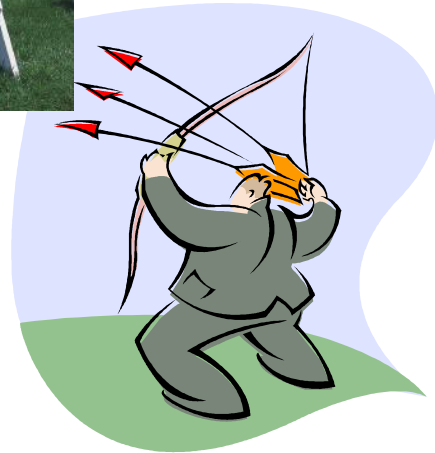


# Intrauterine Insemination (IUI)

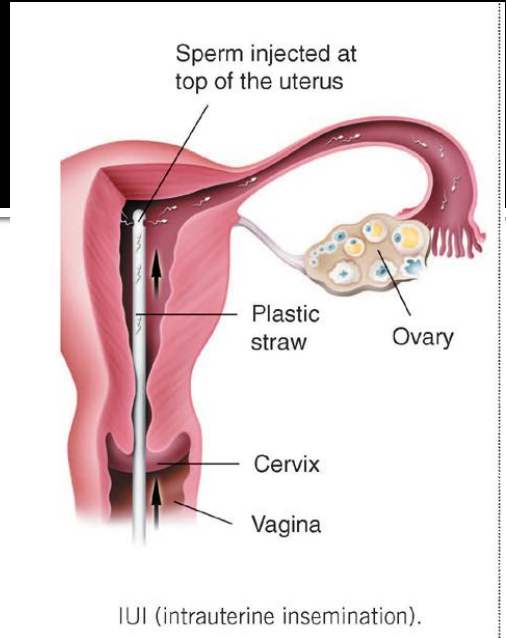
**Intercourse**



**versus**

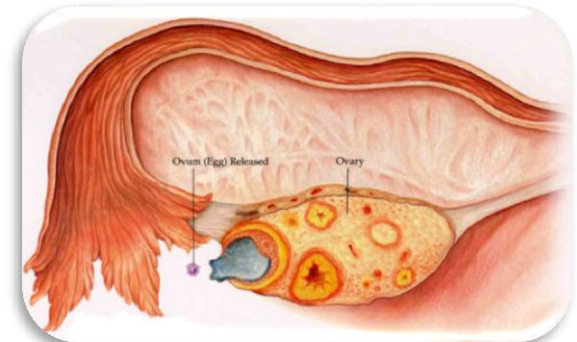
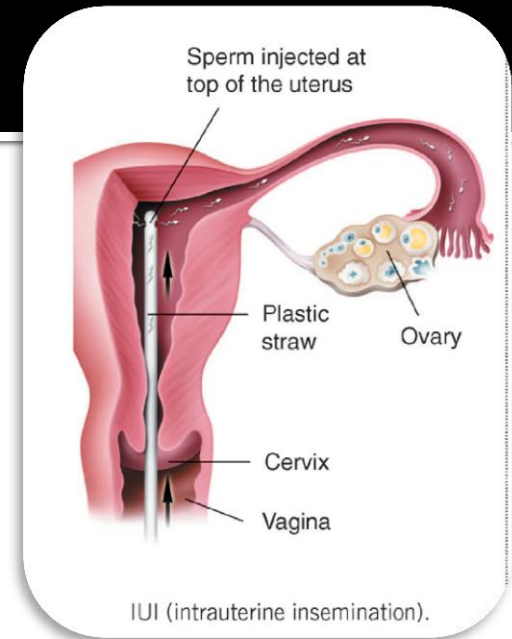
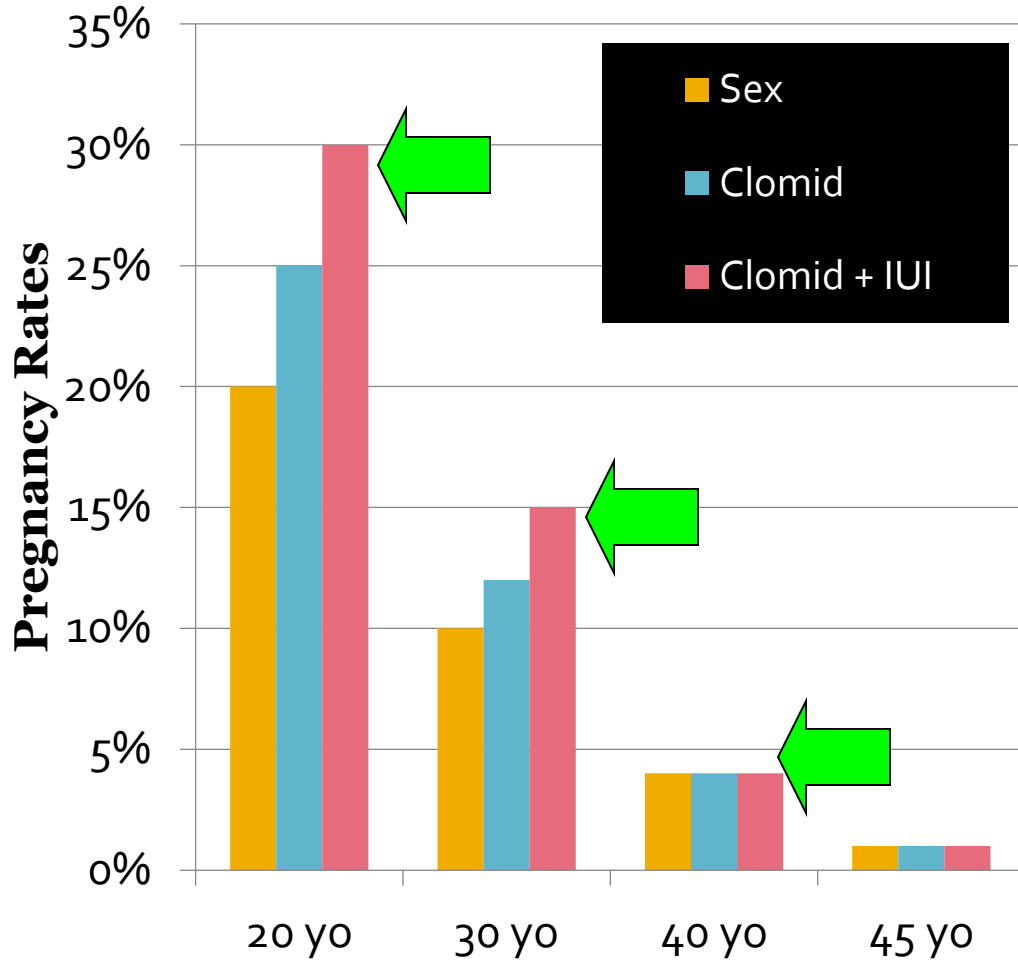


**Intrauterine Insemination**



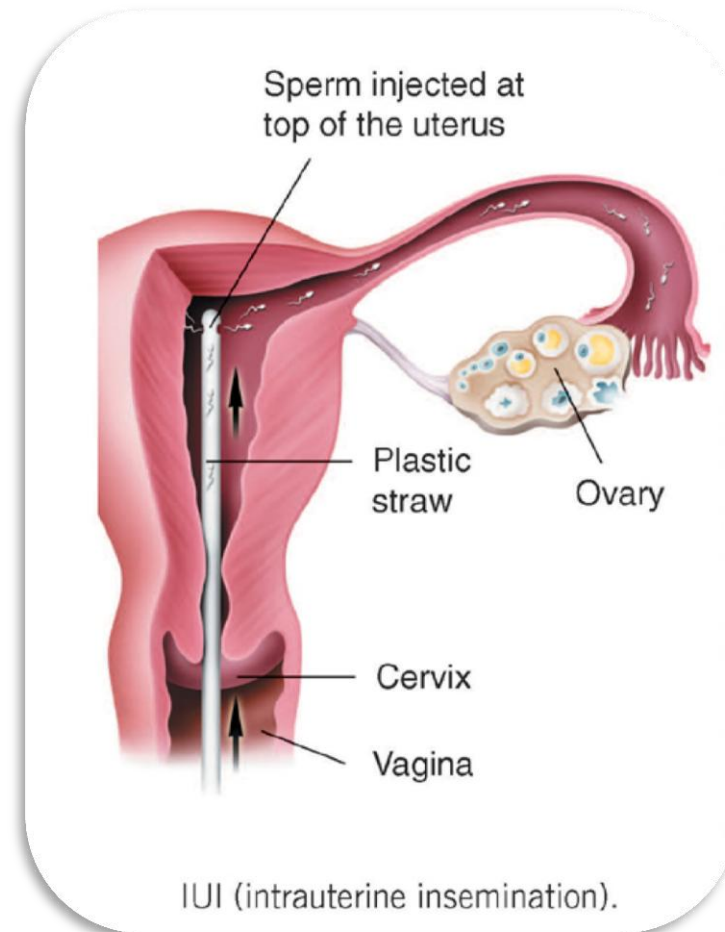
# Outcomes: Clomid + IUI

## Pregnancy Rates per Month

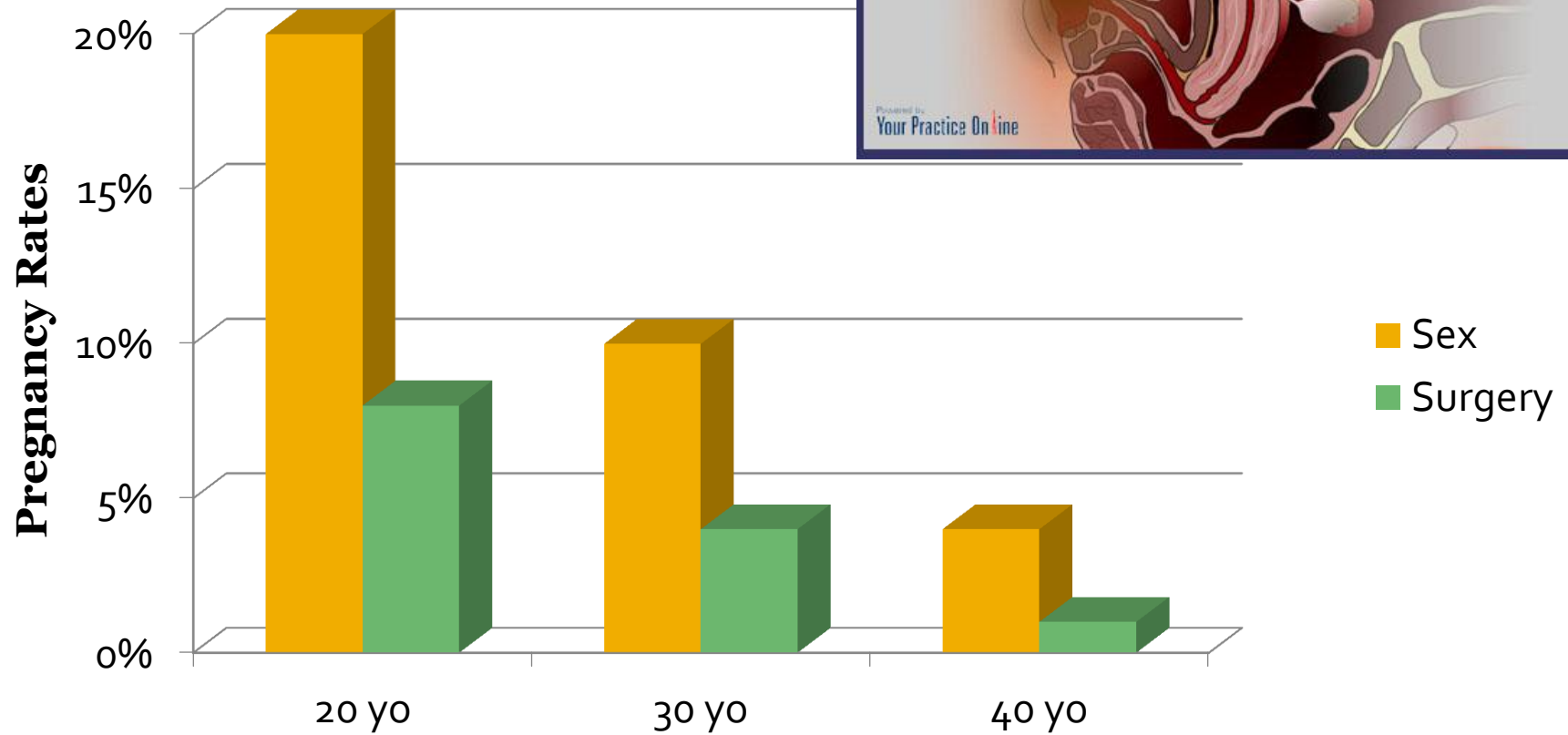
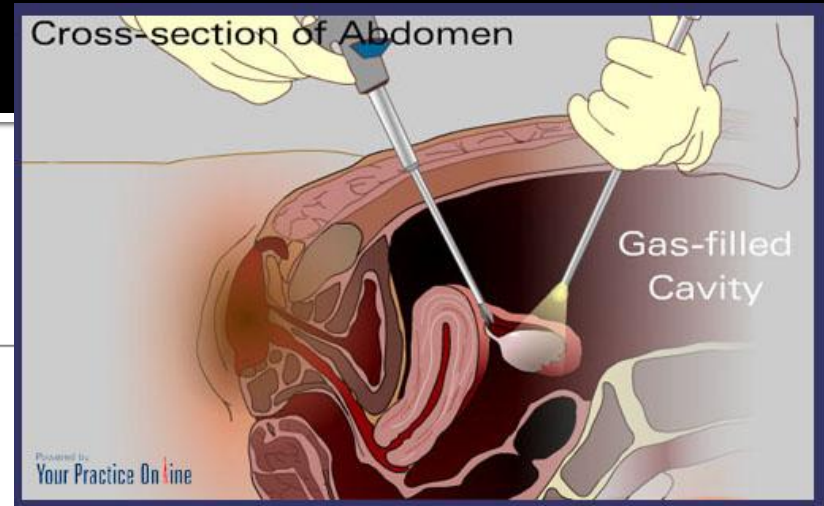


# Should we try IUI first?

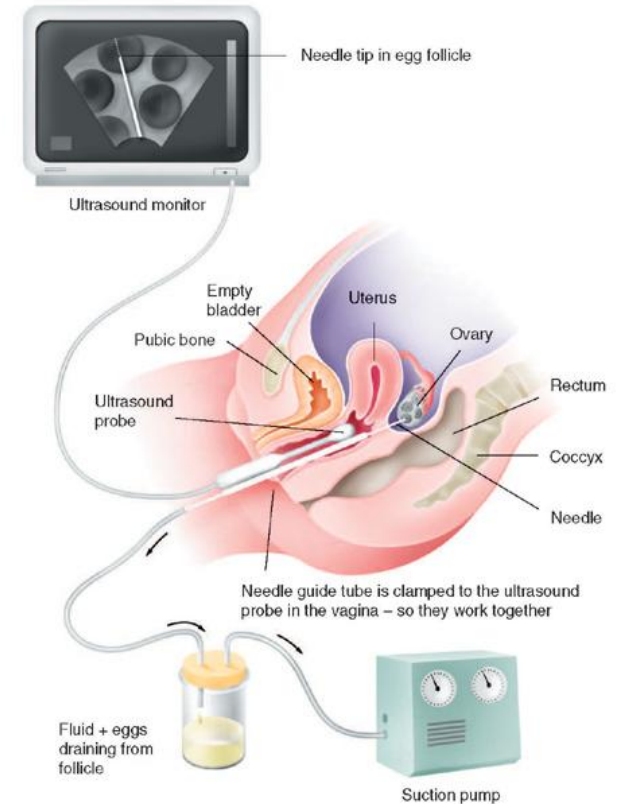
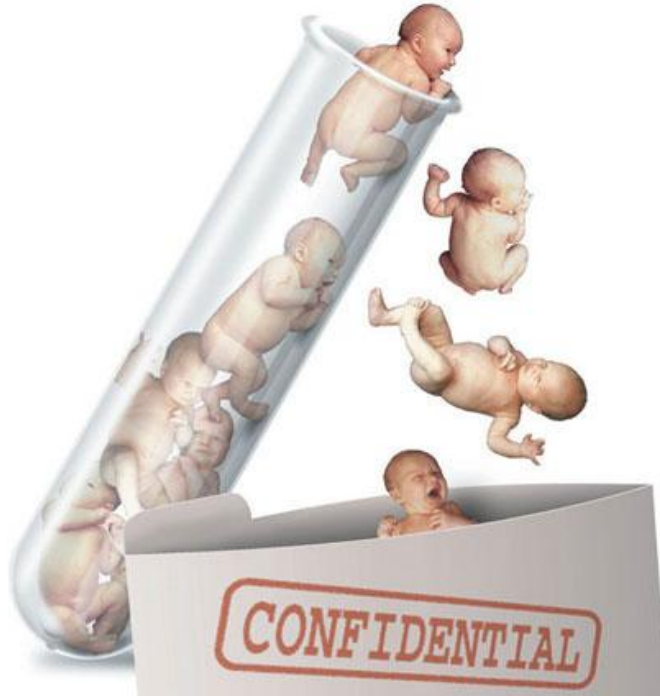
- Yes
- Yes
- Yes
- Maybe???



# Sex and Surgery



# Test Tube Babies = IVF



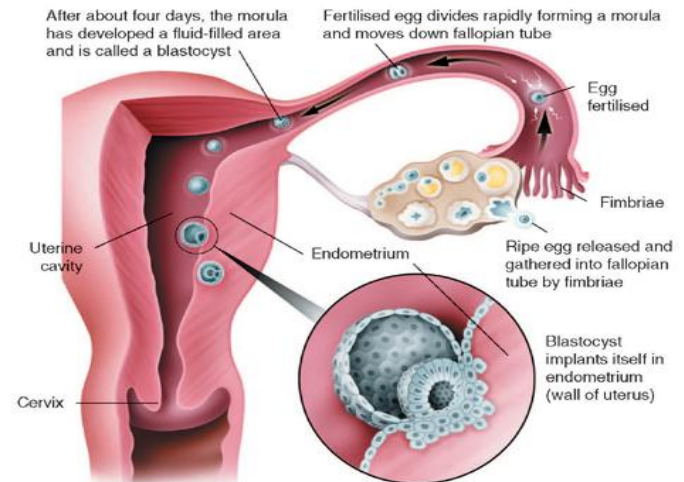
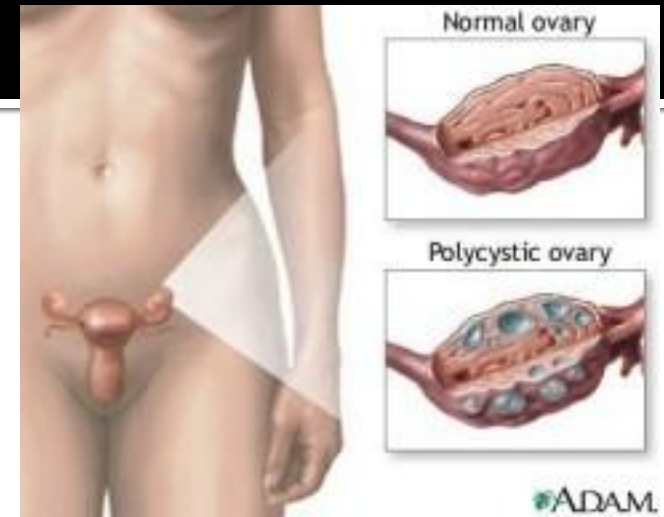
For most IVF and ICSI techniques, the woman's eggs are collected through the vagina using an ultrasound scanner to guide a needle into the follicles and draw off the fluid and eggs.

In Vitro means "In Glass" which is another name for "In the Lab"

# IVF

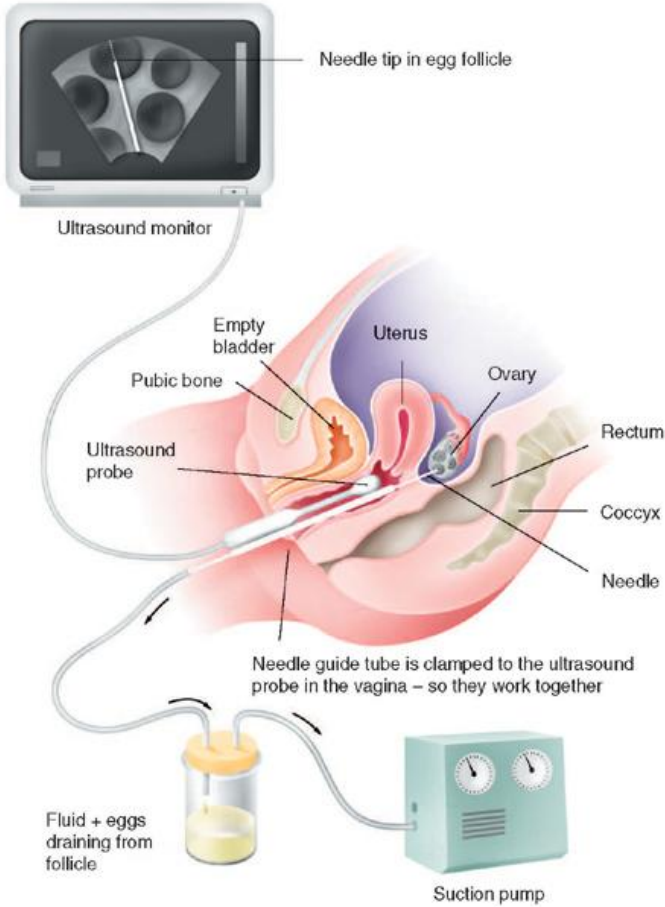
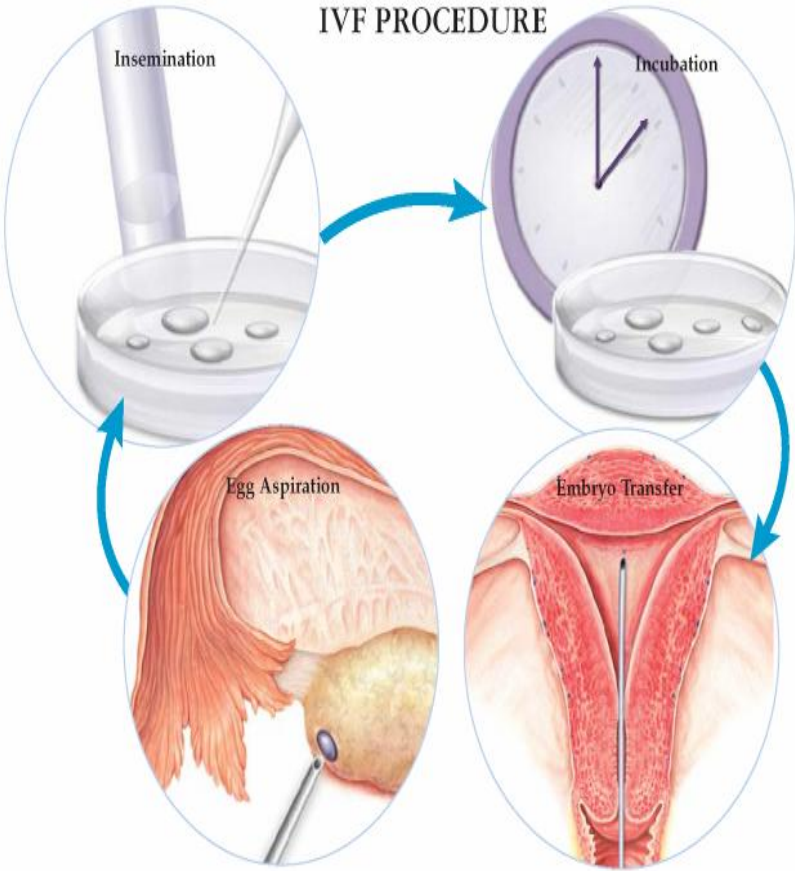
## ■ Goals

- “Save” eggs
- Grow eggs from both ovaries
- Get largest number of “mature” i.e., fertilizable eggs are developed
- Improve selection process of eggs, sperm, and embryos to enhance the pregnancy rates to levels up to 10 times the natural rates
- “Cure” male factor infertility
- “Cure” tubal factor infertility



The fertilised egg divides rapidly, first to form a morula and then a blastocyst. After about six to seven days, the blastocyst reaches the uterine cavity where it implants in the endometrium.

# In Vitro Fertilization



For most IVF and ICSI techniques, the woman's eggs are collected through the vagina using an ultrasound scanner to guide a needle into the follicles and draw off the fluid and eggs.

# IVF – In Vitro Fertilization: Eggs



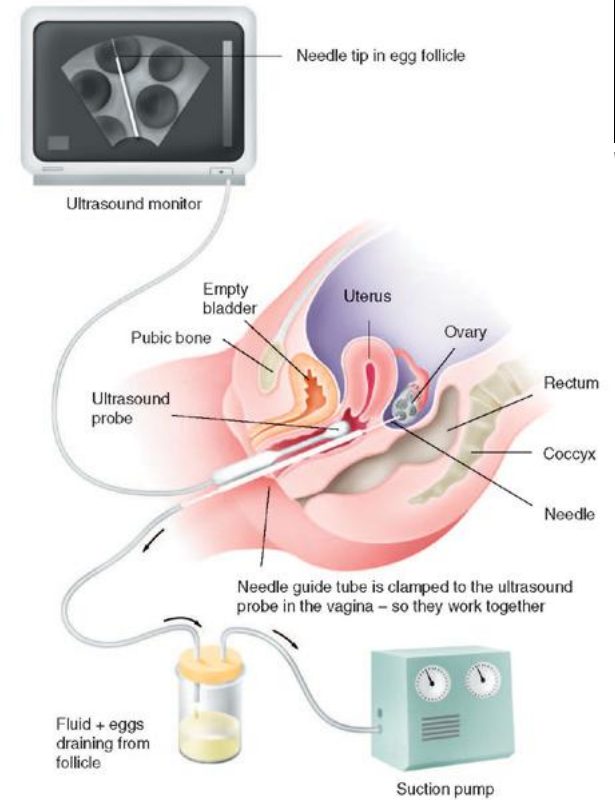
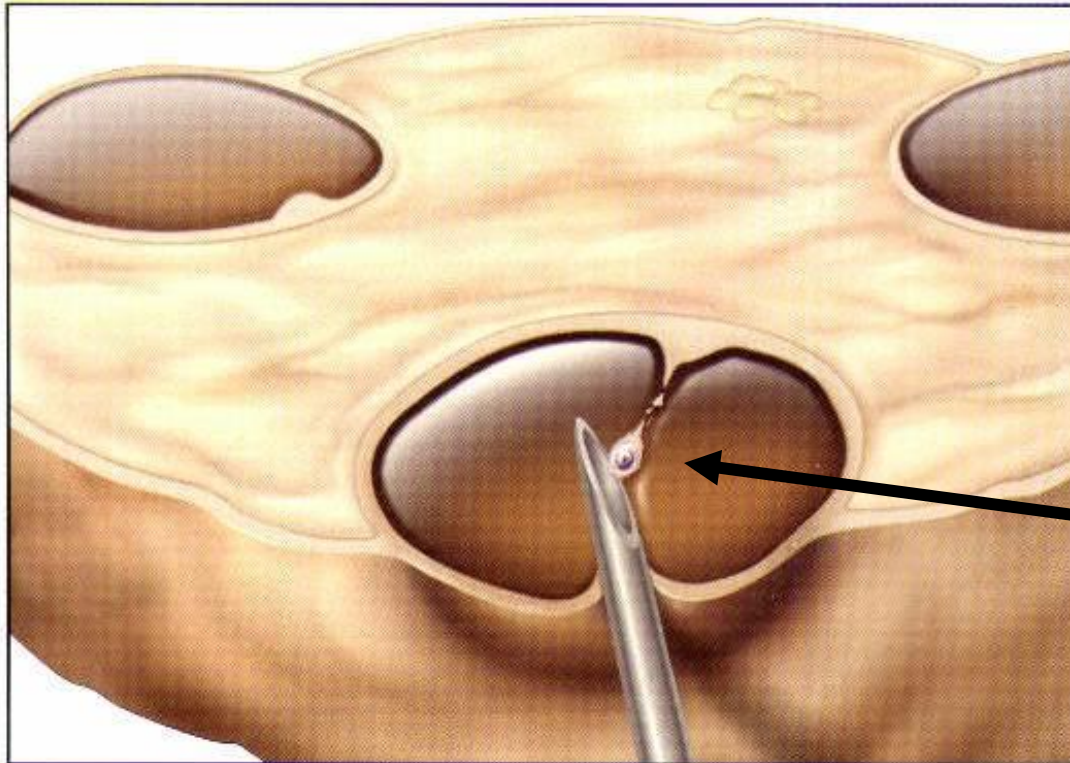
versus

or





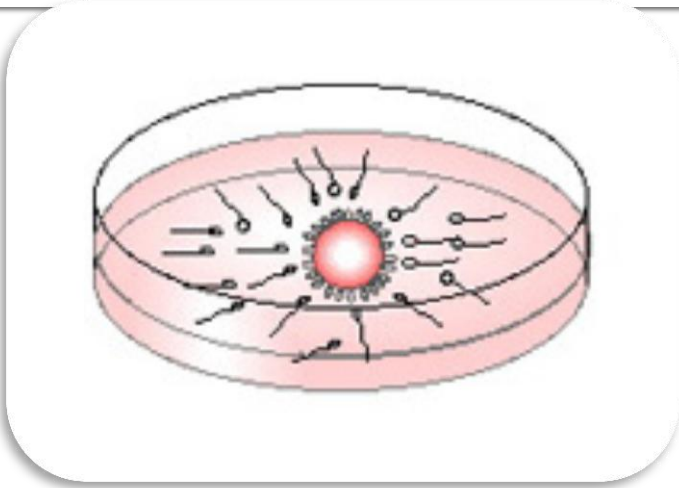
# Egg Aspiration



For most IVF and ICSI techniques, the woman's eggs are collected through the vagina using an ultrasound scanner to guide a needle into the follicles and draw off the fluid and eggs.

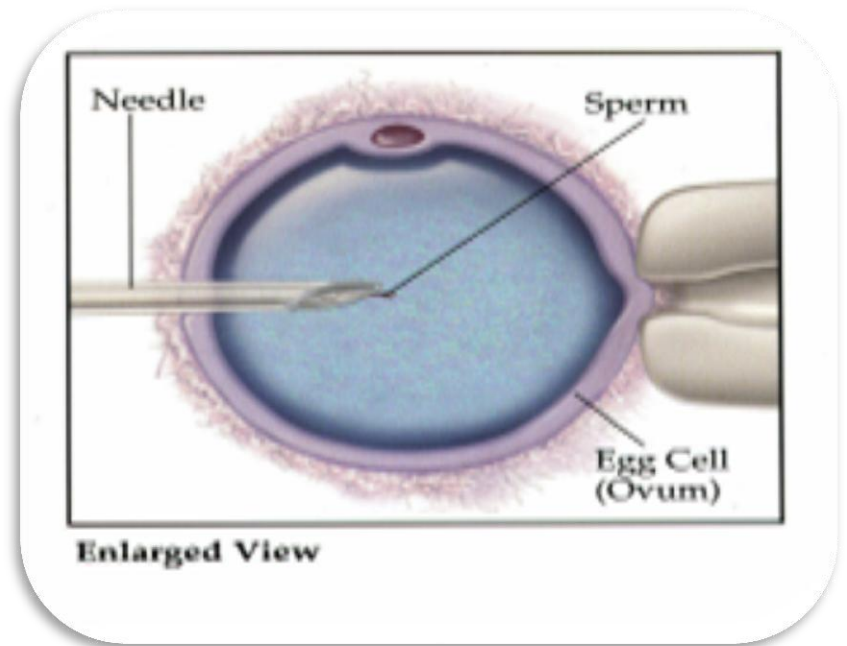
**Egg**

# IVF - Fertilization



OLD

NEW - ICSI

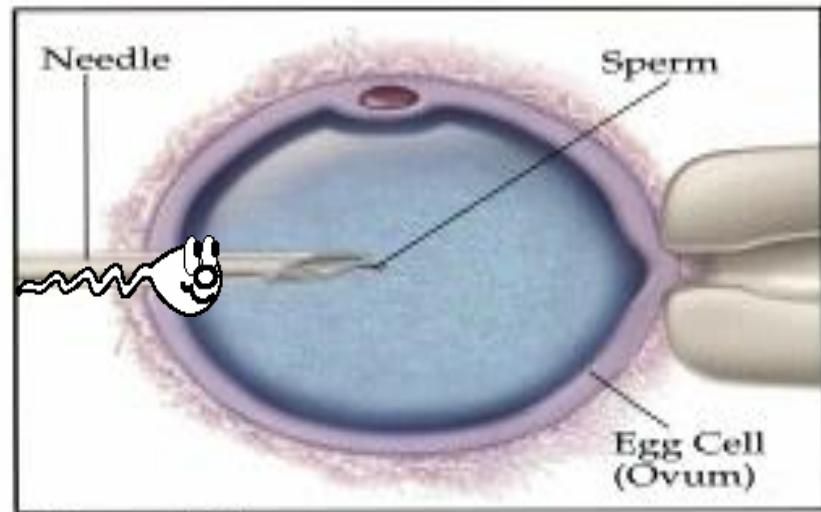


# ICSI: Intracytoplasmic Sperm Injection

Intercourse



versus



Enlarged View

ICSI



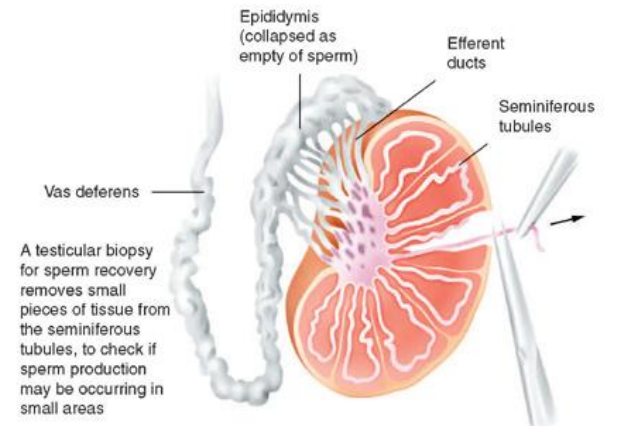
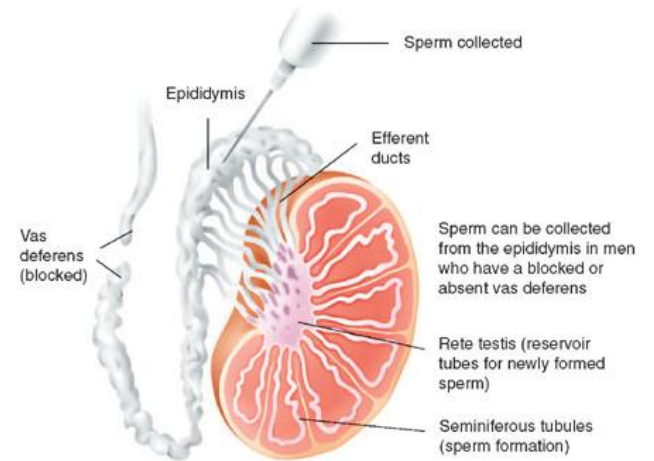
# In Vitro Fertilization - Lab



# What if there are no sperm?

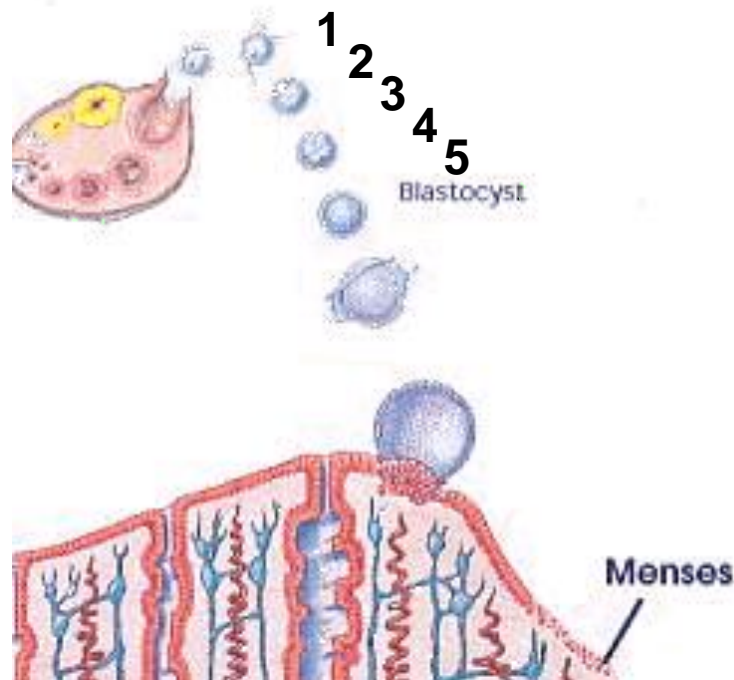
## Testicular Biopsy

- Biopsy of Testicular Tissue
  - TESE = Testicular Sperm Extraction
  - PESA, MESA
- Goal
  - Get sperm
    - If Vasectomy then > **98%** sperm
    - If born without sperm in ejaculate then > **70%** chance of sperm

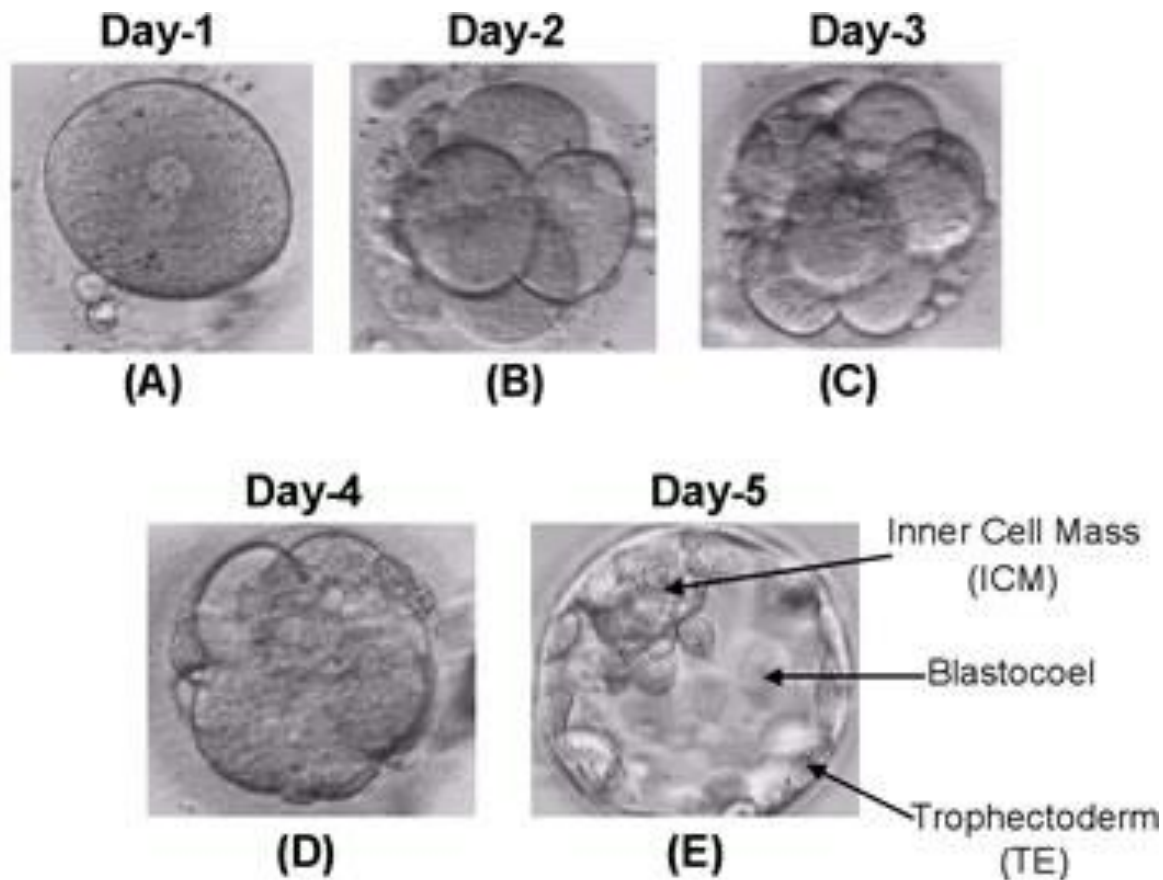


If the man is releasing no sperm in his ejaculate, surgical sperm recovery techniques may be necessary.

# Incubate Fertilized Eggs for 3 to 5 days

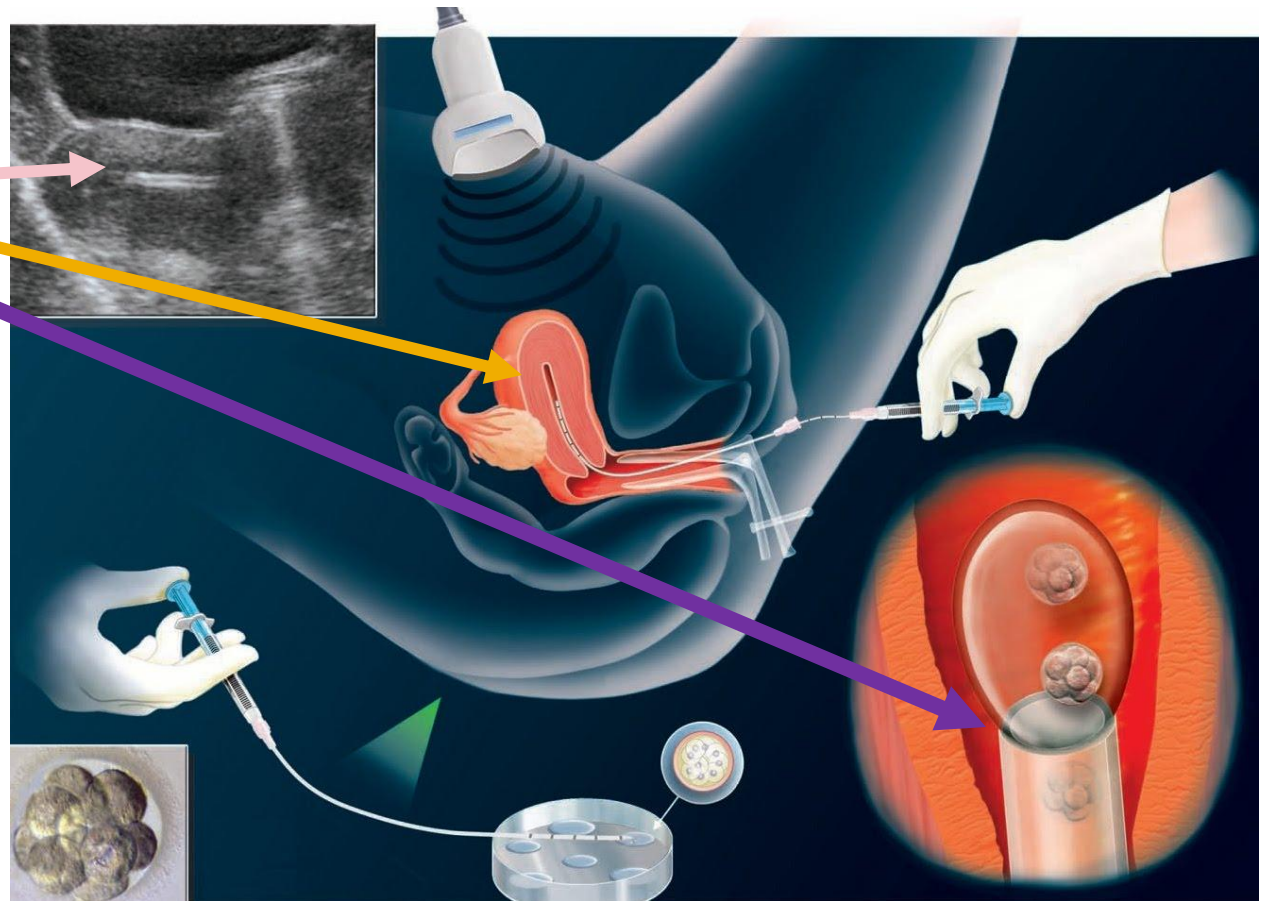


# *In Vitro* Embryonic Development



# IVF last step: Embryo Transfer

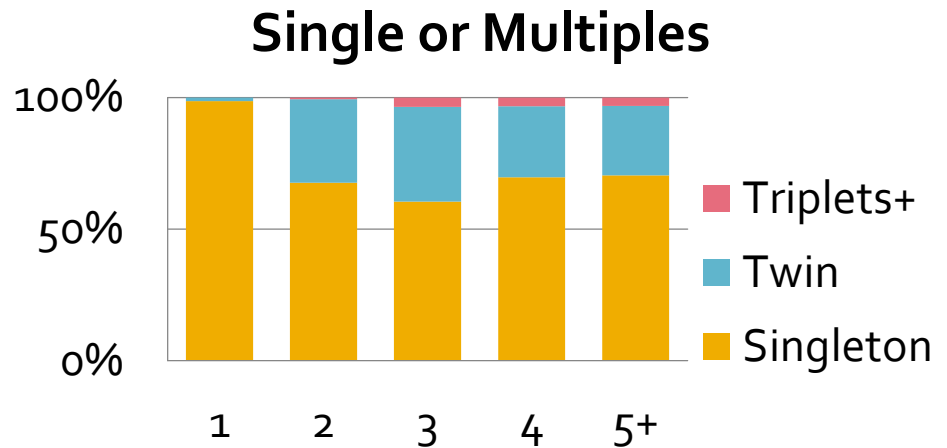
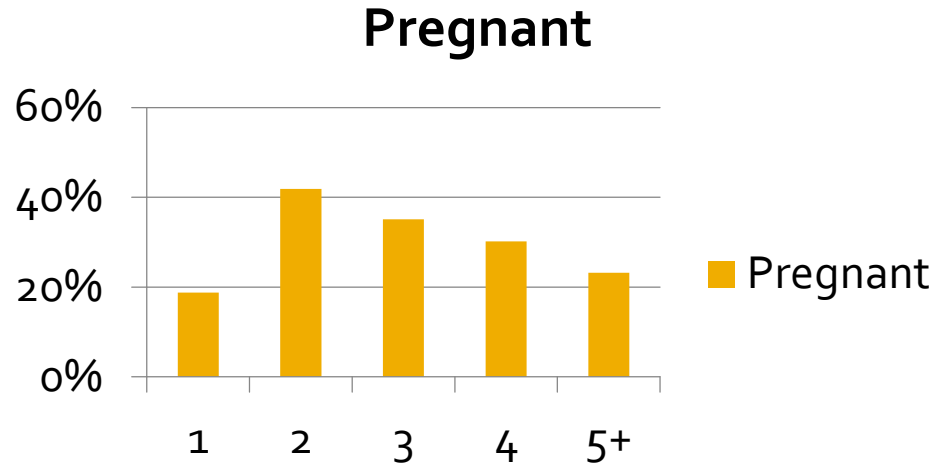
Embryos





# How Many Embryos should I ask for?

- **20 yo**
  - One or two
    - Each embryo has a **29%** chance of “sticking”
- **30 yo**
  - Two or three
    - Each embryo has a **15%** chance
- **40 yo**
  - Four or more
    - Each embryo has a **4%** chance
- **> 40**
  - ????????

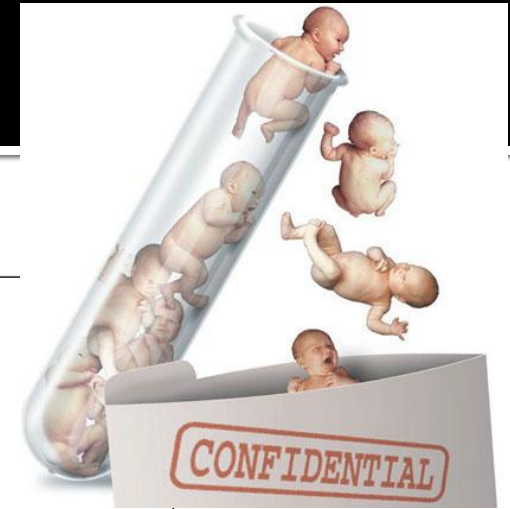


# God has a sense of humor!

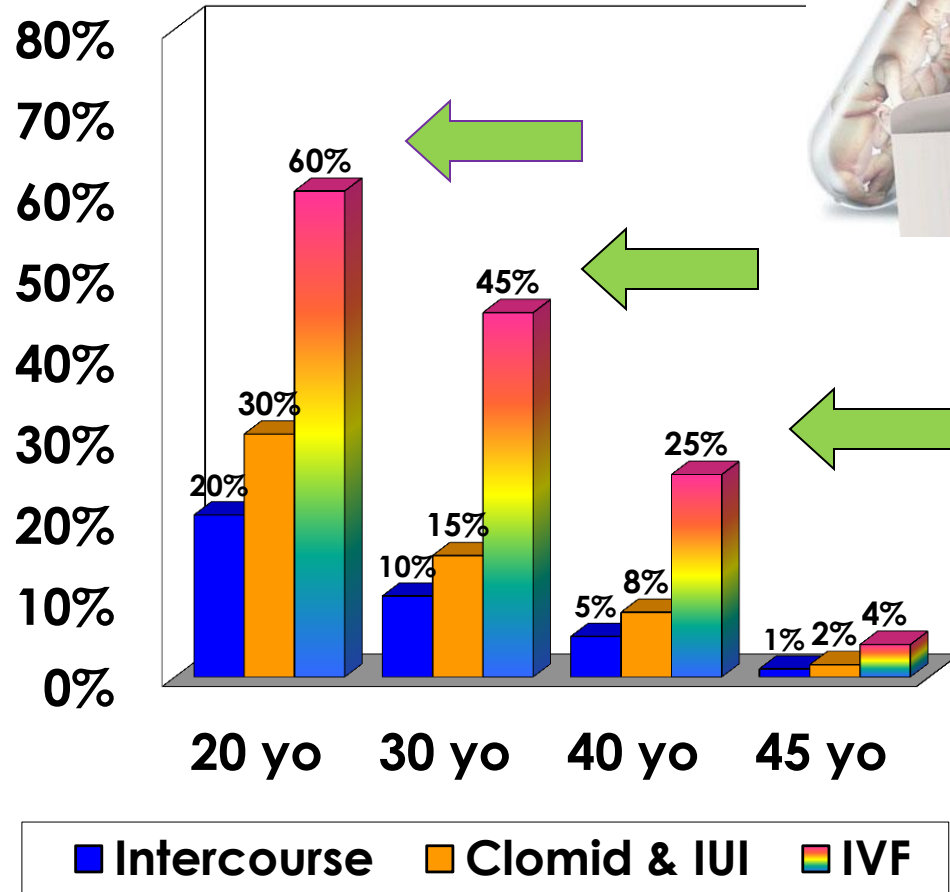


# Outcomes: IVF at RMFC

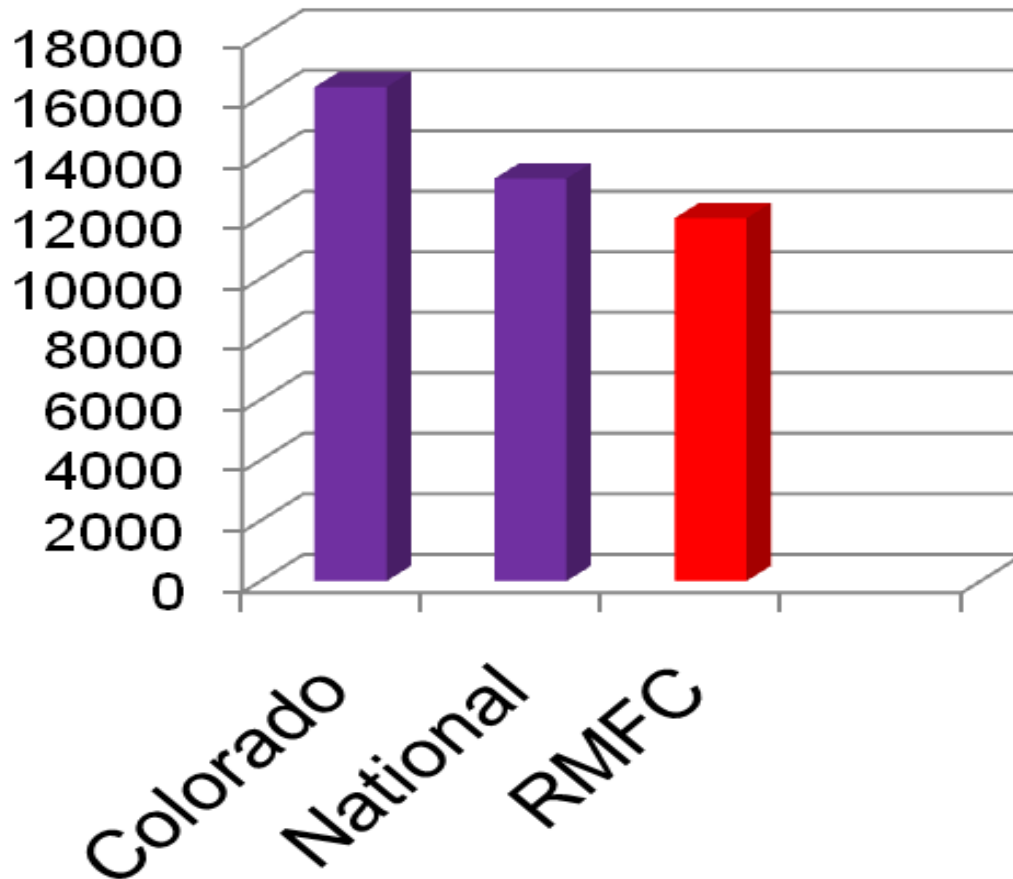
## Pregnancy Rates per Attempt



Pregnancy Rates



**Average IVF Cost in Colorado is 17,335 + meds,  
at RMFC \$ 12000 + meds**

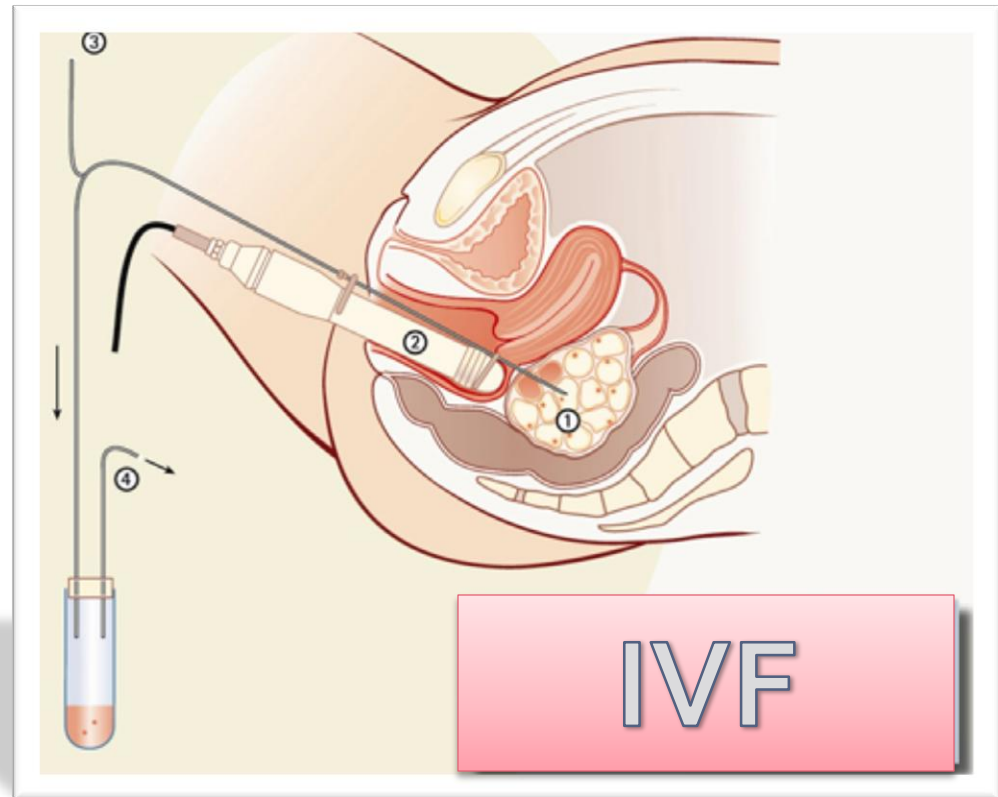


**Military  
Discount  
\$ 500**



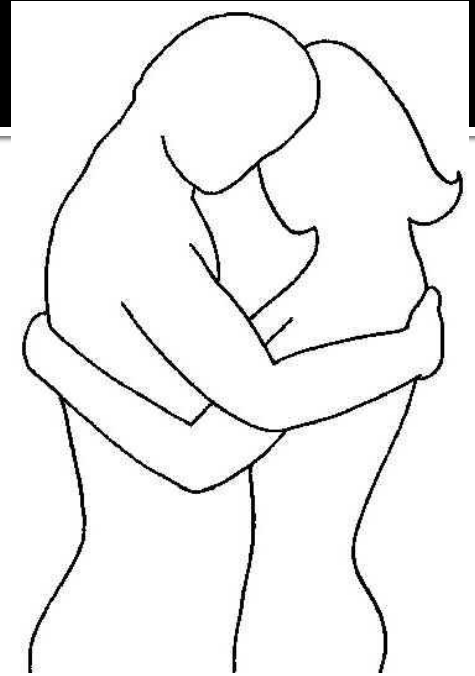
# Do I have to do IVF?

- NO
- NO
- NO
- Maybe!!!



# Summary

- Know the Facts
  - Sperm, Egg, Age, Other causes of infertility
- Know the Tests
  - Semen analysis, SDFA, OAR, HSG
- Know the Treatments
  - TCM, Ovulation Induction, Insemination, Surgery and IVF
- Know the Outcomes
  - What are the realistic expectations for getting pregnant using YOUR egg and YOUR sperm!



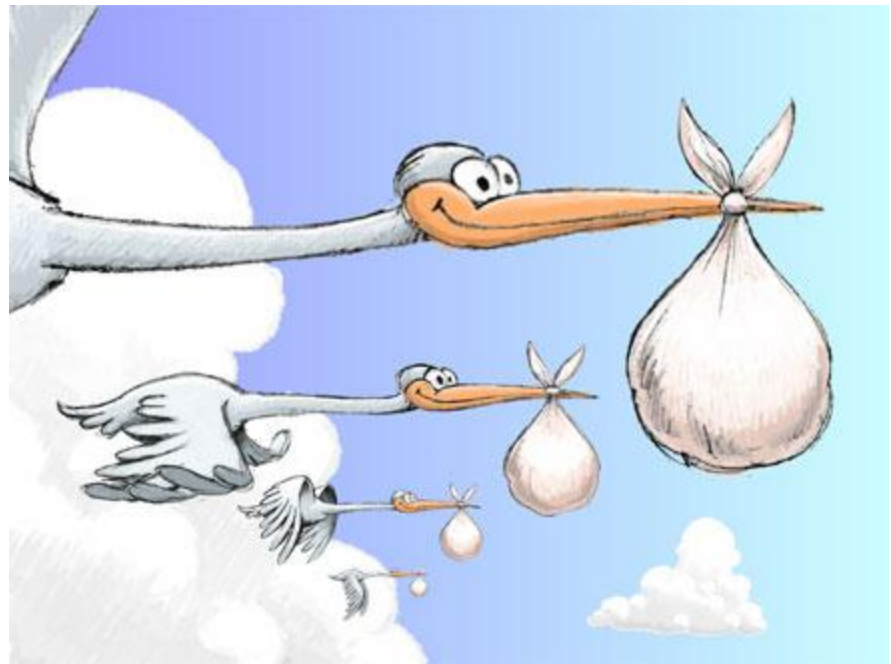
# A Gift of Progeny for you!



- As a way to thank you for coming tonight, RMFC is please to provide you with a coupon for one thousand dollars ( \$ 1,000) off the cost of IVF



# Relax, Enjoy, Breath, Recharge!







# What about Synergy?

Can adding TCM in the form of Acupuncture help me get pregnant?

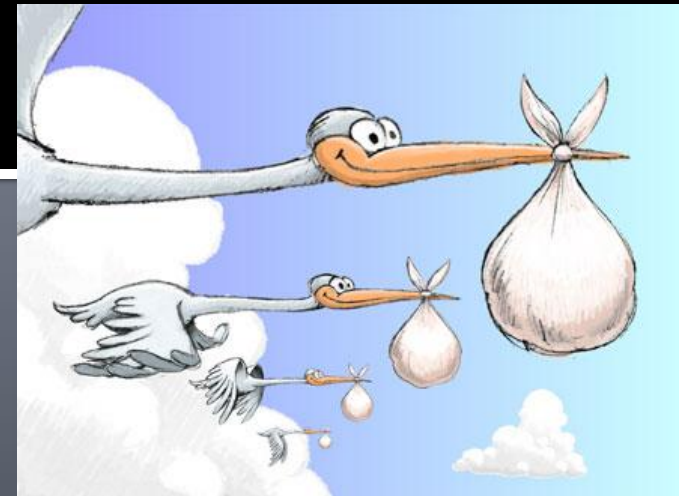


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# PGD

- **Pre-implantation Genetic Diagnosis**
  - Diagnoses genetic disease in embryo so that only “normal” embryos are transferred – currently there are over 59 genetic markers that they can test
  - Help to “Balance Families”
- **Ovarian tissue freezing**
- **Oocyte freezing**

# Preimplantation Genetic Diagnosis



Embryo at 8 cell stage

Hole made with enzymes

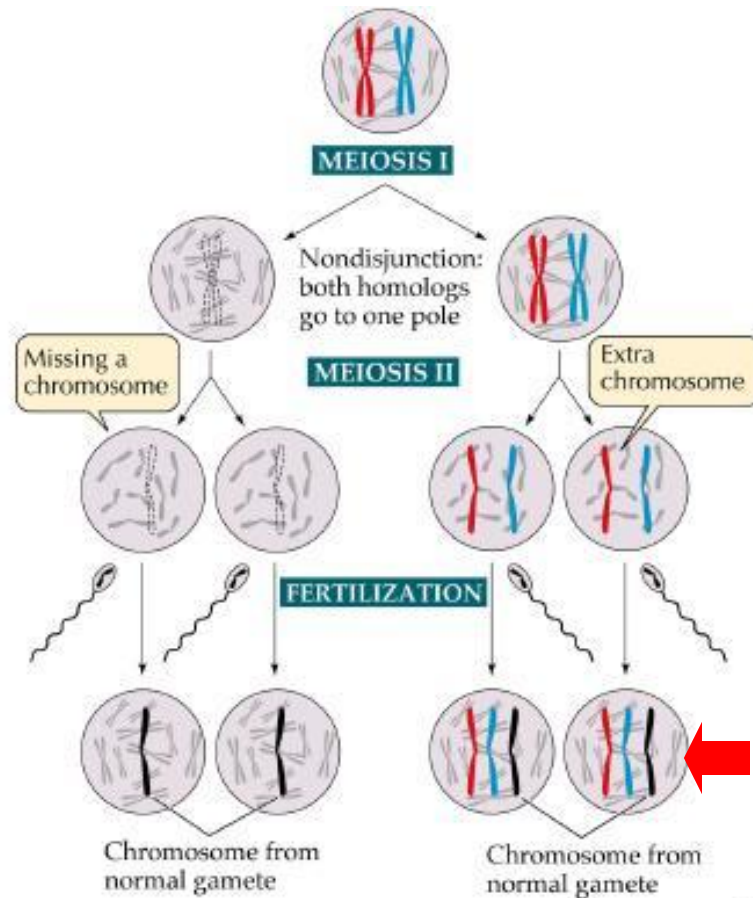
Pipette used to suck out Blastomere

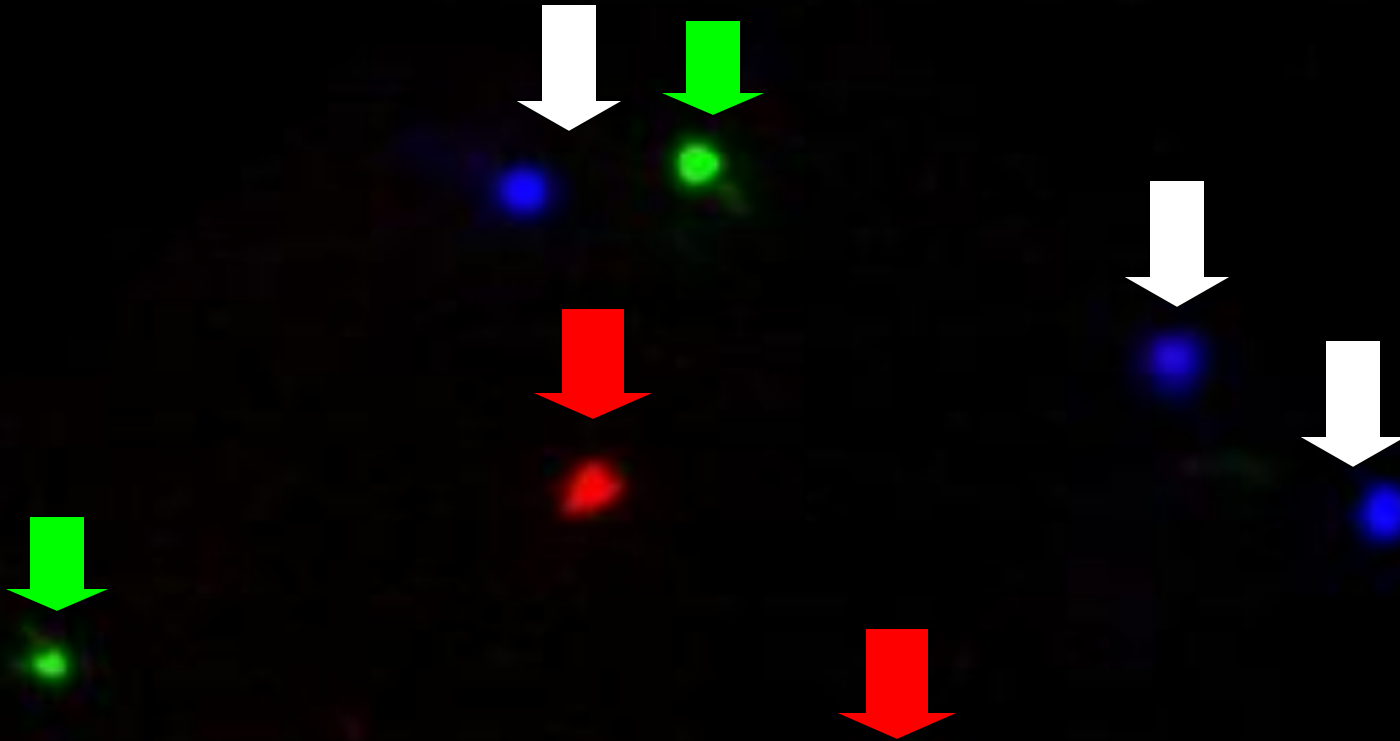
# Preimplantation Genetic Diagnosis



- Blastomere being remove
- Two Blastomere with full chromosomal complement

# Aneuploidy or Woops!

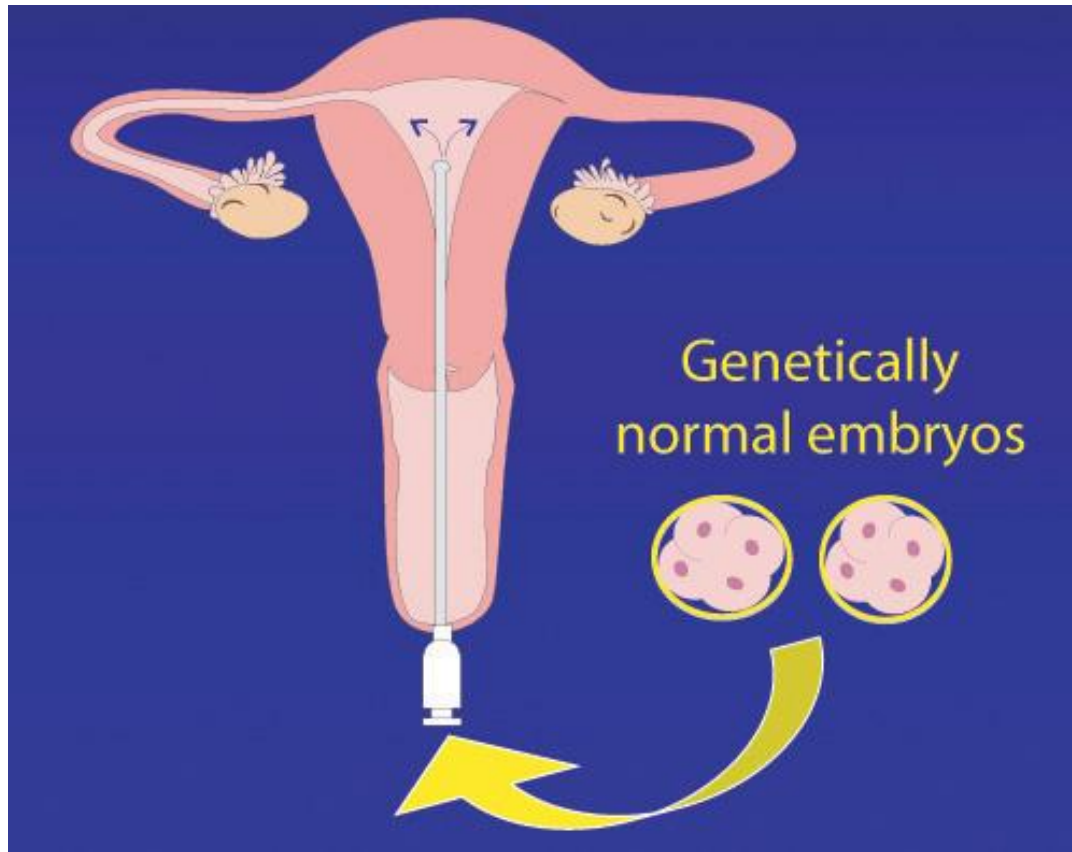




**Trisomy 15**

**Santiago Munné**  
**The Institute for Reproductive Med. and Science of Saint Barnabas, Livingston, NJ**

# PGD last step: Embryo Transfer







# Family Balancing

Corona Institute for Reproductive Medicine & Fertility has joined leading national IVF centers by offering families the opportunity to balance the sex of their future additional offspring.

Family Balancing:

- Married
- Have at least one child
- Desire a child of the less represented sex of children in the family



Issues:

- Not for everyone
- May be medically indicated
- Can reduce risks of genetic disease in offspring

**Please consult your religious advisors regarding these treatments. It is certainly not for everyone, but some couples may need our help and we will be here for you.**