



Fertility in the 21st Century

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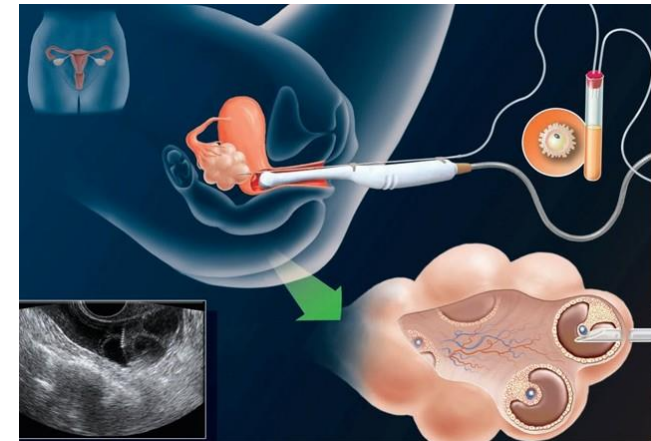
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Dr Kate Van Harselaar
Fertility Specialist, Obstetrician and Gynaecologist

Overview

- Discuss
 - who does it effect
 - where to start
 - when to act
 - first steps
 - possible options to optimize chance of success



Fertility Facts

25 % of couples experience infertility in their reproductive lifetime

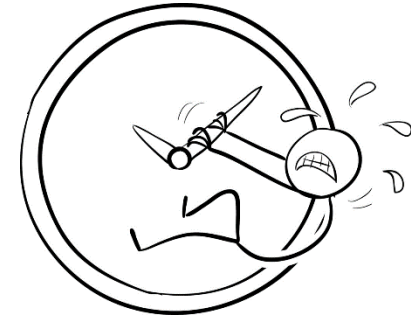
Few causes infertility can be cured, but treatment increases chance preg similar to that fertile couples

Delays in starting family – no or incomplete family



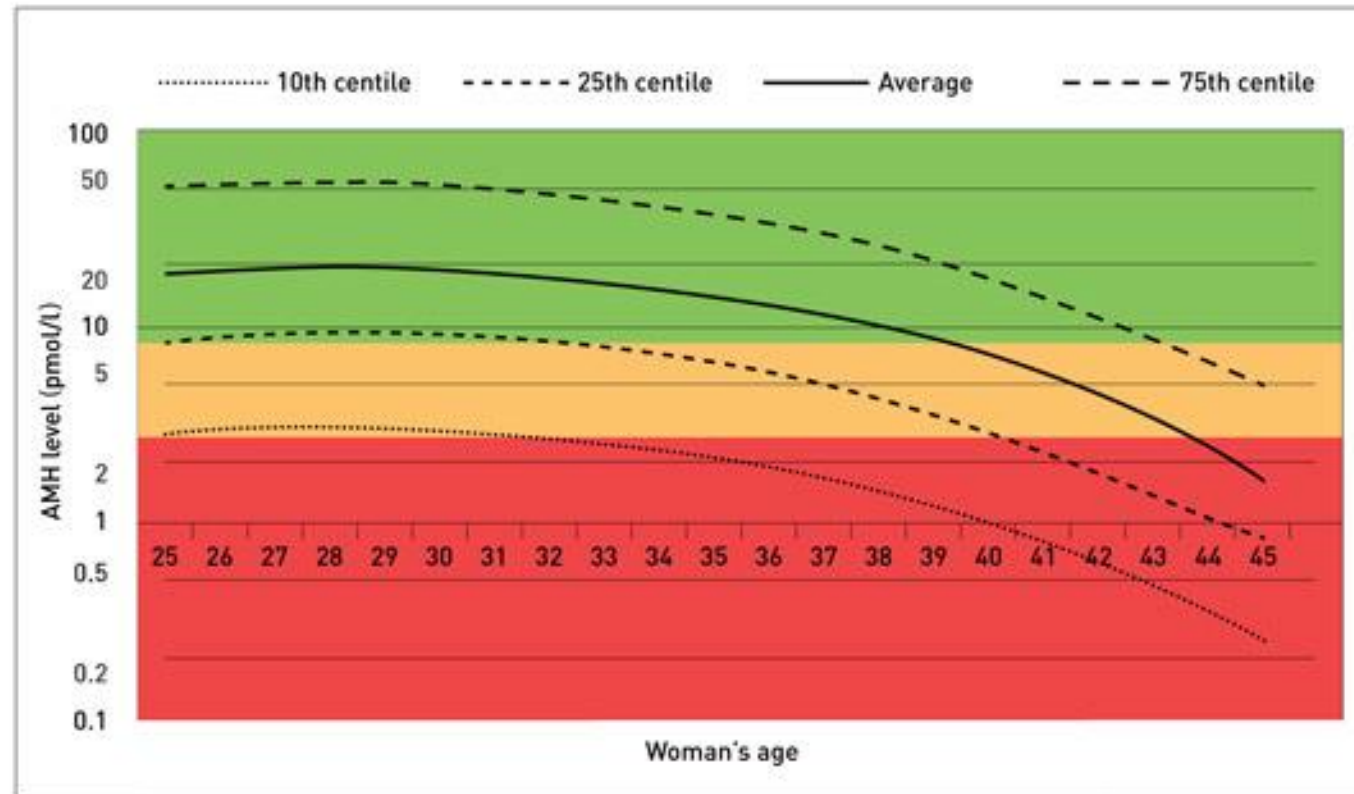
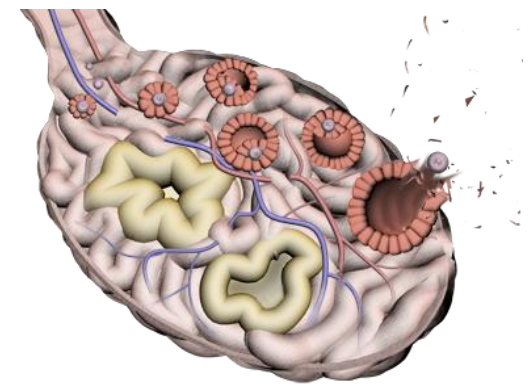
Infertility Couples think it will never happen to them?

- **< 35 yr**
 - time to try
 - time to investigate
 - time to treat
- **35 yr**
 - expedite process
 - not enough to access publicly funded IVF unless pathology
- **37 yr, advanced maternal age!**
 - ovarian reserve declining
 - egg quality decreasing
 - chromosomal abnormality increasing
 - unlikely to get public funding unless pathology



Where to start...

- **Female fertility – AMH**
 - Produced by granulosa cells



- Male – only need one.....



Male fertility

Male Fertility

- As men age their sperm morphology and motility tends to decline
- DNA fragmentation increases
 - IVF pregnancy rate decreases as DNA fragmentation increases
- Paternal age >40 leads to increased rate of miscarriage independent of maternal age

Sperm Health

- Normal BMI
- Dietary antioxidants
- Diets high in fruit, vegetables, fish and wholegrains
- Menevit
- Low alcohol
- No cigarettes
- Frequent ejaculation



When to act...

- **Definition Infertility**
 - <35 yo - 12 months
 - >35 yo - 6 months



History – should be tailored to potential problems?

Females

- Previous pregnancies (miscarriage, ectopics)
- Cycle reg/irreg (p4)
- IMB (polyp)
- STDs (PID risk)
- Gynae issues – endo (1/3 no Sx), PCOS
- Med/surgical Hx
- Risks POF (FH, ovarian insult, chemo/radio)



History – should be tailored to potential problems?

Males

- Testicular infxn, trauma, surgery
- SA
- Med Hx
- Medications

Sexual Dysfunction

- If you don't ask you won't know
- impotence, vaginismus, libido

Occupation

- shift work, travel, horticulture

FH

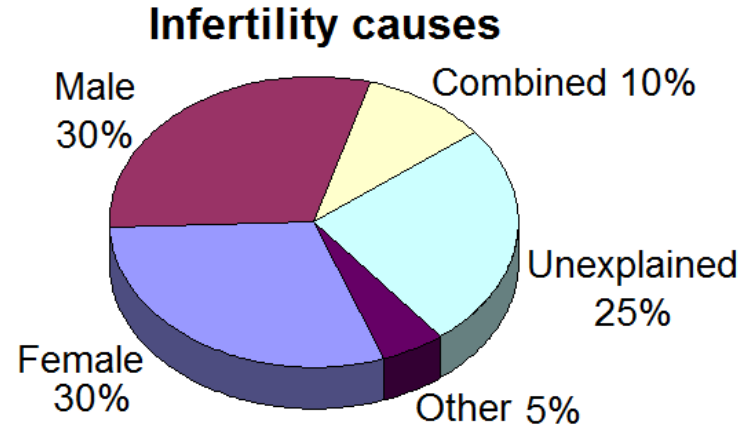


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What are the causes?

It guides our investigations.....



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Investigations - Females?

GP

- D2 FSH/LH, E2
- TFT
- Prolactin
- HbA1C
- 1st AN bloods

Ovulation – cycle? (luteal prog)

AMH

USS

HSG

Laparoscopy + Dye

Hydrosalpinges

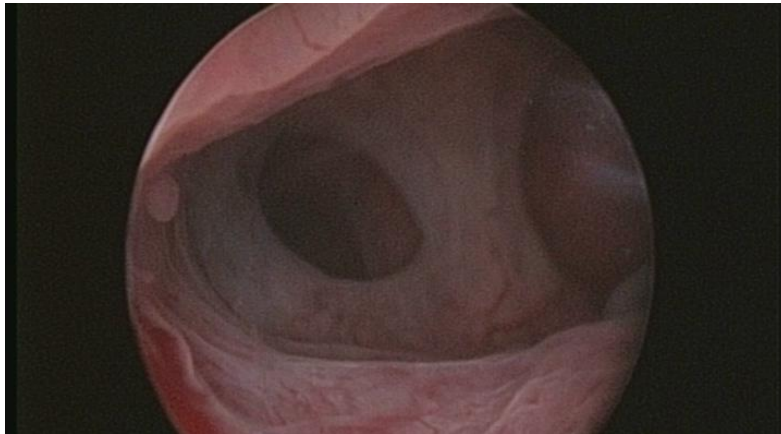
Recurrent miscarriage - screening

Ovarian drilling -PCOS



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Investigations



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Investigations - Male

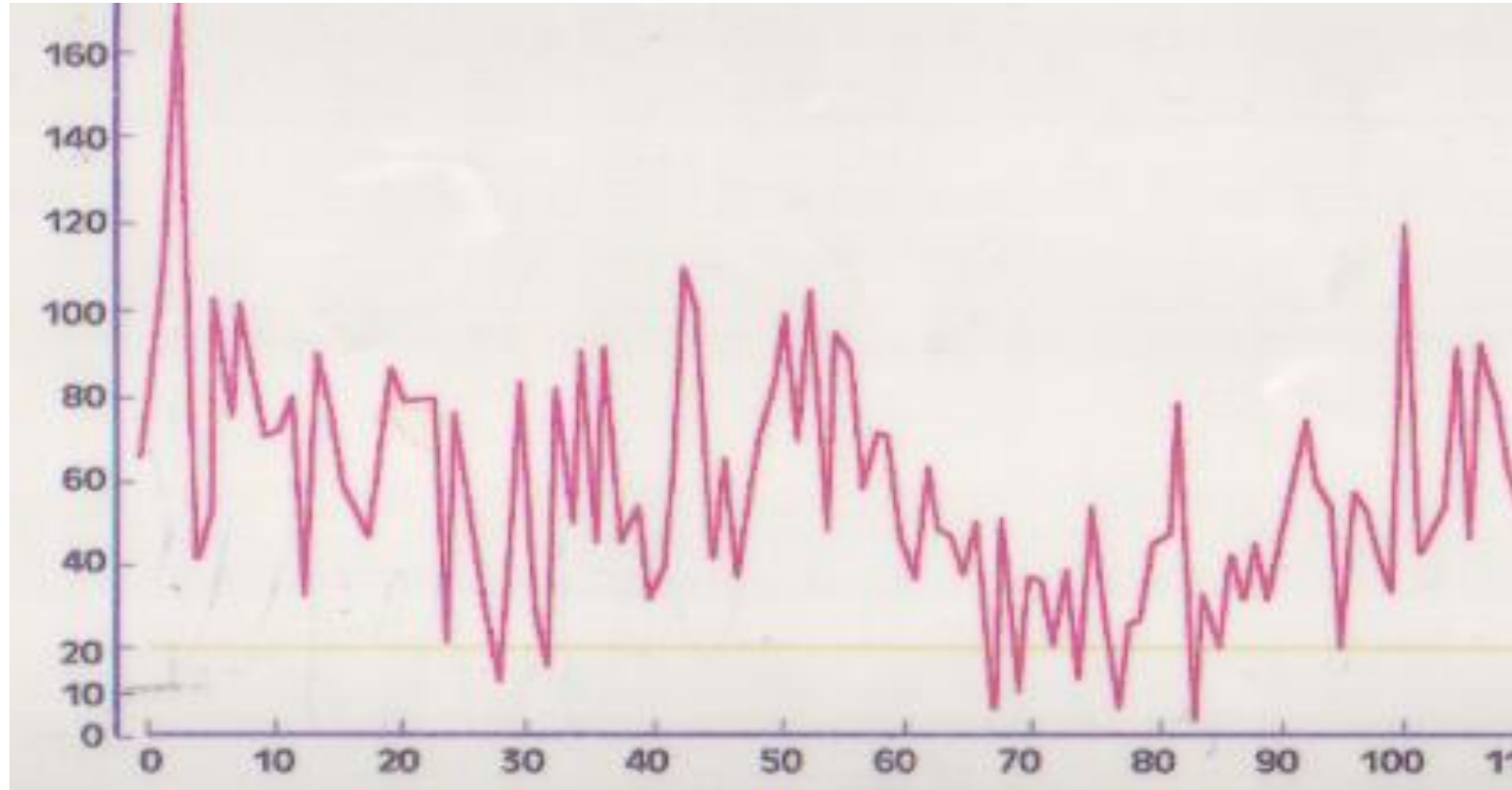
- **Semen analysis** (community vs specialised)
 - Vol >2mls
 - Count >15 Mill/ml
 - Motility >32% progressive
 - Morphology >4% N
 - WCC <1 mill/ml
 - Antibodies
- Abnormal – Repeat
- SCSA – DNA fragmentation



Sperm Count

Fertile man – once a week for 2 years

Density *10⁶/ml



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Treatment - Education?

- Fertility window
- Misconceptions
 - social media
 - salpingectomy
 - previous ectopics
- Intervention depends on cause
 - Sperm antibodies
 - Anovulation
 - High BMI



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Treatments for Infertility

- Targeting fertility window
- Monitored cycle
- Ovulation induction
- Fallopian tube surgery
- Intra Uterine Insemination (IUI)
- In-vitro fertilisation (IVF)
- IVF with Intra-Cytoplasmic Sperm Injection (ICSI)
- Donor eggs/sperm
- Surrogacy
- Adoption
- Nothing



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Publicly Funded Treatment

- Criteria are the same across New Zealand
- People need ≥ 65 points using the fertility CPAC scoring tool
 - Score > 65 only means eligible
 - All have same wait time till treatment
 - Higher score doesn't mean more urgent treatment
- **The CPAC score can only be calculated by a fertility specialist.**

Funding?

CPAC criteria

Knowing criteria can influence success

CPAC SCORING SHEET – FAC, FAD

(Clinical Priority Access Criteria)

Ovulation	6 3 0	Annovulation due to hypopituitary hyogonadism/ Ovulatory but not pregnant after 9 months Rx/ Resistant to CC +/- Metformin +/- LOD < 9 ovulatory cycles/year Other	Name: _____ Ref number: _____ Date scored: _____ Doctor scoring: _____ Signature: _____ Height: _____ Weight: _____ BMI: _____ Date taken: _____ Day 3 FSH: _____ E2: _____ Smoker: Y / N Onset of infertility (month/year): _____ IVF/ICSI IUI DI OI DO (circle treatment, scoring can not be completed without treatment type) Comments: _____ If for 1 st FSA appointment 20 or 40 min required Please circle appropriate duration			
Male	6 3 0	Any of: Strict morphology < 4% Sperm concentration < 1 million/ml Sperm Mar > 40% positive >= 2 years since vasectomy reversal and not preg < 1 million motile after sperm wash IUI and < 2 million motile 3 x IUI for male infertility and not pregnant < 40% total motile or < 15 million/ml in 2 samples Other				
Endo	6 3 2 1 0	Stage IV Stage III Stage II Stage I None				
Tubal	6 3 2 1 0	Occlusion/ severe adhesions/ 12 months surgery Mod adhesions/ 6 months surgery Polyps/ mild adhesions/ normal tube one side Minimal adhesions best side No tubo-peritoneal pathology				
Other	6 3 2 1 0	Severe Moderate Mild Minimal None				
Duration of infertility = sum of all durations > 12 months without live birth		> 5 years ≥ 4 and < 5 years ≥ 3 and < 4 years < 3 years	Now 6 3 2 1	At: 6 3 2 1	At: 6 3 2 1	
Total diagnostic score						
		OBJECTIVE CRITERIA	Points	Now	At:	At:
Diagnostic (O1)		Total diagnostic score	≥ 6 3 – 5 2 0 – 1	10 7 4 2		
Woman's age (O2)			≤ 39 y = 40, 41 ≥ 42y	10 5 1		
Objective score		$OS = O1 \times O2 \div 100$				
		SOCIAL CRITERIA				
Duration of infertility over time (S1)		Less than 1 year 1 or 2 years 3 or 4 years 5 years or more	5 20 40 50			
Children at home (50% of time or more and under the age of 12. (S2)		None 1 by relationship 1 by previous relationship • 2 or more children at home excludes eligibility	30 10 8			
Sterilisation (S3)		Neither partner One or both partners	20 10			
Social score		$SS = S1 + S2 + S3$				
FINAL SCORE		$= OS \times SS$				



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Waitlist for Treatment

- Generally **8-10 months**.
- You can have a **private consultation to access public treatment**. This is useful when time is of the essence.
- Patients can access **private fertility treatment** whilst on the public waiting list.

Take control.....

- Know your cycle - Fertility window
- Lifestyle factors
 - Smoking
 - Decr sperm quality, bld flow to uterus, incr MC
 - IVF – halves success, decr quality/number eggs
 - Weight (BMI)
 - <19 and >32 (men and women)
 - Drugs (marijuana)
 - Incr RR Infertility 60%

Take control.....

Lifestyle factors

- Alcohol >2units/day
 - Incr RR Infertility 60%
- Coffee >250mg/d
 - Decr fecundability 45%
- Pollutants (occupation)
 - horticulturalists



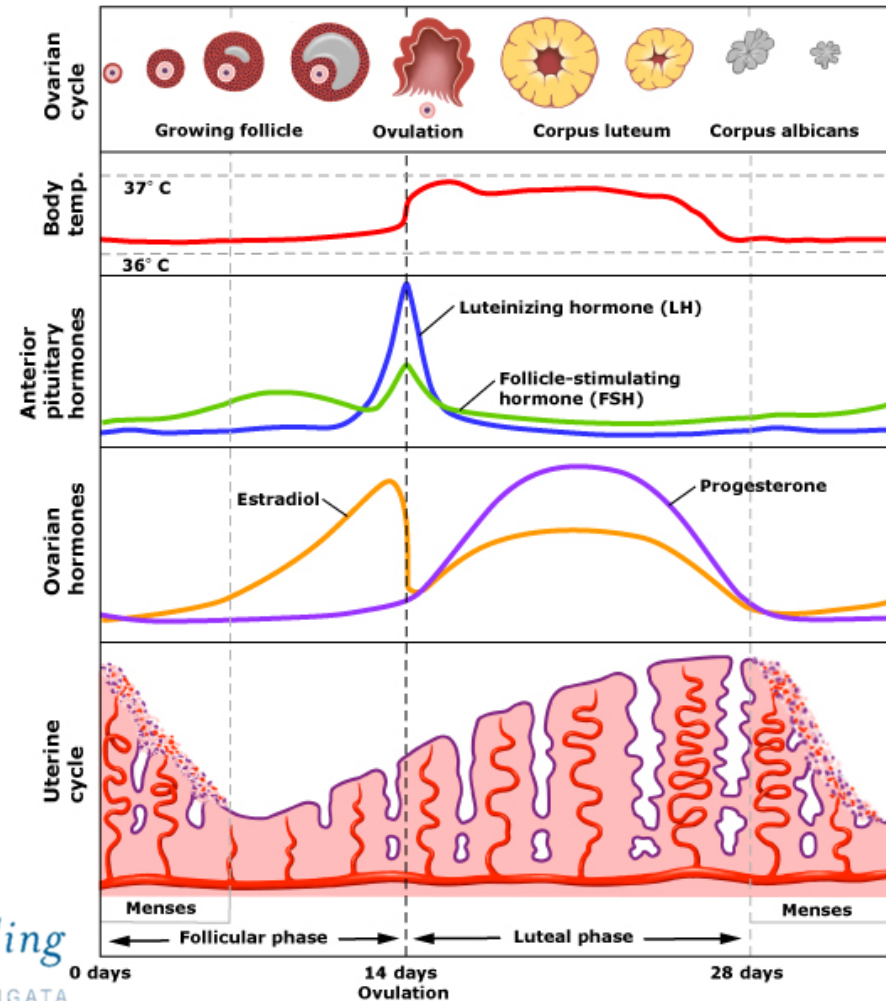
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Menstrual cycle

Fertility Window
Monitored Cycle
OI



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Ovulation Induction



- Aim – 1-2 follicle
- Indication – anovulation, PCOS, irregular cycle
- Drugs
 - Clomiphene - success ovulation 42%
 - E2 antag, blocking normal negative feedback, incr GnRH, incr FSH, acts on follicles
 - Risk multiple preg Metformin
 - augments clomiphene - success ovulation 76%
 - Letrozole
 - Gonadotrophins
 - Other treatments unsuccessful
 - Higher risk multiples

– Process

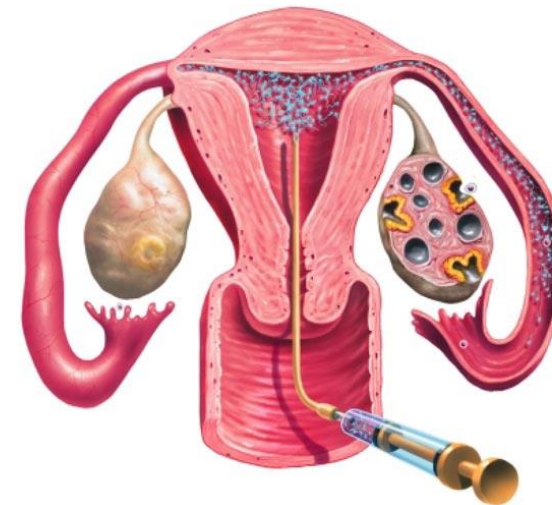
- Blds (follicle growth/ovulation), USS, target window, ovulation, pregnant.



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IUI

- Sperm get “head start” into uterus
- With or without ovulation induction
- Indications
 - Mild male factor
 - Need minimum number motile sperm
 - Mild endometriosis
 - Unexplained infertility
- Recommended treatment
 - 4 cycles with partners sperm
 - 6 cycles if donor sperm
- Move to IVF if unsuccessful



In COH/IUI, sperm are injected directly into the uterine cavity at the time of ovulation. Fertilisation occurs inside the fallopian tube. This procedure may be performed with or without controlled ovarian stimulation.



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IVF



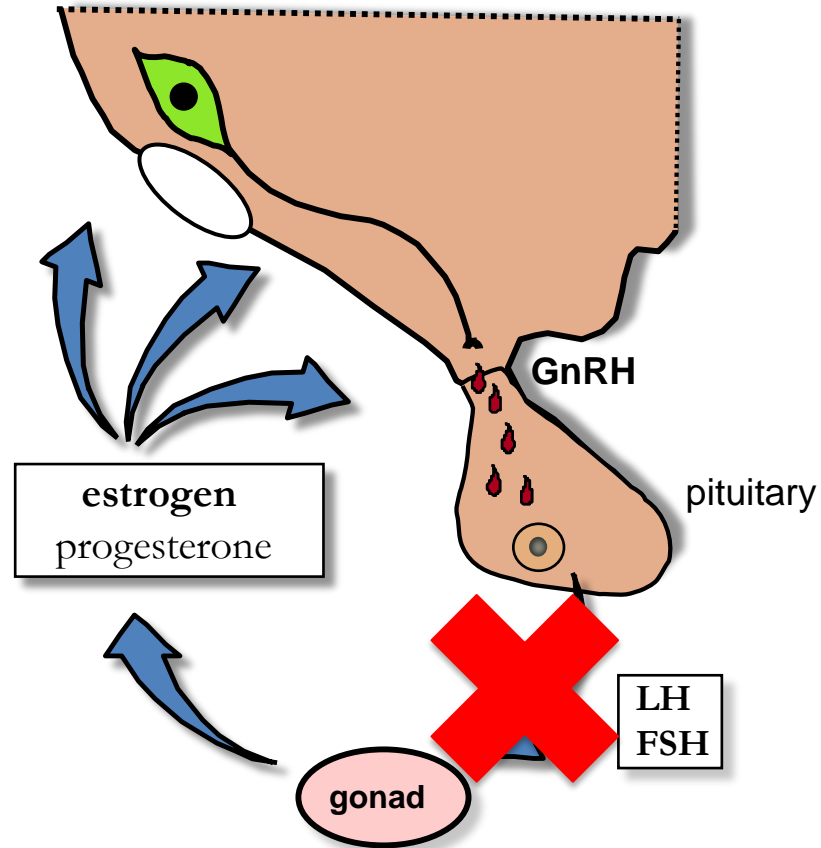
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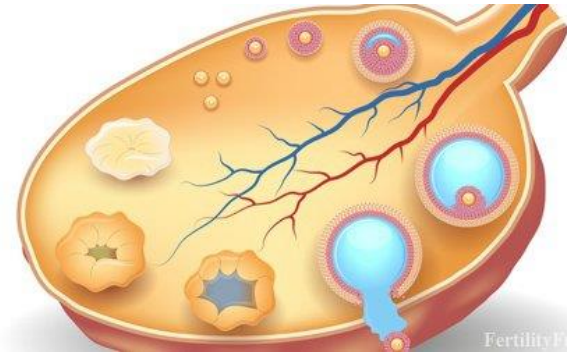
Step 1 – controlling the pituitary

GnRH agonist



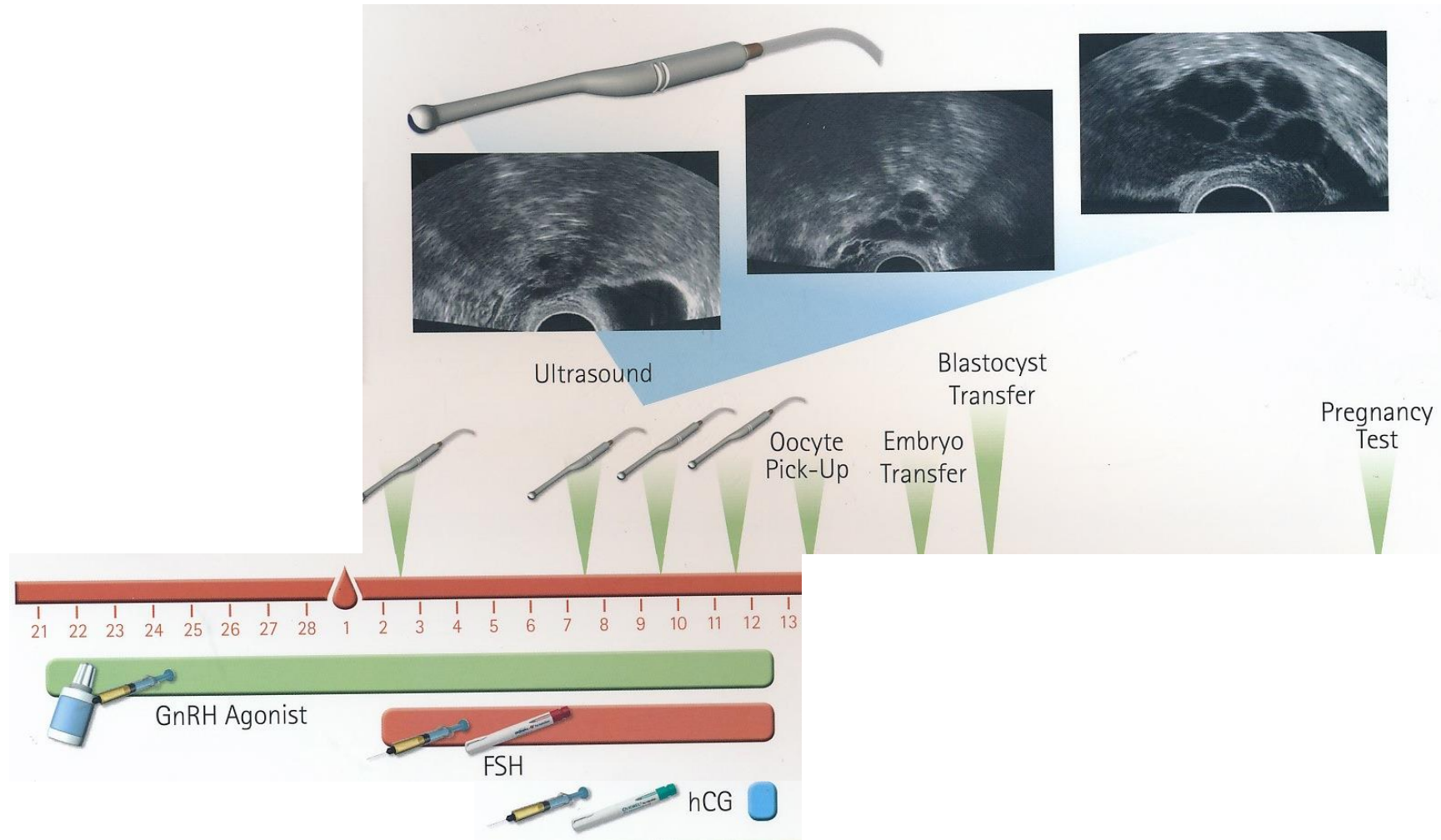
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Fertility Partners

Step 2 – Stimulating the ovaries

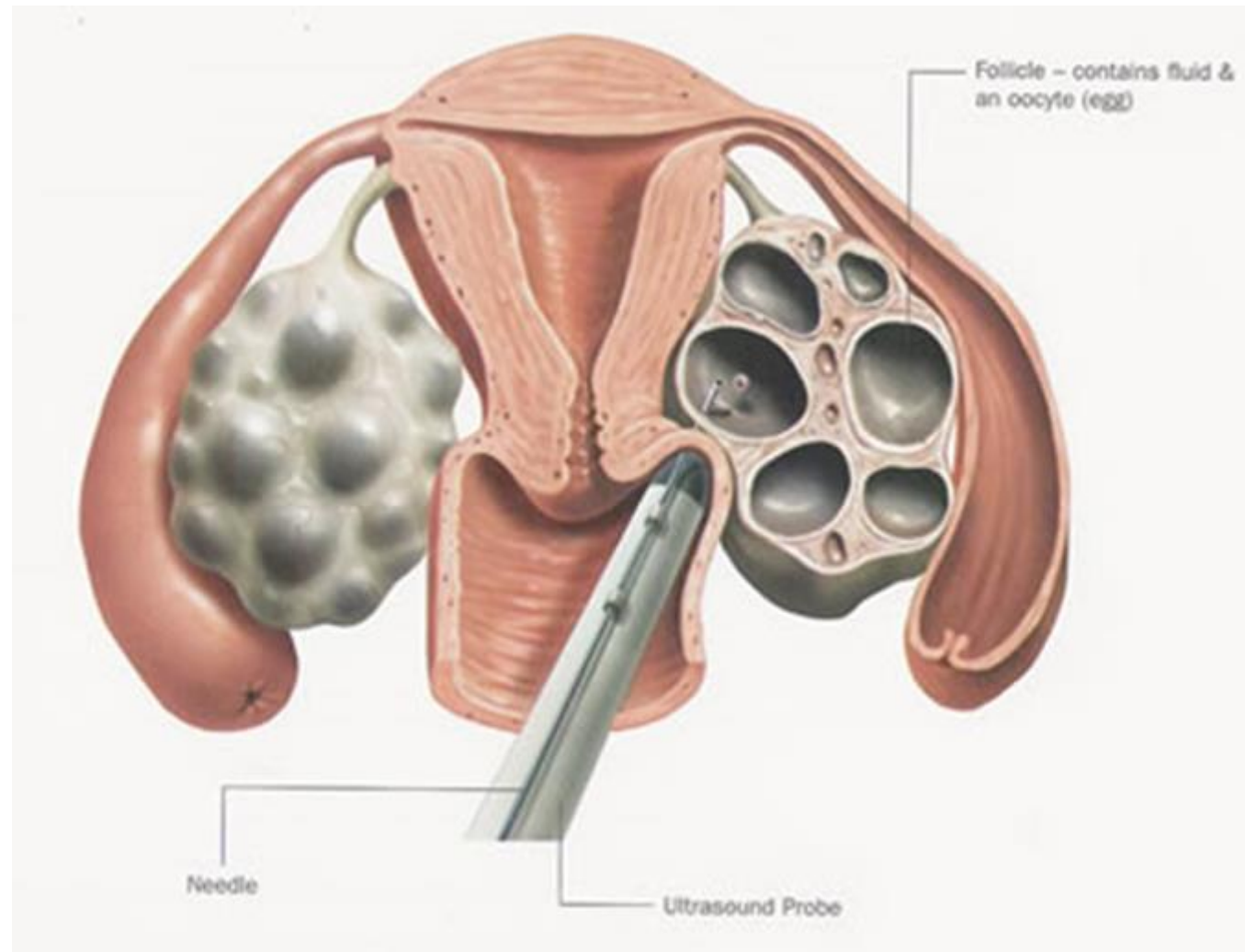


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Step 3 - OPU

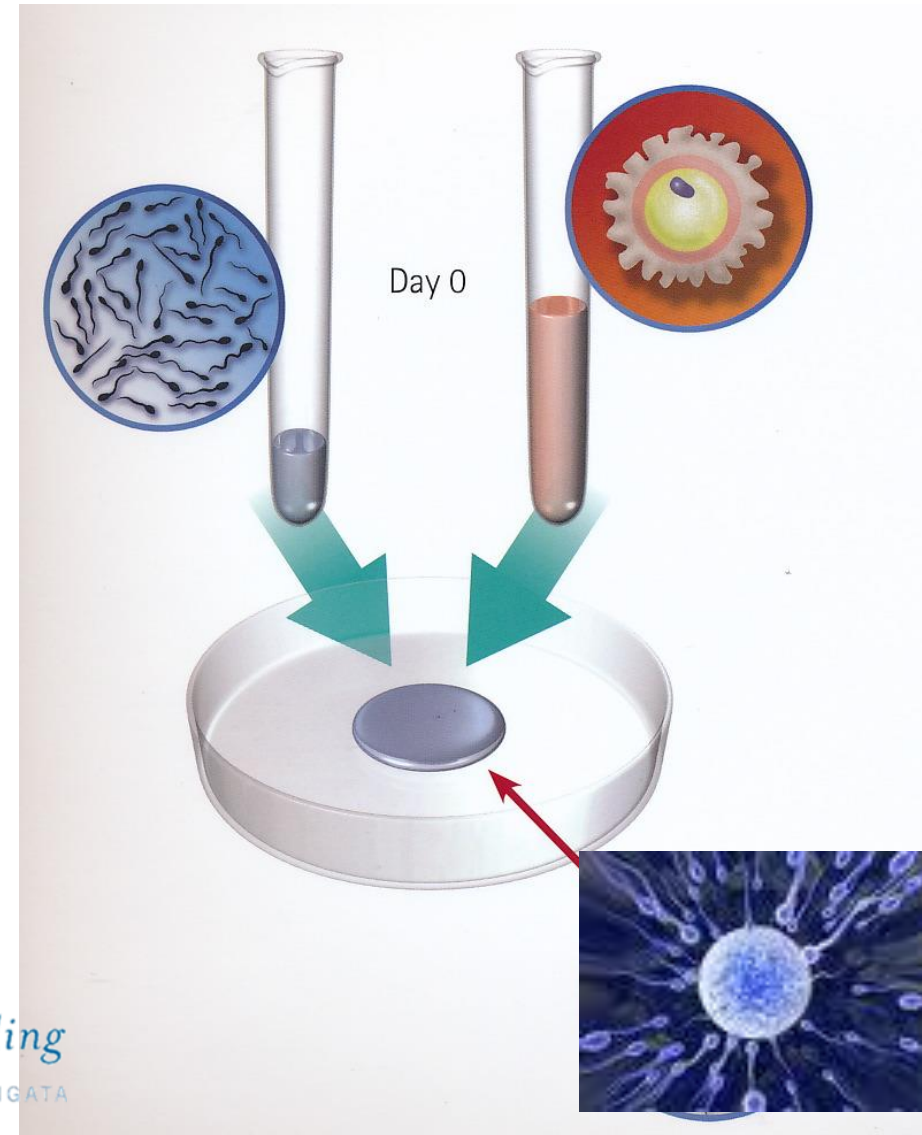
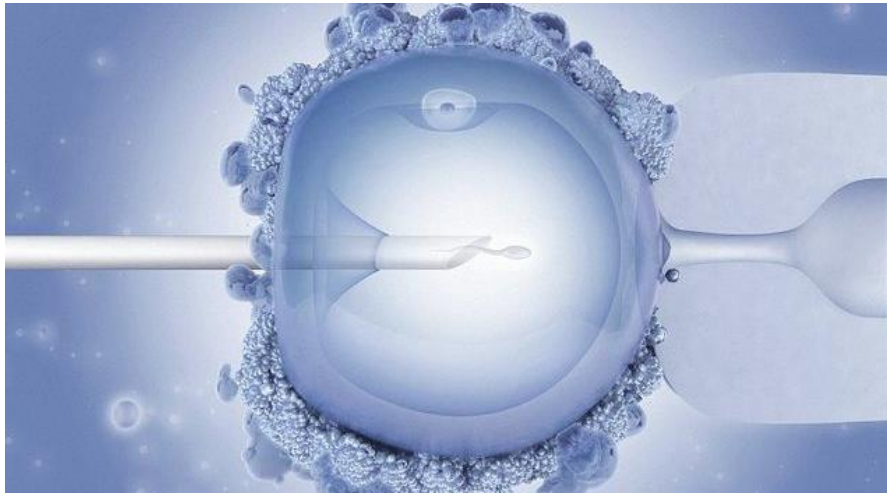


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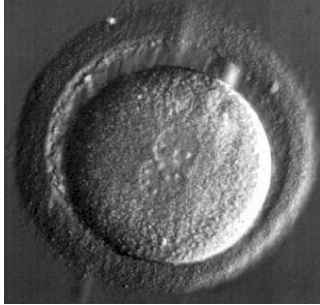
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Step 4 – Fertilisation ICSI vs IVF

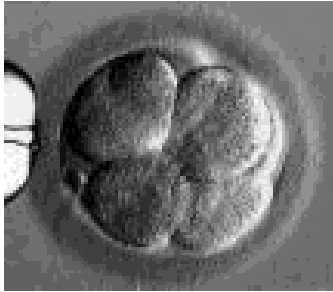


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Fertilisation



Fertilised egg day 1



8-cell embryo day 3



Blastocyst

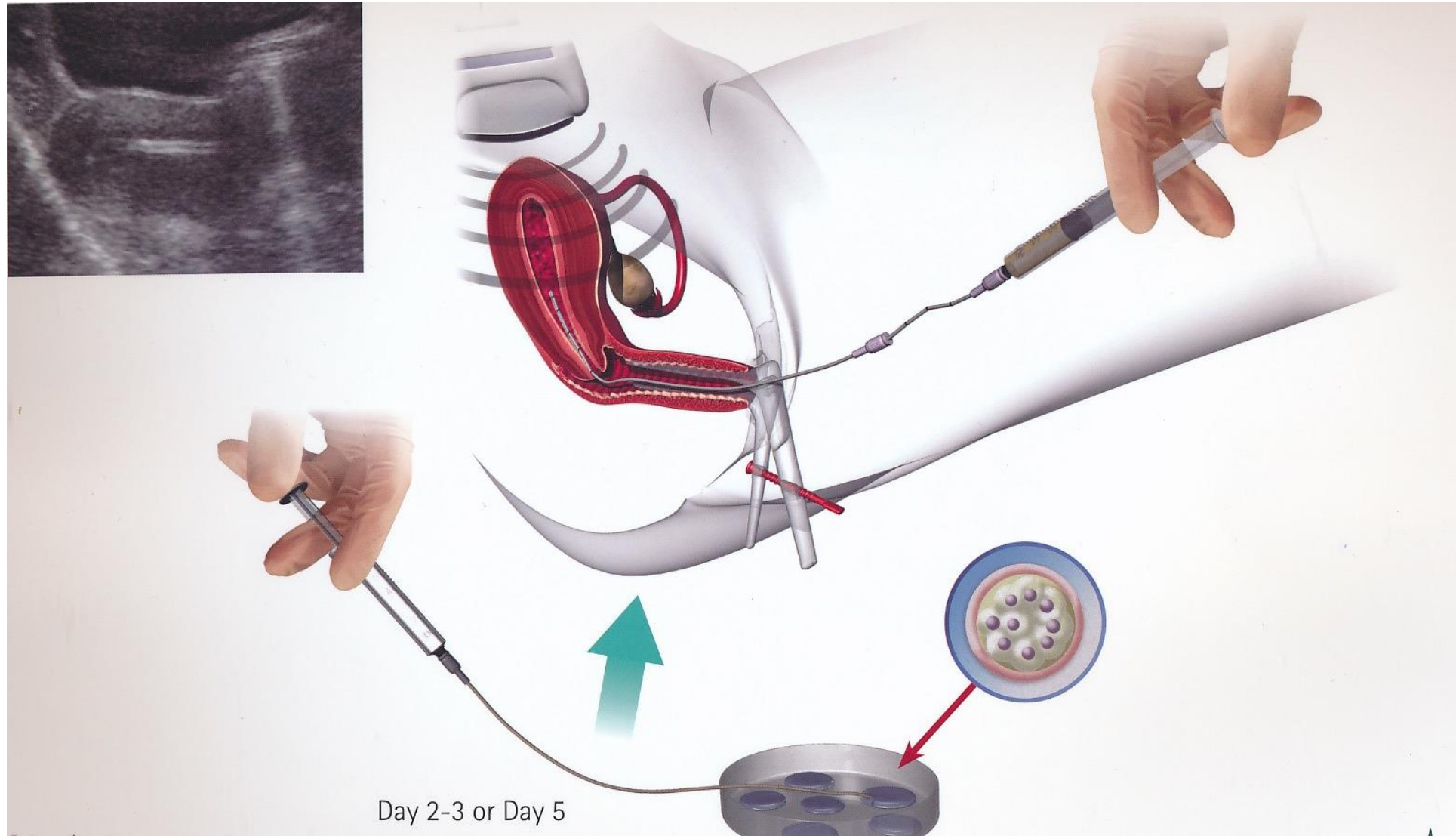


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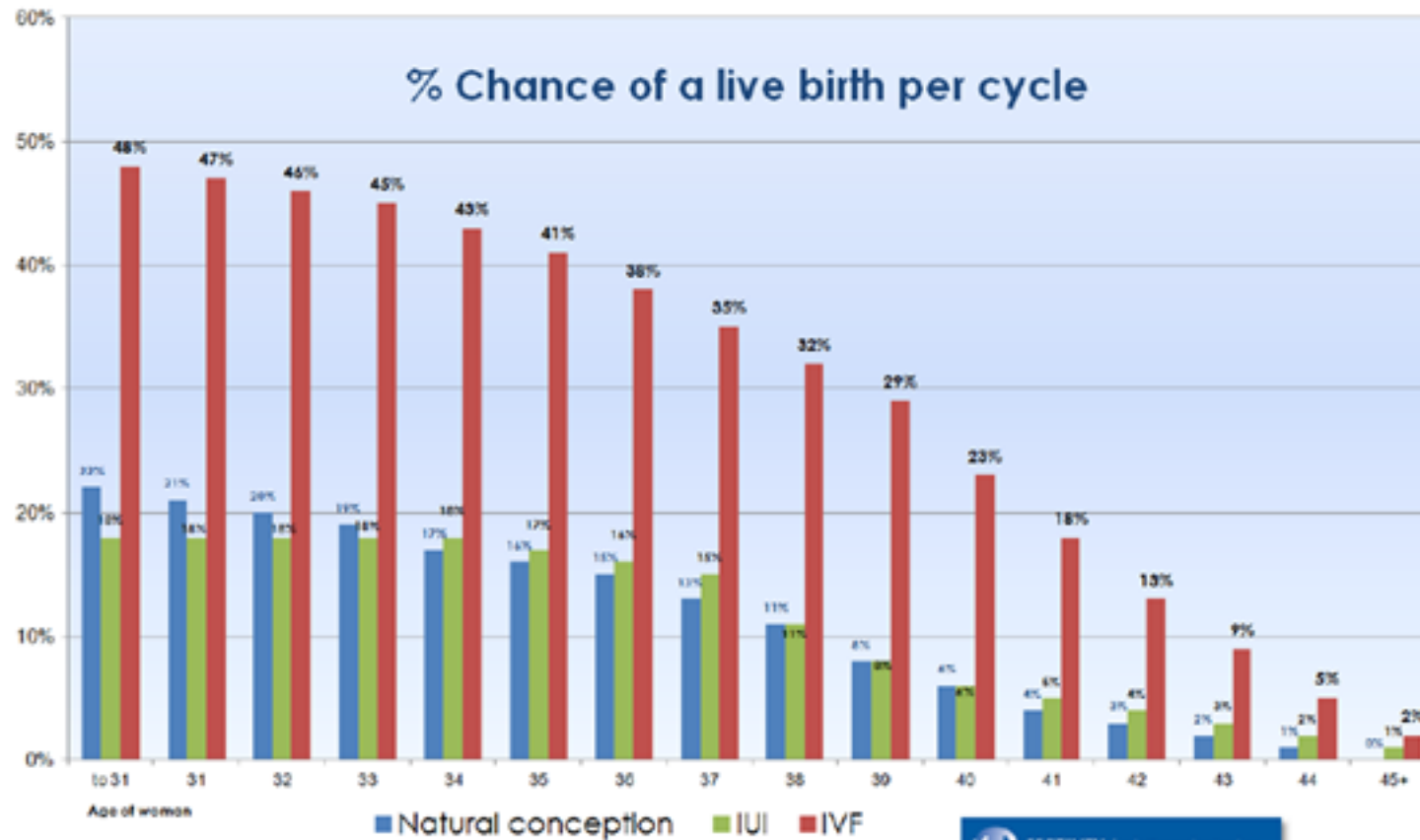
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Step 5 – Embryo transfer



IVF – chance of success



Source - Fertility Associates Biological Clock & Pathway to a child data



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Egg Freezing

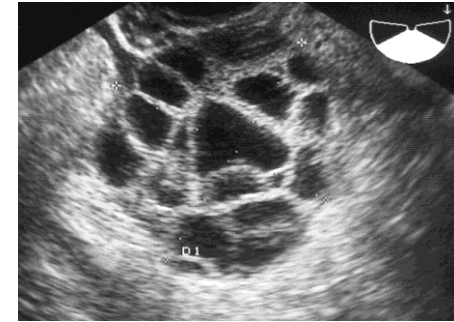
Fertility preservation:

- Cancer
- Social
- Religious or ethical objections to embryo freezing
- No sperm at IVF
- Rapid reduction of ovarian reserve



Complications IVF

- Ovarian hyperstimulation syndrome
 - A thing of the past
- Multiple pregnancy
 - Not under MOH
- Wellbeing children
 - impt



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Egg Donor



- Women in their late 30s early 40s
- Previous Treatment with IVF unsuccessful
- Growing need for egg donors
 - Women having children in their late 30s



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Sperm Donor



- Increase of single women
- Same sex couples
- Late 30s
 - Biological Clock is ticking
 - Educated
 - Financially stable
 - Have not met 'Mr Right'
- Azoospermia or multiple failed treatment with own sperm



LISTEN, I'M PUSHING 30 - I'M
GONNA LIKE YOU REGARDLESS.

Surrogacy

- Complex counselling and ethics approval required
- FA doctors and counsellors
- Indications
 - Congenital absence of uterus
 - Previous hysterectomy
 - Previous pelvic radiation
 - Same sex male relationship
 - Considered if multiple previous embryo transfers and no pregnancy with no other explanation



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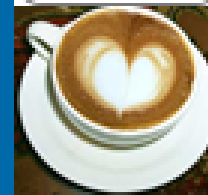
Supporting patients

- Education
- Counseling – tools to survive
- Support Groups
- Life after fertility treatment
 - Good
 - still not easy
 - Bad
 - alternative path
 - a different kind of life



Take Home Messages for Patients

- Maintain a healthy weight
- Don't smoke
- Reduce caffeine
- Reduce or avoid alcohol
- Folic Acid
- Consider Sperm health
- Don't leave it too late



Take home message for referrers

- Consider early referral
- Remember the biological clock
- Address lifestyle issues
- Are they eligible for funding



*"Could you reset my biological clock?
They put me on the nightshift."*



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