

# Evaluation and Management of Female and Male Infertility



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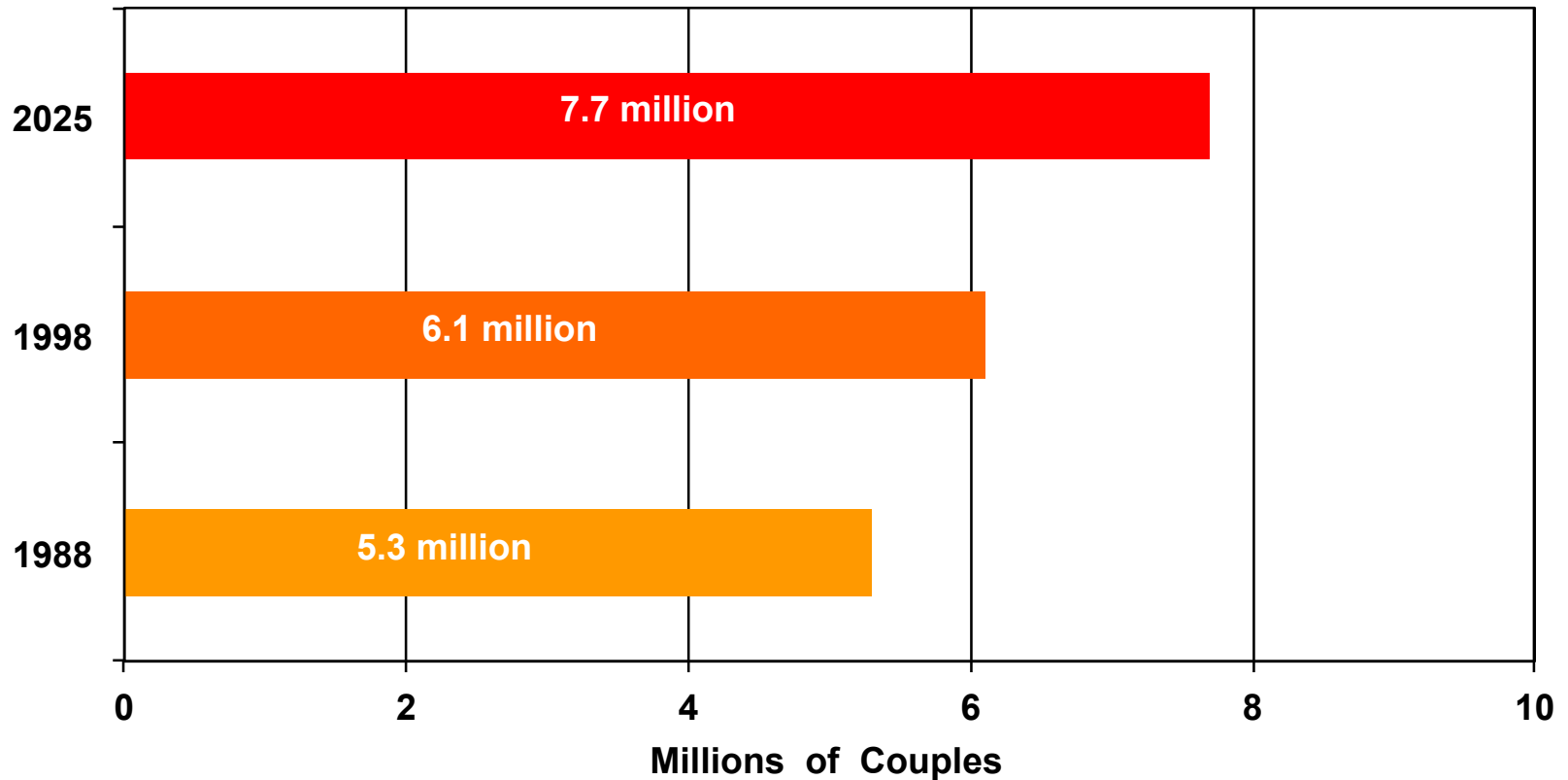
# Definition

< 35 years: after 1 year of  
unprotected intercourse

>35 years: after 6 months of  
unprotected intercourse



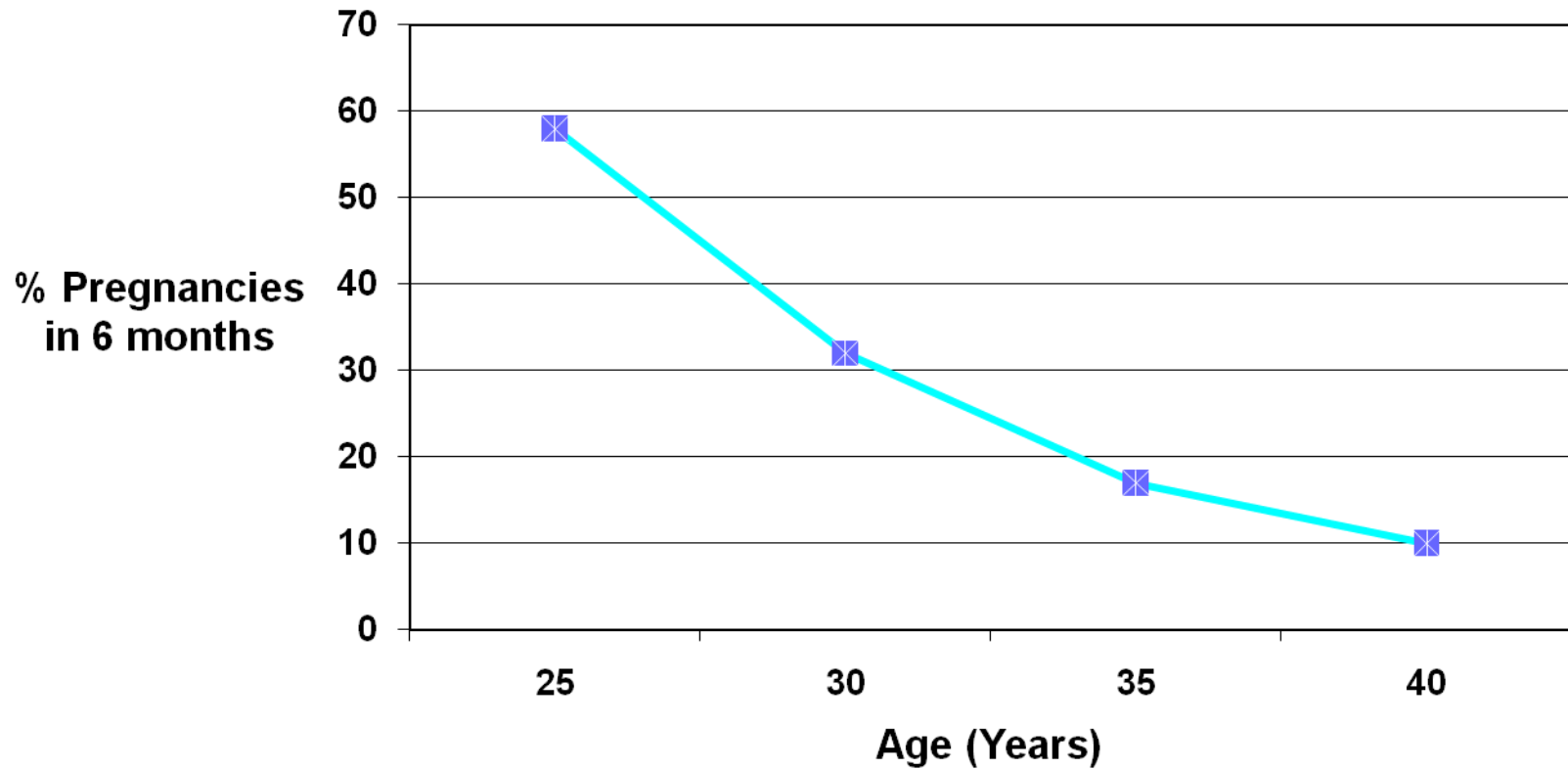
# Couples Experiencing Infertility



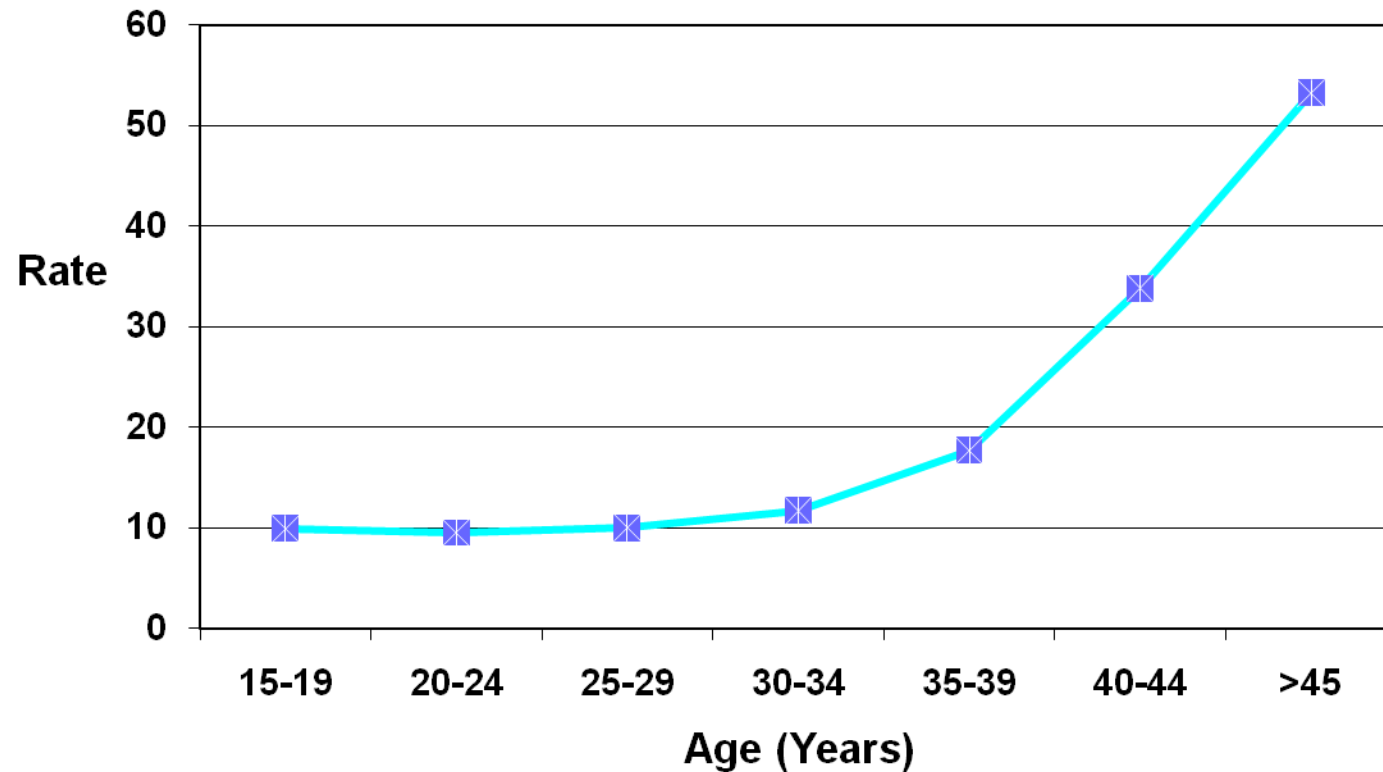
# Time Required for Conception

Time of Exposure	Pregnant
1 month	25%
3 months	57%
6 months	72%
1 year	85%
2 years	93%

# Fertility Decreases with Age



# Age and Spontaneous Abortion Rate

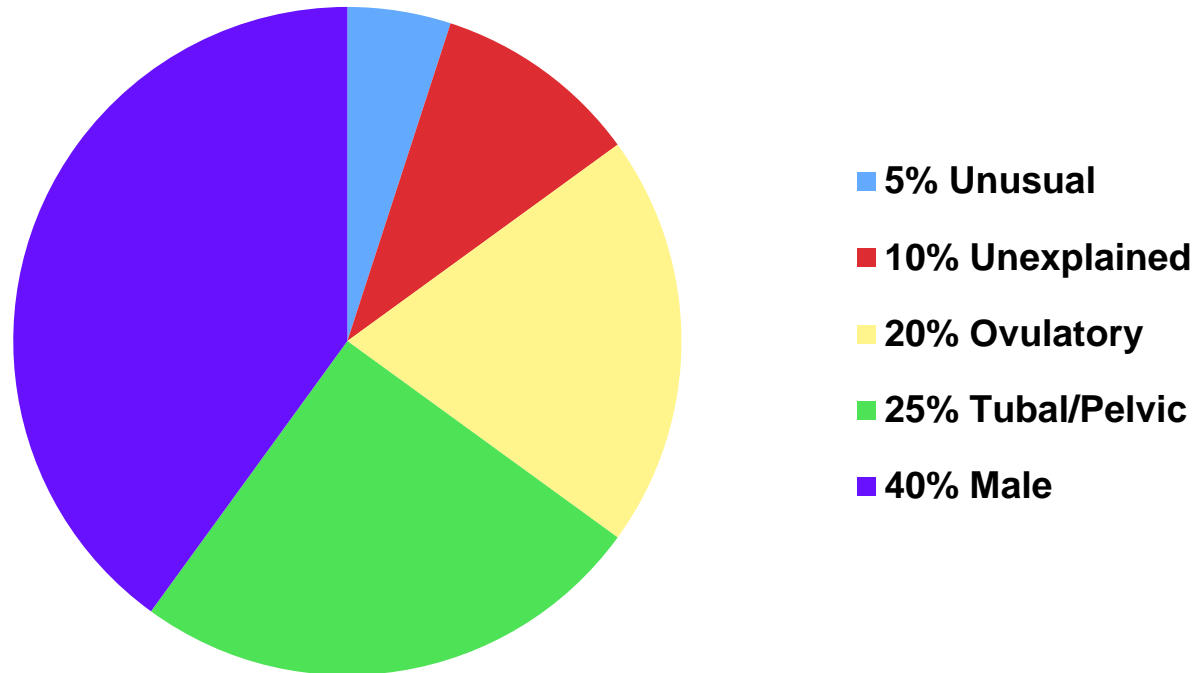


# Age and Chromosomal Abnormalities at Birth

Maternal Age	All Chromosomal Abnormalities
20	1/526
30	1/384
35	1/204
36	1/164
37	1/130
38	1/103
39	1/82
40	1/65
41	1/51
42	1/40
43	1/32
44	1/25



# Causes of Infertility





# History



Prior pregnancy outcome

Detailed menstrual history

STD/PID

PMH, PSH, medications

Social history

FH birth defects, genetic disease

# Physical Exam

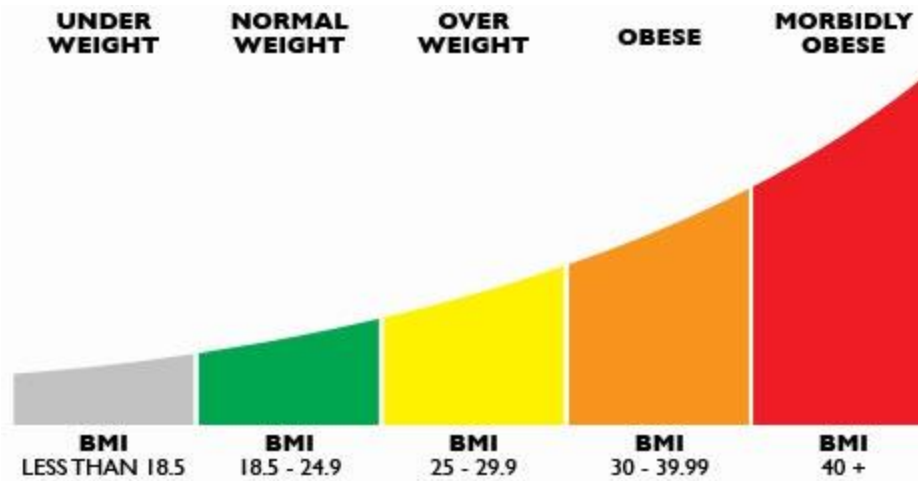
BMI

Hirsutism, acanthosis nigricans

Thyroid exam

Breast discharge

Pelvic exam



# Initial Evaluation

D3 FSH, E2, PRL, TSH, LH, AMH

Antral follicle count (AFC)

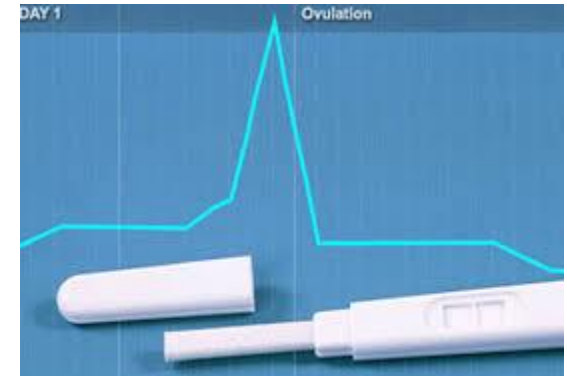
Urinary LH and midluteal P4

Hysterosalpingogram or Sonohysterogram

Semen Analysis

OB prenatal package

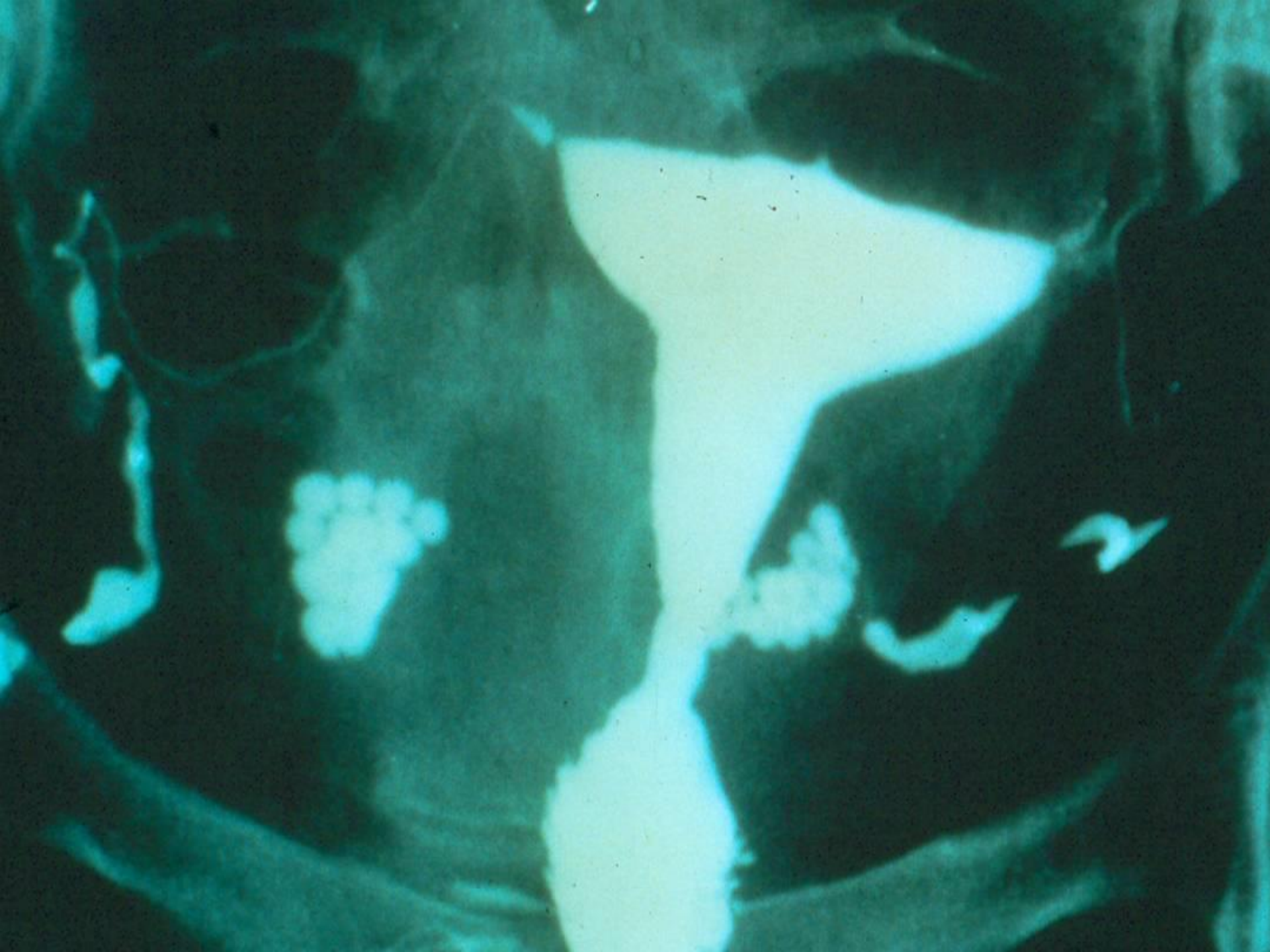
Comprehensive genetic screening



# Additional Diagnostic Tests



T, DHEAS, 17 OH Progesterone  
EMB  
Laparoscopy  
Hysteroscopy



# Male Infertility

Solely responsible in 20% of infertile couples

Contributory in 30-40% of infertile couples



# History and Physical



Systemic illnesses

Infection

Previous surgery

Current medication

Substance abuse

Hypospadias

Presence of vas deferens

Testes size

Varicocele

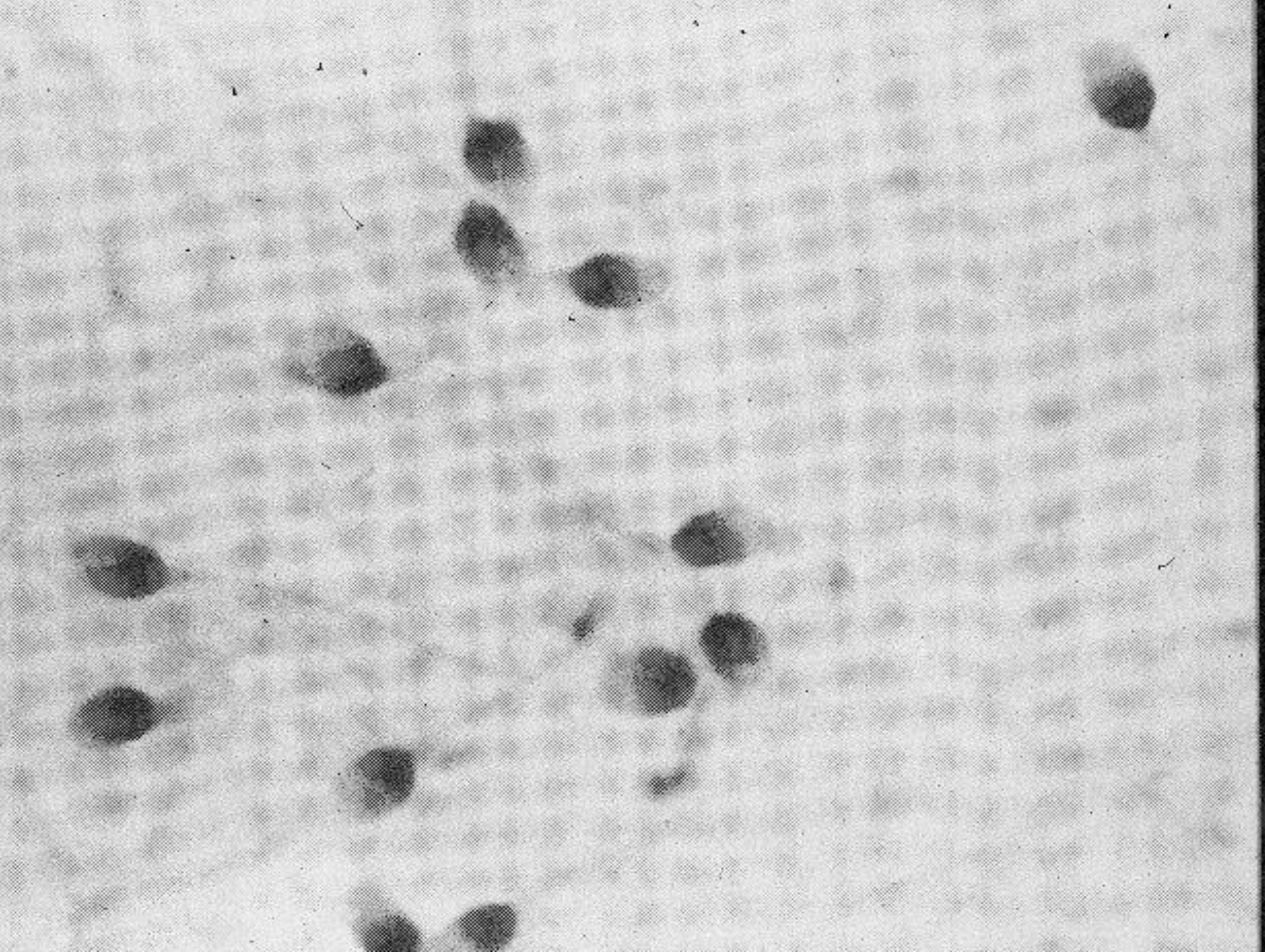
# Semen Analysis

Volume	1.5 – 5 mL
Sperm Concentration	>15 million/mL
Motility	>40%
Morphology	>14%*
WBC	<5/mf

World Health Organization, 2010  
FCI SA Criteria\*

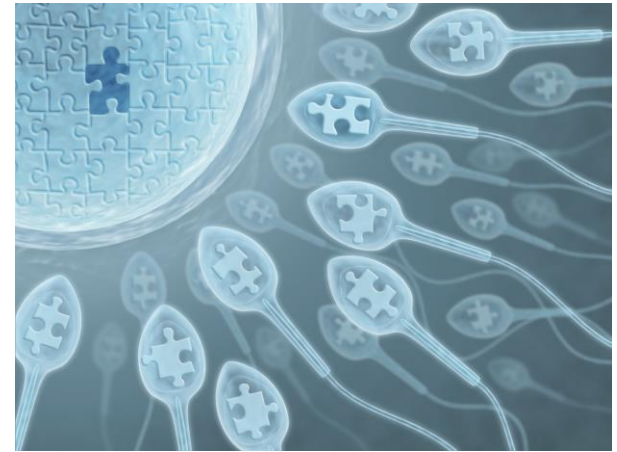




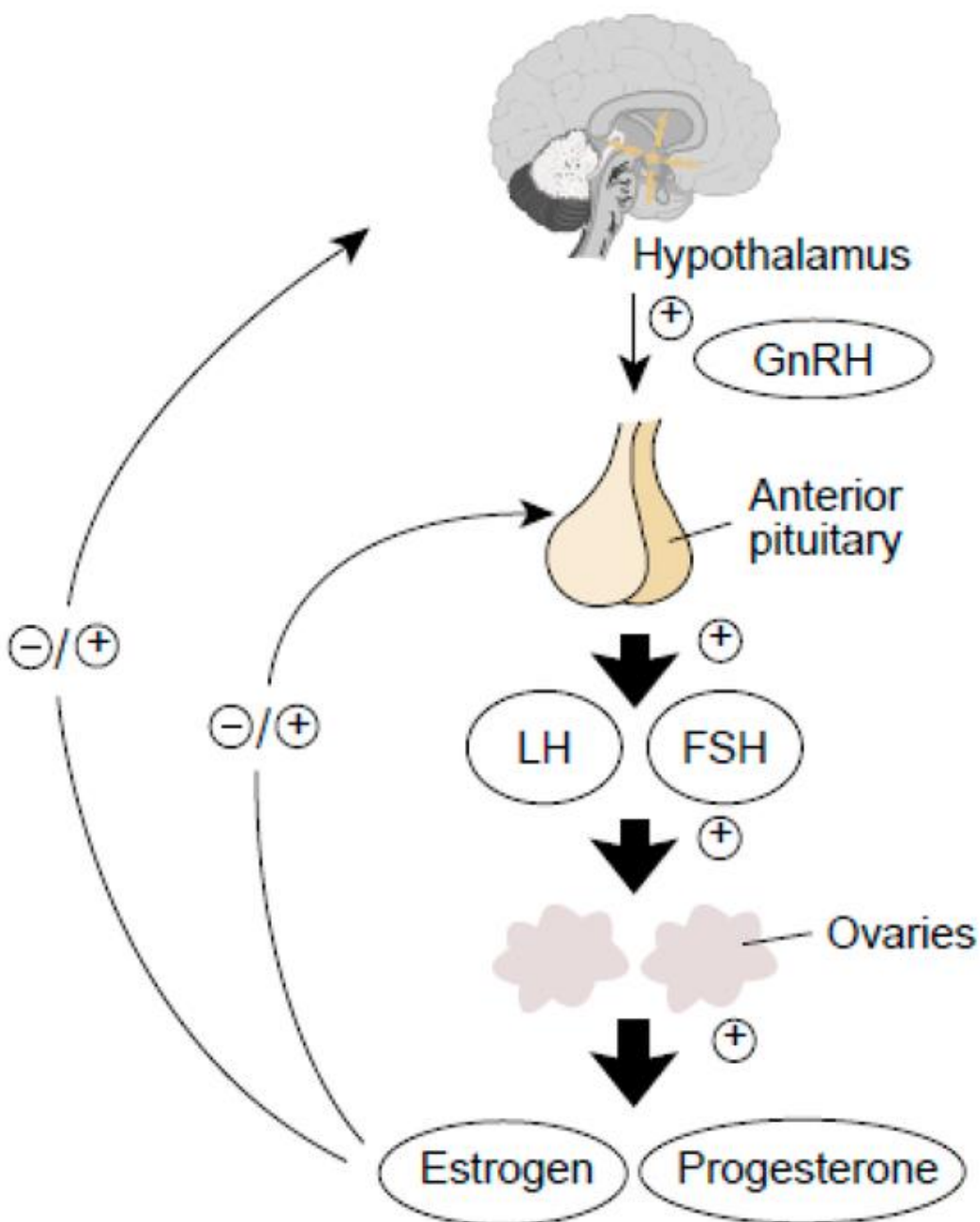


# Evaluation

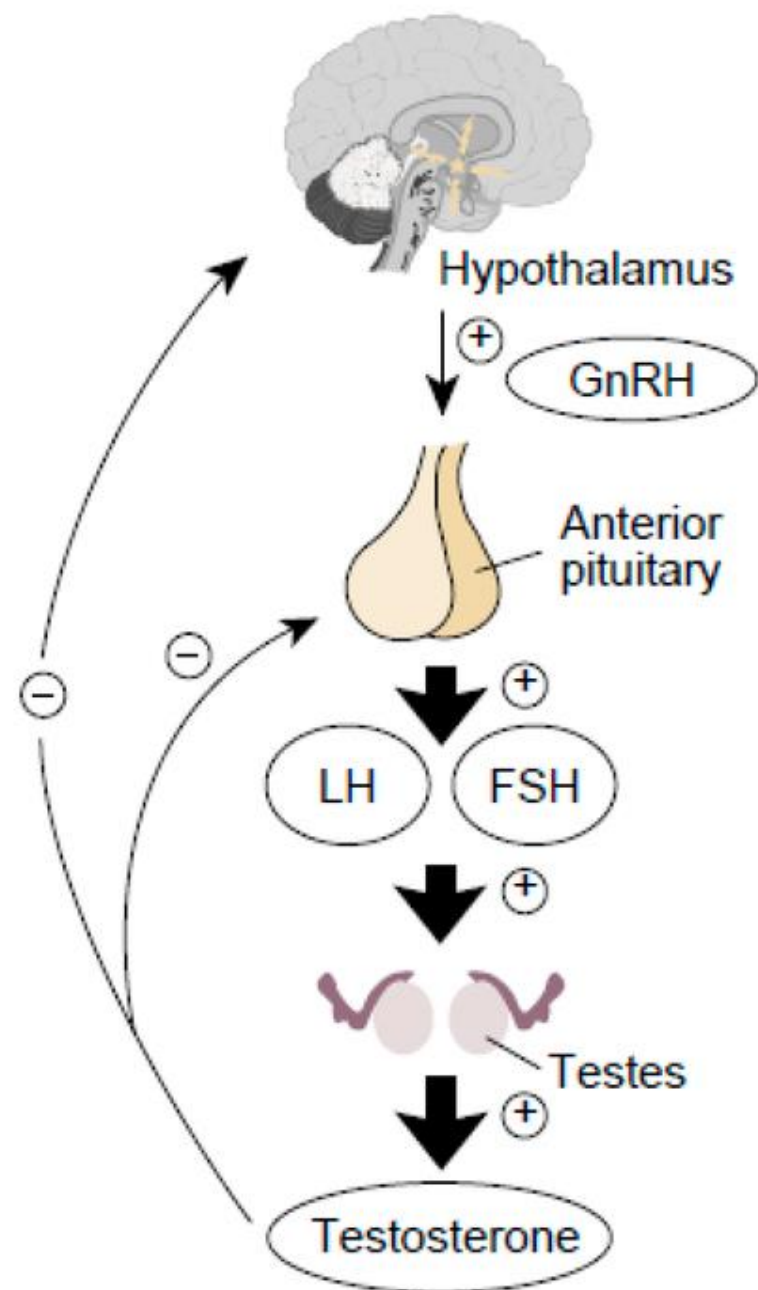
Endocrine testing  
Postejaculatory urinalysis  
Transrectal or scrotal ultrasound  
Specialized tests  
Genetic screening



## Female HPG Axis



## Male HPG Axis



# Endocrine Testing

Condition	FSH	LH	T	PRL
Normal Spermatogenesis	N	N	N	N
Testicular Failure	H	H	L	N
Hypogonadotropic/hypogonad	L	L	L	N
Ductal obstruction	N	N	N	N

# Specialized Tests

Leukocytes in semen  
Direct antisperm antibody test  
Sperm viability tests  
Postcoital testing  
Sperm penetration assay  
Computer-aided semen analysis  
SCSA  
Sperm Aneuploid test



# Genetic Screening

Cystic fibrosis gene mutation: Congenital absence of vas deferens

Chromosomal abnormality:

- 1% of normal men

- 5% of men with oligospermia

- 10-15% of men with azoospermia



Microdeletion of Y-chromosome: AZFa, AZFb, and AZFc

# Etiology of Male Infertility

Varicocele	35%
Idiopathic	25%
Primary Testicular Disorders	14%
Genital Tract Obstruction	10%
Sperm Autoimmunity	5%
Hypothalamic-Pituitary Diseases	1%

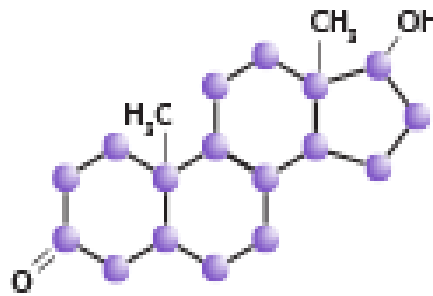


# Clinical Cases

Testosterone supplementation

Medical conditions with retrograde ejaculation

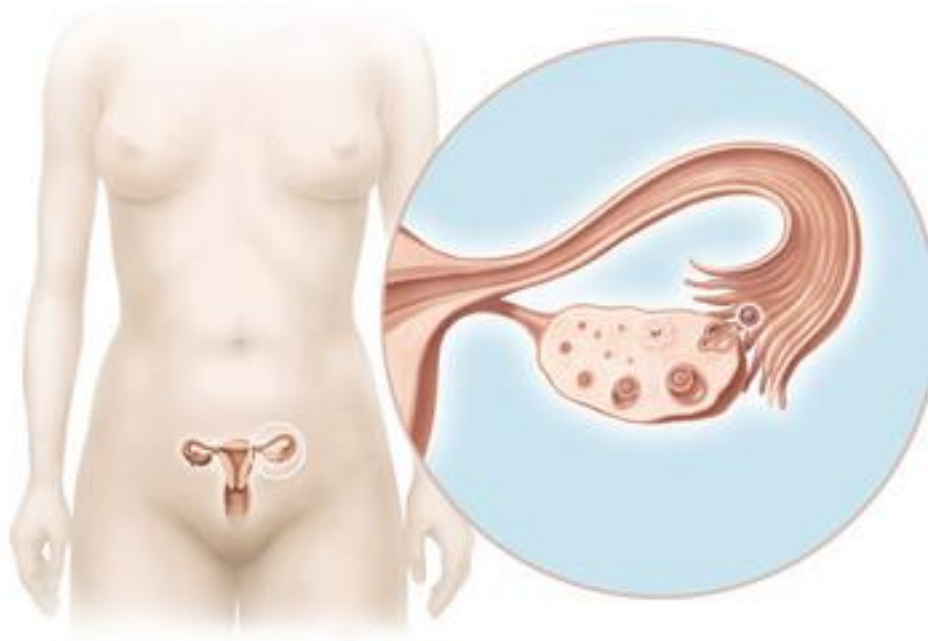
Antisperm antibodies



Testosterone



# Ovulation Induction



# Ovulation Induction: oral medications

## Clomiphene citrate

50-150mg x 5 days

Half life=7 days

Hypothalamic receptors

Hot flashed, mood swings



## Letrozole

2.5-5mg x 5 days

Half life=2 days

Aromatase inhibitor

Nausea, fatigue



# Ovulation Induction: oral medications

Induce ovulation in 80% of patients

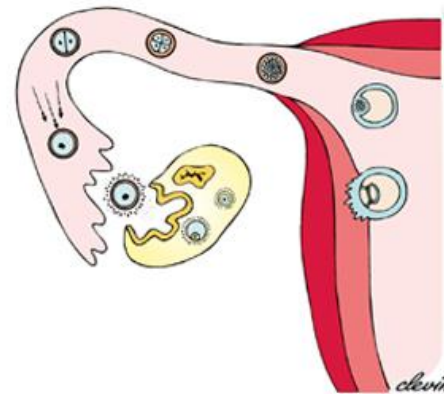
5-10% chance of twins

Rare ovarian hyperstimulation

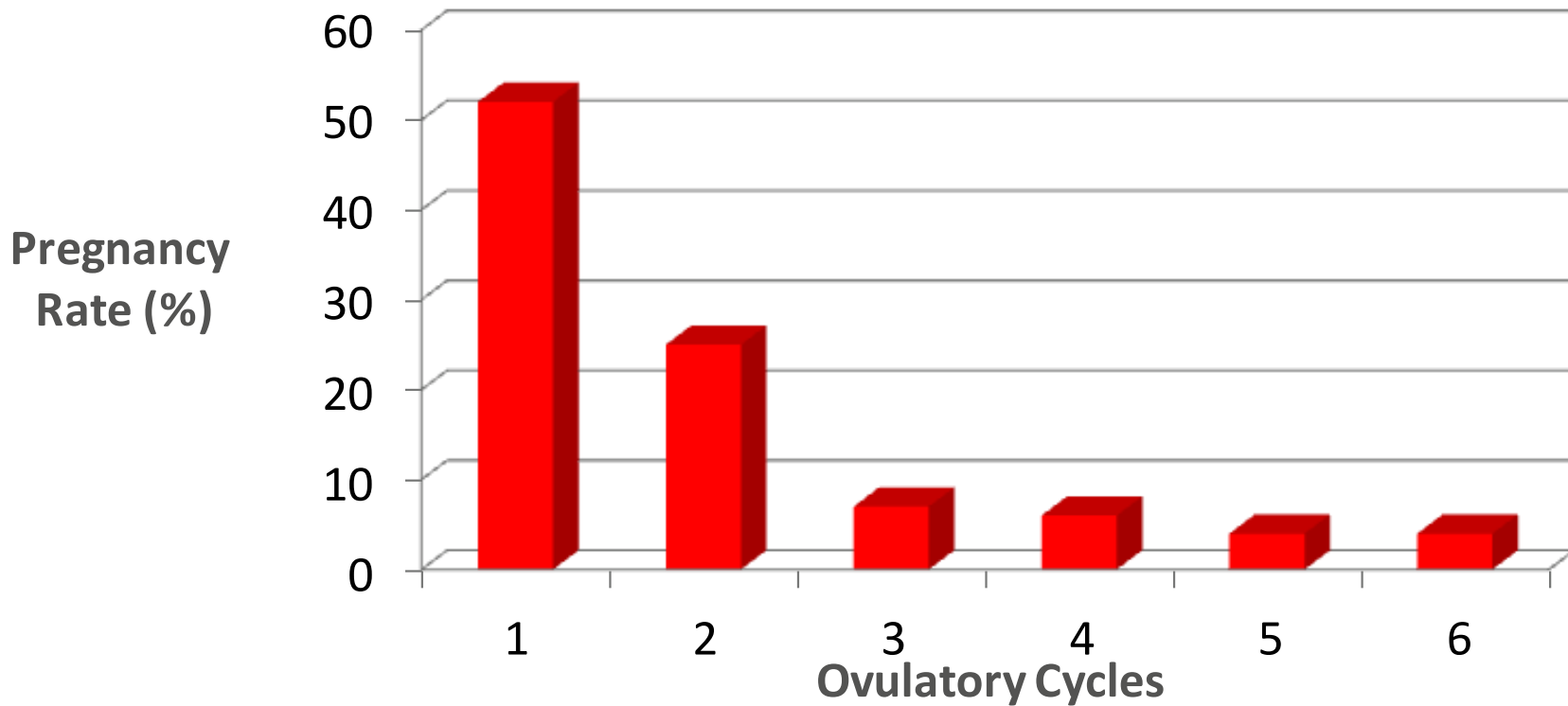
Possible increased risk of ovarian cancer

May be combined with:

- + Metformin 1500mg
- + Dexamethasone 0.25-0.5mg
- + Bromocriptine 2.5mg
- + Gonadotropins cycle d8-10



# Rate of Conception with Clomiphene Citrate



# Ovulation Induction: injectable medications

FSH

FSH + LH

GnRH Agonist

GnRH Antagonist

HCG trigger

Progesterone in oil



# Ovulation Induction: injectable medications

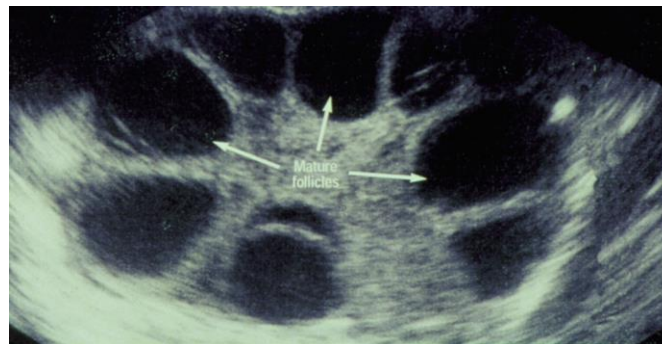
Induce ovulation in 95% of patients

Breast tenderness, abdominal bloating

Multiple pregnancy rate 20-25%

Ovarian hyperstimulation: mild, moderate, severe

Possible increased risk of ovarian cancer later in life



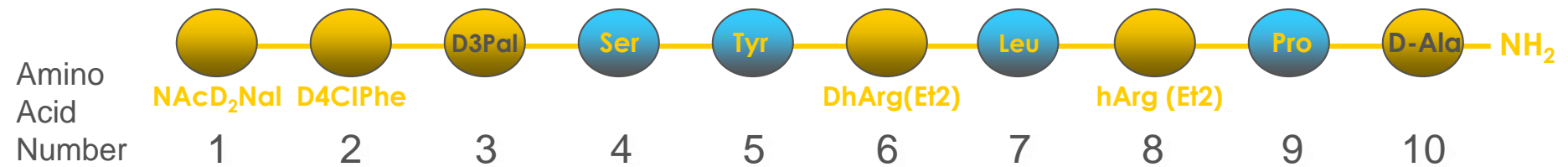
# GnRH



## Lupron<sup>®</sup>



## Antagon<sup>™</sup>



# Ovulation Induction: vaginal medications

## Progesterone supplementation

Progesterone vaginal suppositories

Crinone 8%

Endometrin 100mg

## Estrogen supplementation

Estradiol vaginal tablets





# Varicocele: Treatment

Palpable varicocele

Couple with documented infertility

Female partner with normal fertility or  
potentially correctable infertility

One or more abnormal semen parameters

ASRM Practice Bulletin, 2014



The American  
Society for  
Reproductive  
Medicine

# Varicocelelectomy before assisted reproductive technology: are outcomes improved?

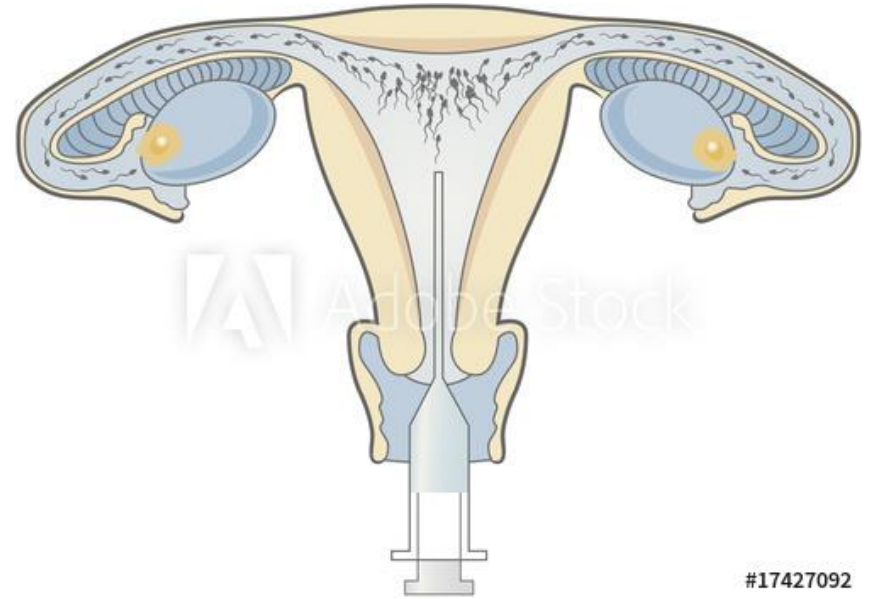
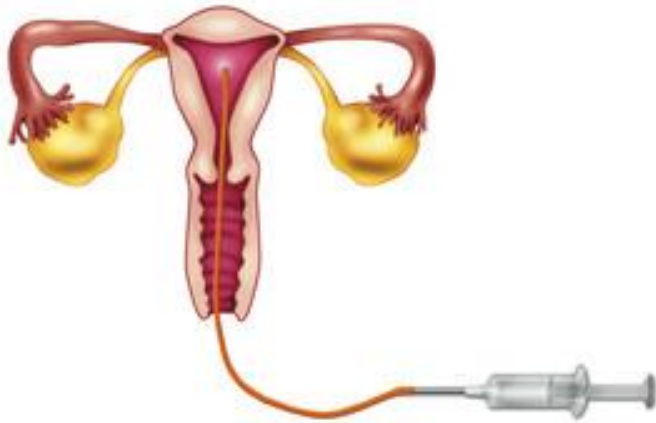
Taylor P. Kohn, M.Phil.,<sup>a</sup> Jaden R. Kohn, B.S.,<sup>a</sup> and Alexander W. Pastuszak, M.D., Ph.D.<sup>b,c</sup>

<sup>a</sup> Baylor College of Medicine; <sup>b</sup> Center for Reproductive Medicine, Baylor College of Medicine; and <sup>c</sup> Scott Department of Urology, Baylor College of Medicine, Houston, Texas

Insufficient evidence surgery improves IUI outcome  
Possible benefit prior to IVF/ICSI  
N=6 studies

Kohn, et al. Fertil Steril 2017; 108: 385

# Intrauterine Insemination



#17427092

# Percoll Gradient Centrifugation



# Treatment Options: Success Rates

Treatment	Success Rate (% per cycle)
Observation	3-4
Natural cycle + IUI	4
Clomiphene + IUI	8-10
Clomiphene + FSH + IUI	10-15
FSH + IUI	15-20

Fertility Centers of Illinois, 2013

N=3033 cycles

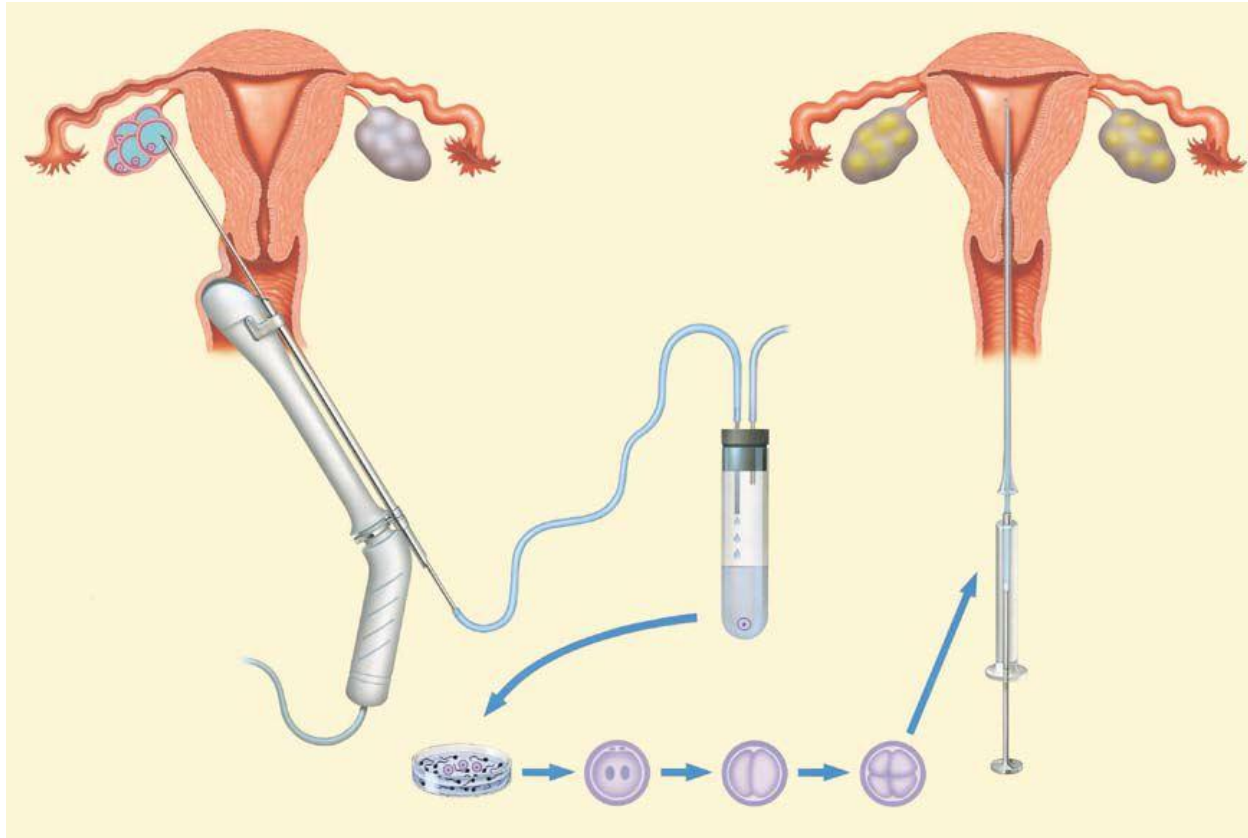
# Role of tubal surgery in the era of assisted reproductive technology: a committee opinion

The Practice Committee of the American Society for Reproductive Medicine  
American Society for Reproductive Medicine, Birmingham, Alabama

Surgical treatment only for mild hydrosalpinges  
Salpingectomy is recommended prior to IVF

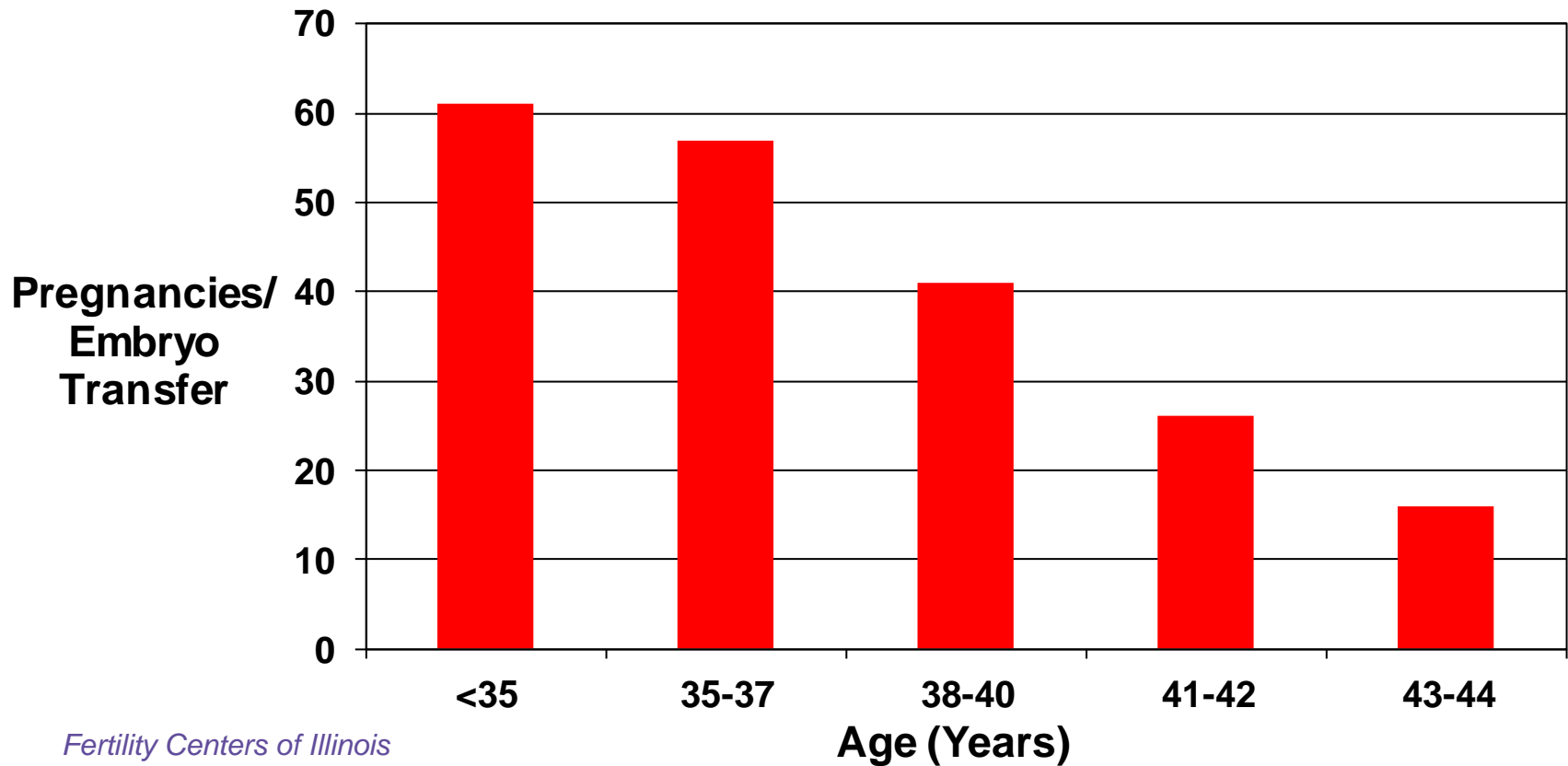
ASRM Practice Committee Document, 2015

# In Vitro Fertilization





# IVF Clinical Pregnancy Rates 2017

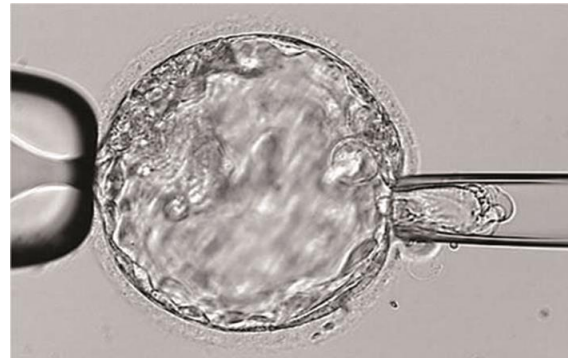




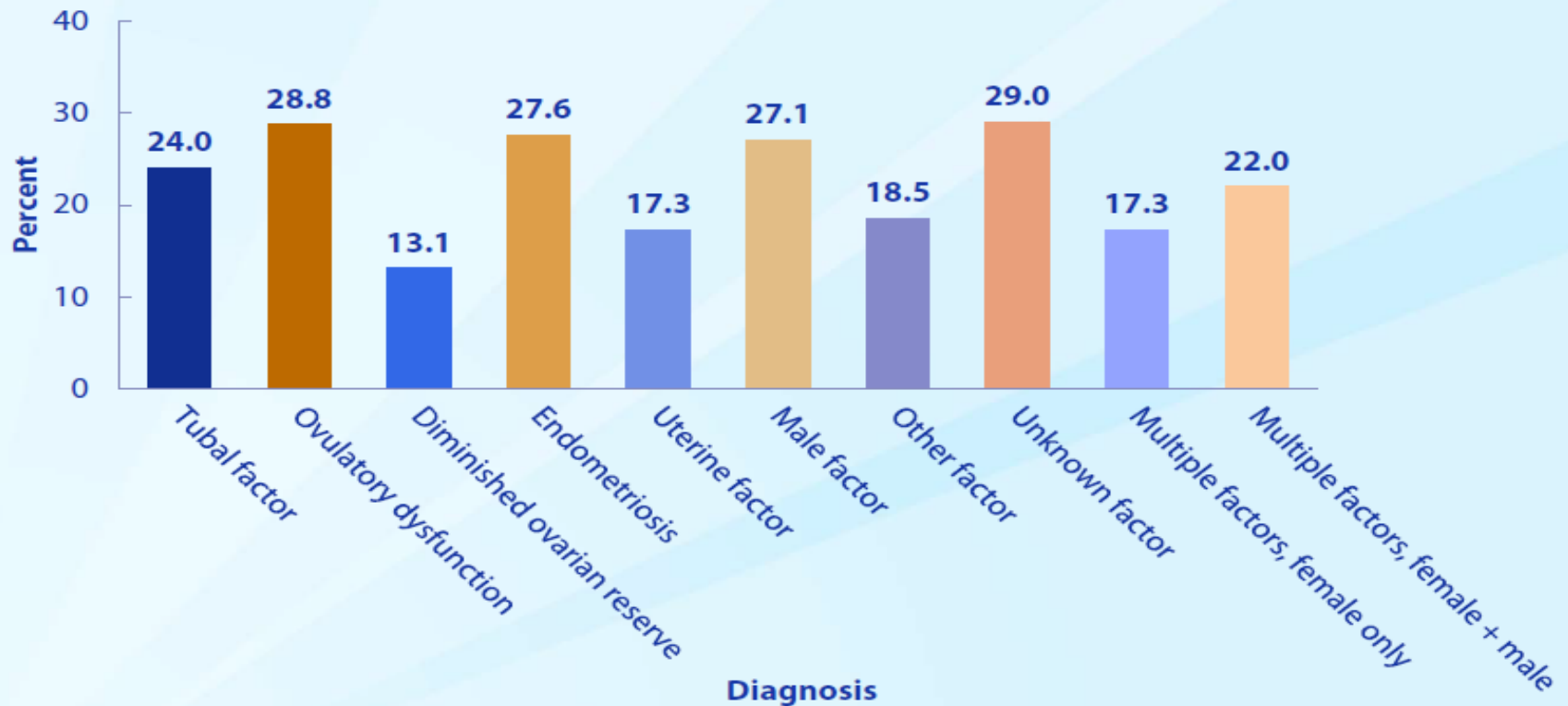
# Preimplantation Genetic Testing

Biopsy:	Outer Cell Mass, 5-7 Cells
Error Rate:	1-2%
Clinical Error Rate:	5-8%
Platforms:	aCGH, SNP Array, NGS, HR NGS
Mosaicism:	20%
Miscarriage Rate:	10%

*Munne, S, Fertil Steril 2016, 105-1146*



## Percentages of ART Cycles Using Fresh Nondonor Eggs or Embryos That Resulted in Live Births, by Type of Infertility Diagnosis, 2015



National Center for Chronic Disease Prevention and Health Promotion  
Division of Reproductive Health



# Reproductive Options

Donor Oocyte

Donor Sperm

Gestational Surrogacy

Embryo Adoption

Conventional Adoption



# Cost of Treatment

## Oocyte Vitrification

Procedure and storage	\$7,000
Medications	\$3,000-5000

## IVF

Procedure	\$11,500
Medications	\$3,000-5000
Freezing and storage	\$1,200

## PGT

Biopsy	\$2,200
Genetic testing	\$4,000-5,000



# Emotional Aspects of Infertility



Role of stress  
Refer to clinical psychologist  
Complementary medicine  
Support groups  
Patient education seminars

# Contact



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