

## Metro North GP Alignment Program



**GYNAECOLOGY WORKSHOP**

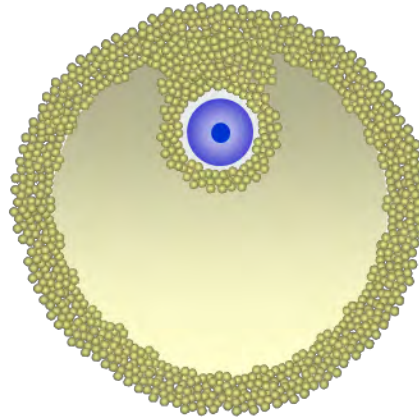
**SATURDAY 4 NOVEMBER 2017**

Skills Development Centre, Caboolture Hospital

## **Fertility**

Dr Hayden Homer

Gynaecologist and Fertility Specialist



# Fertility

Professor Hayden Homer

MBBS (Hons) MRCOG CCSST (RCOG, UK) FRANZCOG PhD

Gynaecologist and Fertility Sub-specialist

Christopher Chen Chair in Reproductive Medicine

Director, CCR Oocyte Biology Research Laboratory

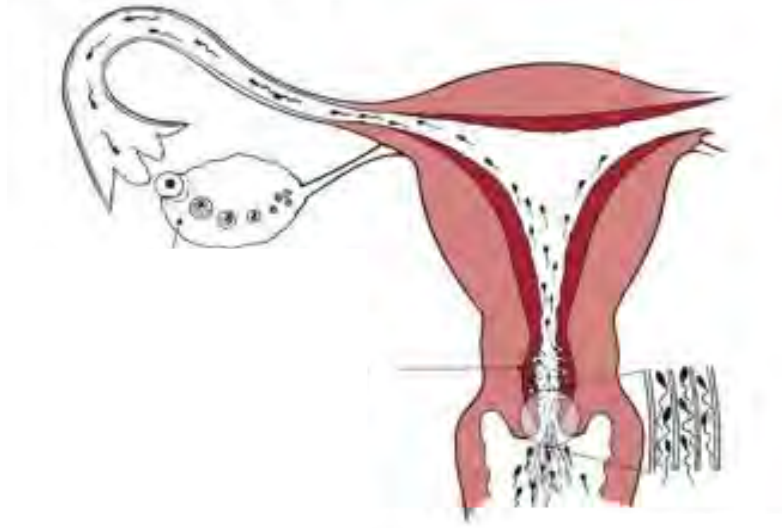
# Infertility

- Affects 1:6 couples in Australia
- Inability to conceive after 12 months of unprotected SI
  - 50% conceive after 6 months
  - 80% after 12 months
  - 90% after 18 months

# Important general considerations

- Couples should be seen together
- Welfare of the child
- Alcohol - minimal
- Smoking - none
- BMI : 19-30
- Folate : 0.4 mg per day
- Fitness for pregnancy
  - Medical conditions
  - Pre-conception counselling

# Key Fertility Factors



- **Eggs:** Ovulation + Quality (Age) + Numbers (Ovarian Reserve)
- **Tubes:** Patent and functional
- **Sperm:** Concentration + Motility + Morphology

**What is the single most important determinant of pregnancy success?**

**FEMALE AGE**

# Cornerstone of Reproduction

The oocyte provides nearly ALL membrane and cytoplasmic determinants including organelles and macromolecules required by the embryo

Li & Albertini 2013 *Nature Reviews Molecular Cell Biology*



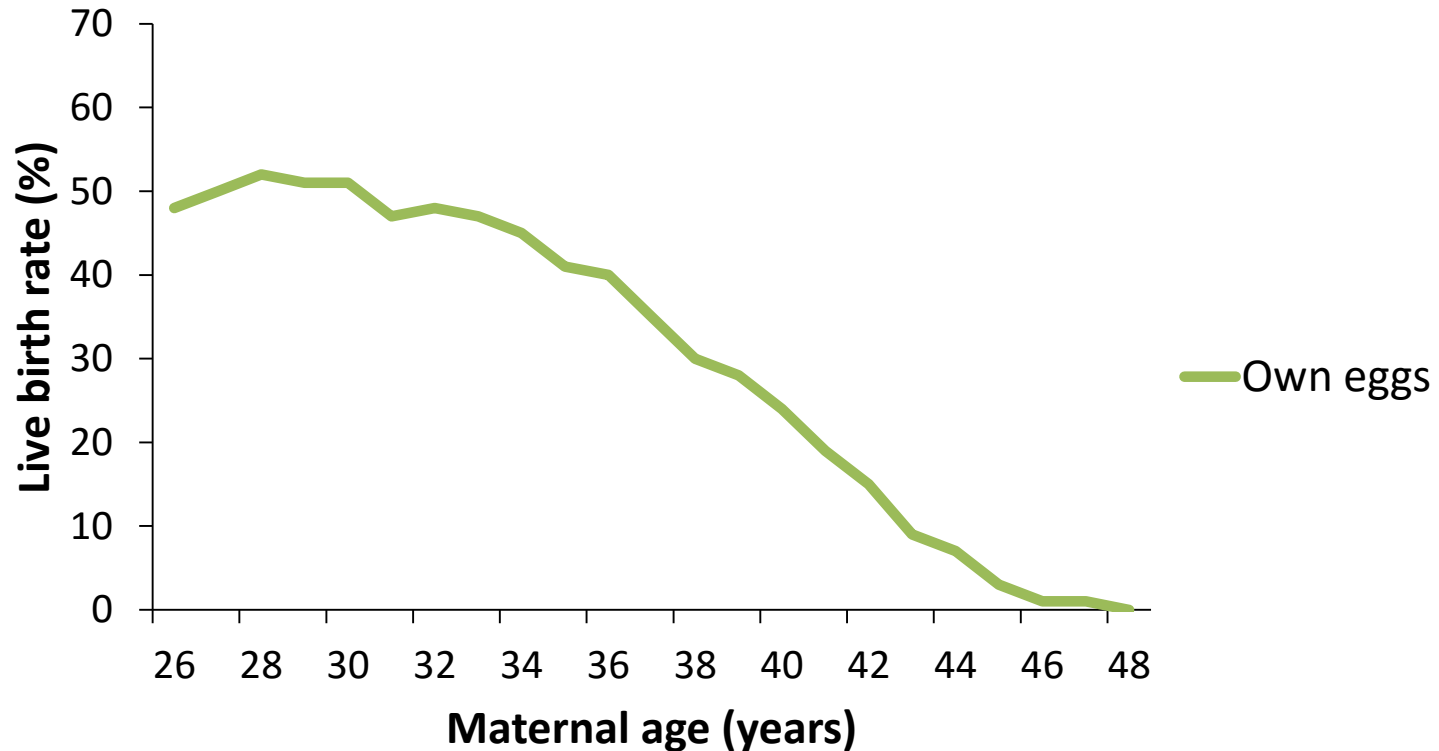
THE UNIVERSITY  
OF QUEENSLAND  
AUSTRALIA

**UQCCR**  
UQ Centre for Clinical Research

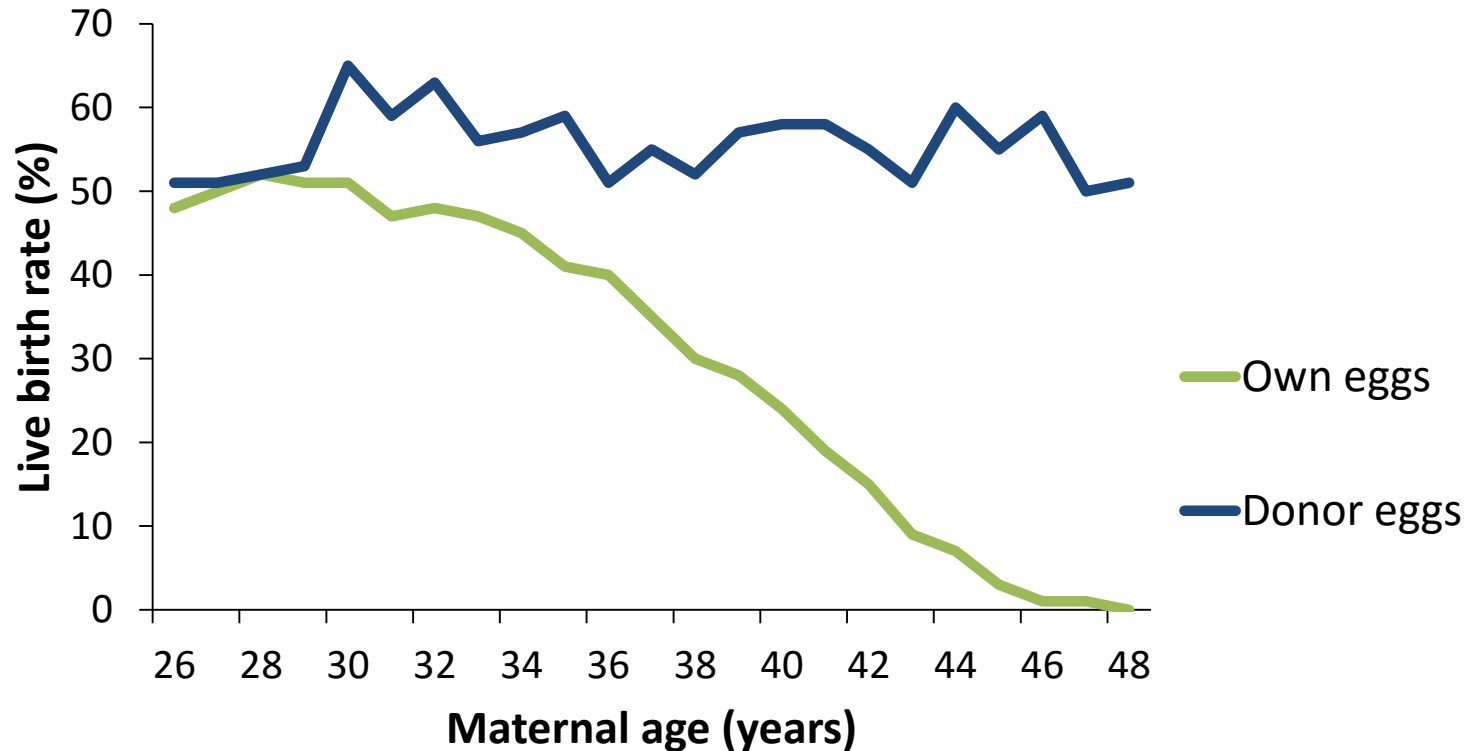




# Oocyte quality is rate-limiting for pregnancy success



# Oocyte quality is rate-limiting for pregnancy success



**4 cycles of IVF for under 35's**

**80 cycles of IVF for over 45's**

Macaldowie et al. 2015. Assisted reproductive technology in Australia and New Zealand 2013.

National Perinatal Epidemiology and Statistics Unit, UNSW.

# Causes of infertility

- Female age – 1:4 treatments to women >40 y
- Unexplained (20%)
- Ovulatory disorders (25%)
  - PCOS (80%)
  - Hyperprolactinaemia (7%)
- Tubal and pelvic factors:
  - Endometriosis (15%)
  - Pelvic adhesions (12%)
  - Tubal blockage (11%)
- Male Factor (30-50%)
- Associated factors:
  - Fibroids
  - Uterine anomalies - Septum

# Ovulatory dysfunction: PCOS

- Affects 6-10% of women
- Leading cause of menstrual irregularity, androgen excess and infertility in women
- Accounts for 80% of anovulation

# PCOS – clinical features

- Menstrual dysfunction: oligo-amenorrhoea
- Hyperandrogenism: Acne, hirsutism, male-pattern hair loss
- Polycystic ovaries on USS
- Metabolic issues / cardiovascular risks
  - Insulin resistance
  - Dyslipidemia
- Infertility – Anovulation
- Unopposed oestrogen activity: Endometrial hyperplasia / carcinoma

# PCOS diagnosis

## Rotterdam criteria

2 out of the 3 of the following are required to make the diagnosis of PCOS:

1. Oligomenorrhoea or amenorrhoea
2. Clinical and/or biochemical evidence of hyperandrogenism
3. Polycystic ovaries - >12 follicles 2-8 mm in diameter

# PCOS: Fertility treatment

- Weight loss
- Ovulation induction
  - Clomiphene citrate – 80% ovulation; 40% pregnancy
  - Letrozole – aromatase inhibitor
    - Less inhibitory effect on endometrium than CC
  - Metformin – inferior to CC as OI agent
  - Gonadotropins
- Laparoscopy – ovarian drilling
- SO + IUI
- IVF



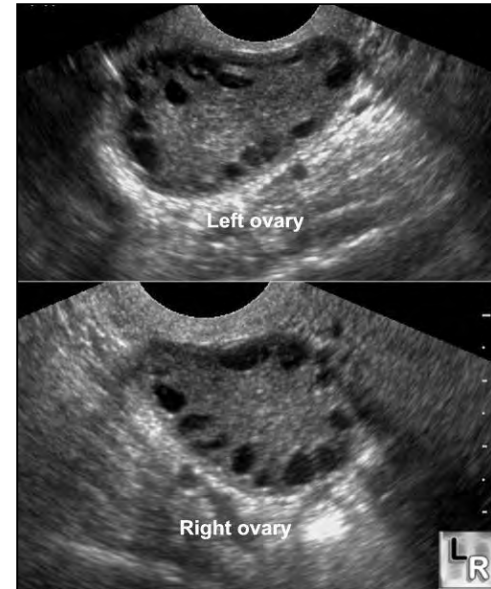
# Case study – Mrs HC

32 G0P0 12/12 primary infertility

- Menstrual history
  - Irregular menstrual cycle (average cycle length 3 months)
  - Normal menstrual flow, mild dysmenorrhoea
- Past history
  - BMI = 32
  - No pelvic surgery or pelvic infection

# Case study: Mrs HC

- Investigation results:
  - TFT's, Prolactin - NAD
  - USS: PCO
  - Partner's SA - Normal
- Diagnosis:
  - Anovulation secondary to PCOS



# Case study: Mrs HC - Treatment

- Weight loss: Diet and exercise
- Ovulation induction
  - Clomiphene citrate – 50 mg D2-D6
  - Letrozole – 2.5 mg D2-D6
  - USS monitoring – 5-10% risk of multiple pregnancy
  - 3-6 ovulatory cycles
- Consider confirming tubal patency
  - At the start
  - If low risk, after 3 cycles if not pregnant

# Ovulation induction (OI) versus Superovulation (SO)

- Ovulation induction = Monofollicular development in anovulatory patients
- Superovulation = Induction of multi-follicular development in ovulatory patients

# SO + IUI

- Ovarian stimulation to generate 2-3 eggs
- Cycle tracking with USS to precisely time ovulation
- Lab preparation and washing of semen to concentrate the highest quality spermatozoa
- Introduce sperm high into uterine cavity close to Fallopian tubes at the time of induced ovulation
- Success rates – 15% per cycle for under-35's
- Relatively low invasive



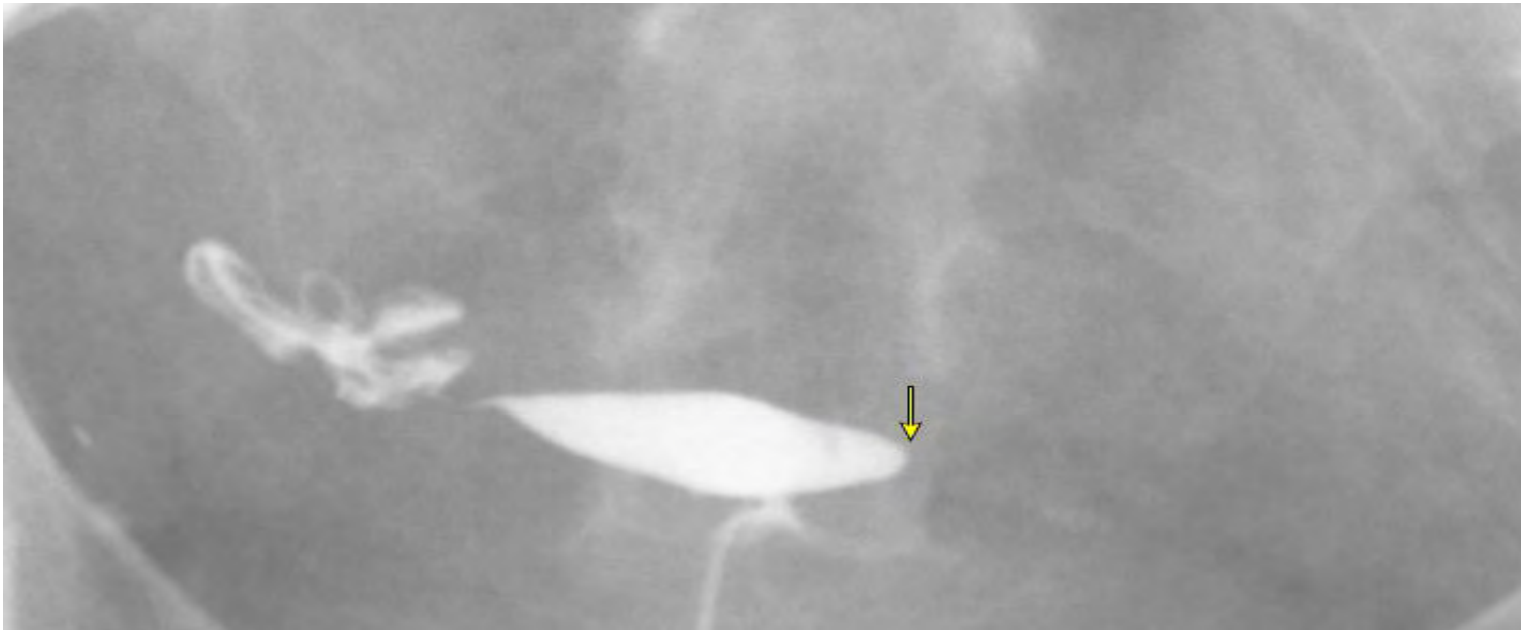
# Fallopian tube occlusion

- Cause of infertility in up to 40% of women
- Main causes:
  - Sexually transmitted infections (such as chlamydia)
  - Previous pelvic surgery (ruptured appendix)
  - Endometriosis

# Fallopian tube occlusion: diagnosis

- Symptoms
  - Often asymptomatic at presentation
  - Pain: Dysmenorrhoea, dyspareunia
- Investigations
  - Hysterosalpingogram (HSG)
  - HysterosalpingoContrastSonography (HyCoSy)
  - Laparoscopy with dye

# Fallopian tube occlusion: HSG



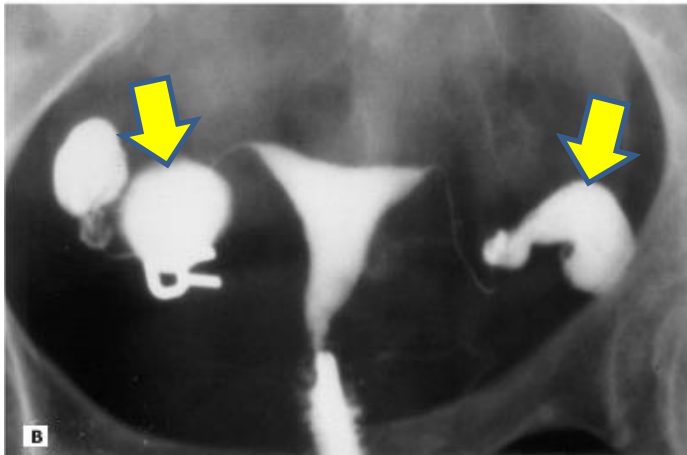
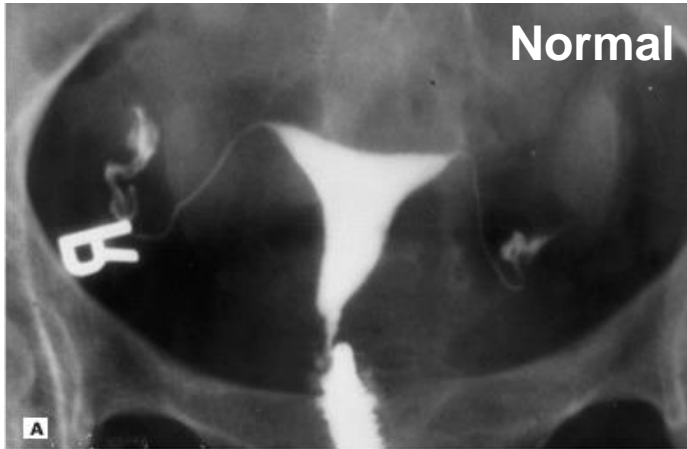


# Case Study: Ms FT

28 G0P0 18/12 primary infertility

- Menstrual history
  - Regular cycles /28
  - Very painful
- Past history
  - BMI = 23
  - Previous chlamydia

# Case Study: Ms FT - HSG



**Ms FT:**  
**Bilateral hydrosalpinges**

# Case study: Ms FT - Treatment

- In vitro fertilization
- Salpingectomy for hydrosalpinges before IVF
- Tubal surgery
  - Neosalpingostomy
  - Fimbrioplasty
  - Tubal reanastomosis - Previous tubal ligation

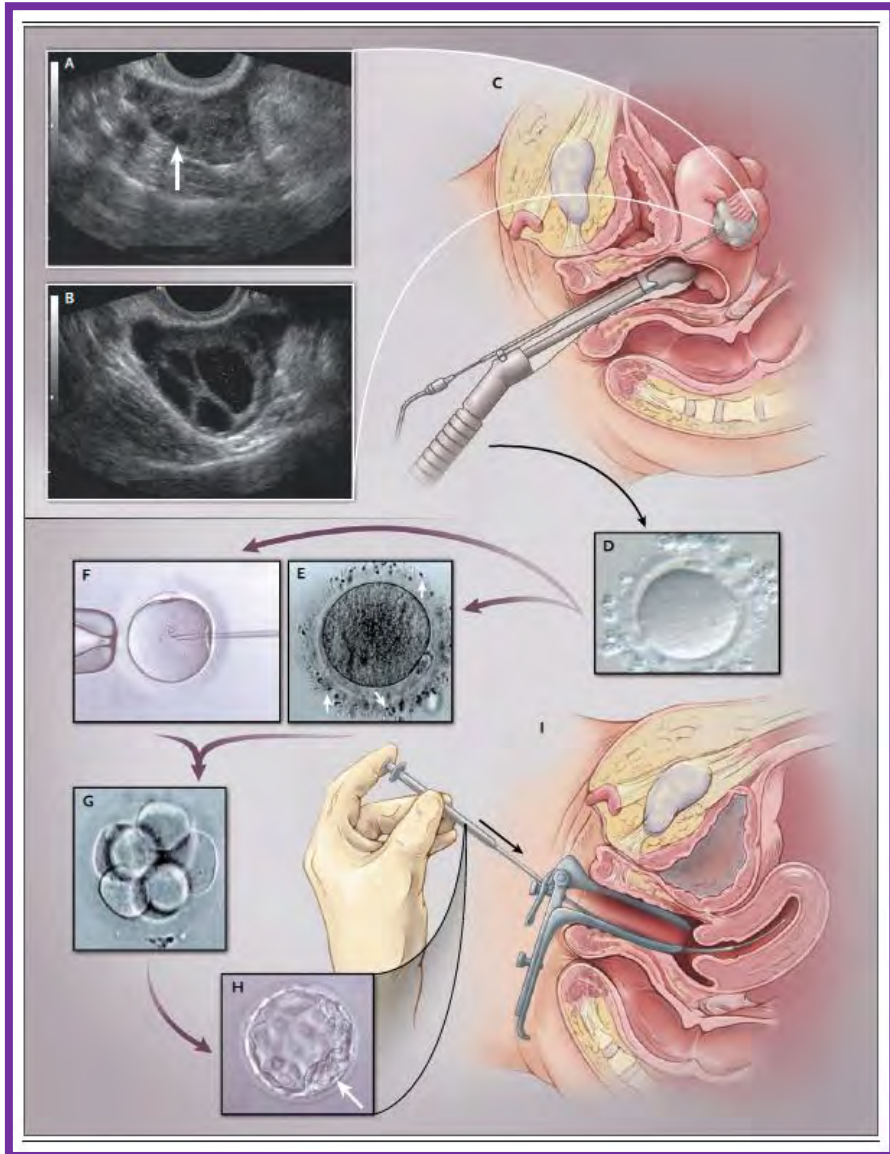
# IVF

***In vitro* fertilisation = fertilisation “in glass”**

**Egg fertilised by sperm outside of the body**

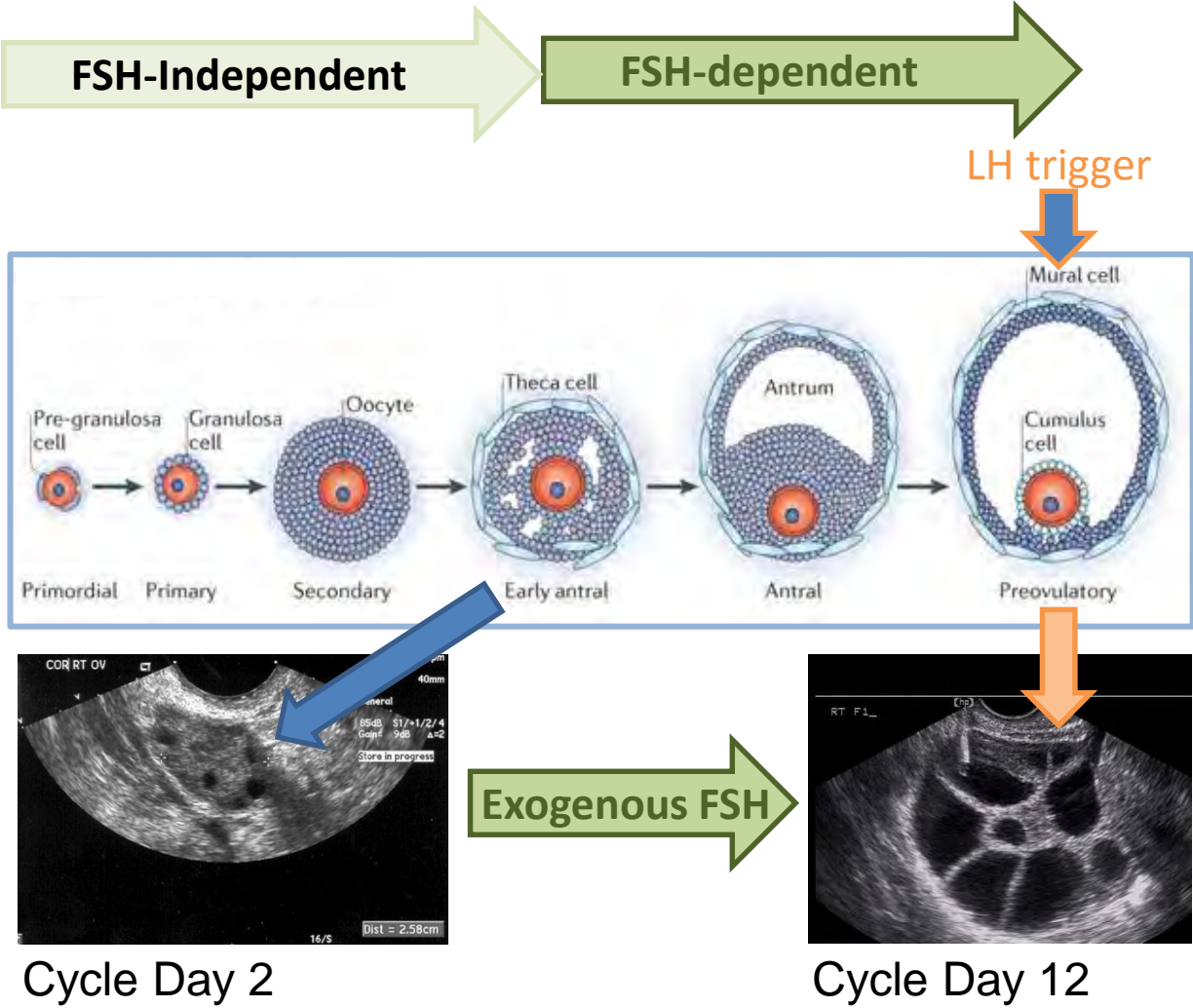


# Overview of IVF



- Superovulation
- Cycle monitoring
- USS-guided Trans-Vaginal Egg Pick-up
- Fertilisation
  - Standard
  - ICSI
- Embryo culture
- Embryo transfer

# Exogenous FSH sustains follicular development

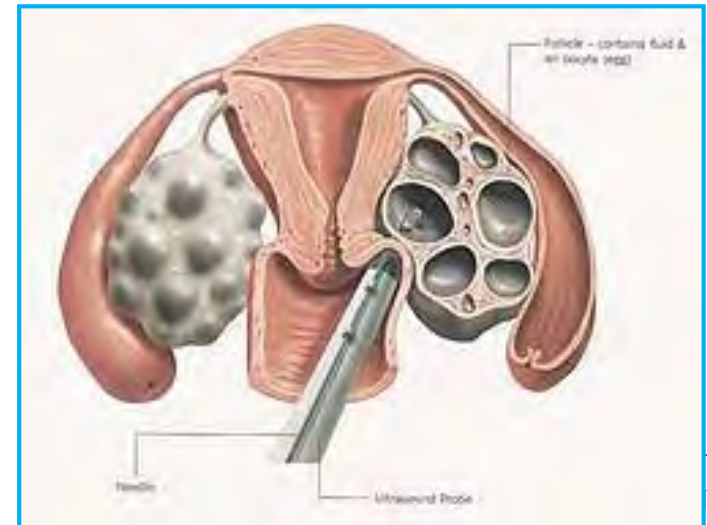
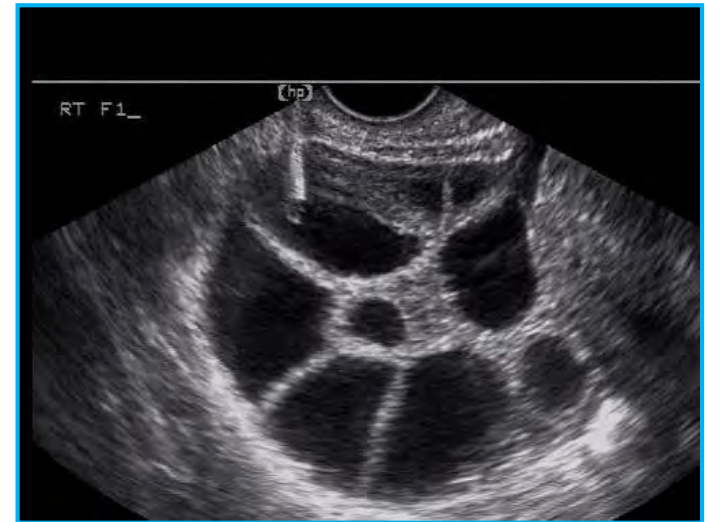
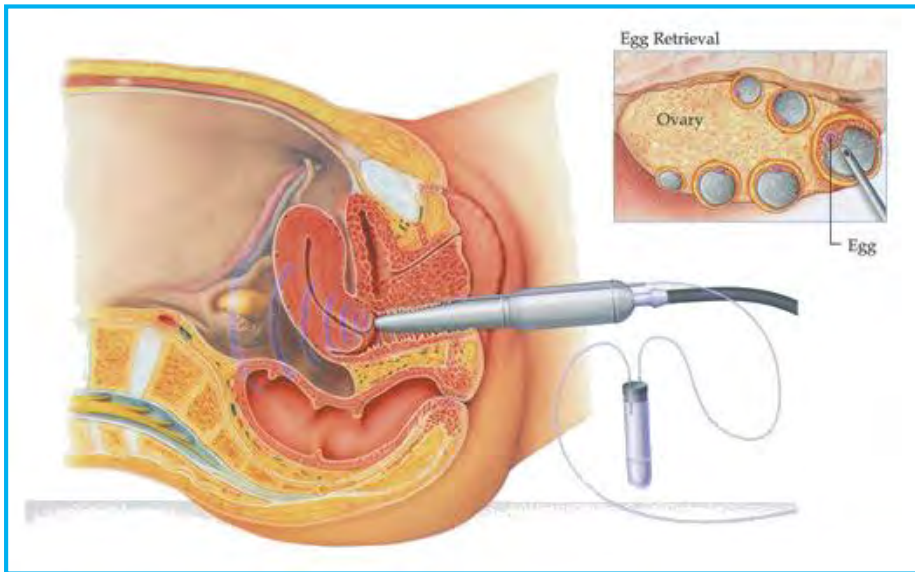


Cycle Day 2

Cycle Day 12

# Egg Collection

36 – 38 h post-trigger



- Acute Haemorrhage 0.04 – 0.07%
- Infection 0.3 – 0.6%

# Case study: Mrs PM

39; Primary infertility; TTC for 8 months

- Menstrual history
  - Regular cycles
- Other history:
  - BMI = 28
  - No pelvic infection
  - No prior surgery
- Partner 45
  - Smokes 20/day
  - BMI 40



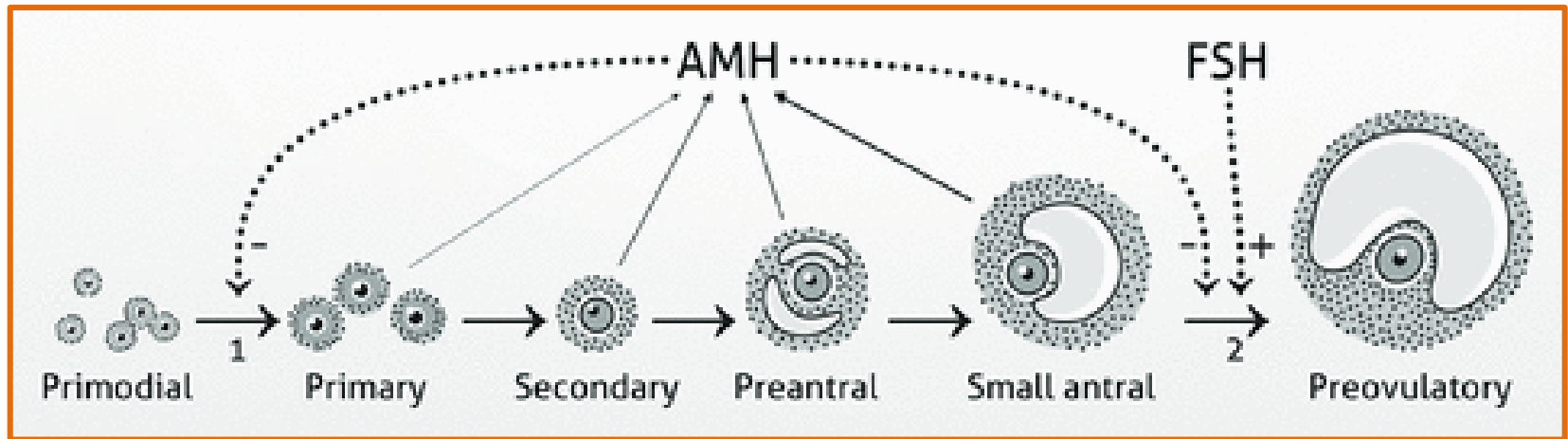
# Case study: Mrs PM

- Female age = 39 years
- Narrow window of fertility left
- Do not wait for 12 months of trying before referring

# Case study: Mrs PM

- Investigation results:
  - Regular cycles  $\Rightarrow$  Ovulating
  - AMH = 2 pmol/L
  - Partner's SA
    - Concentration = 10 M/ml
    - Progressive motility = 20%
    - Morphology = 1%

# Ovarian Reserve: AMH

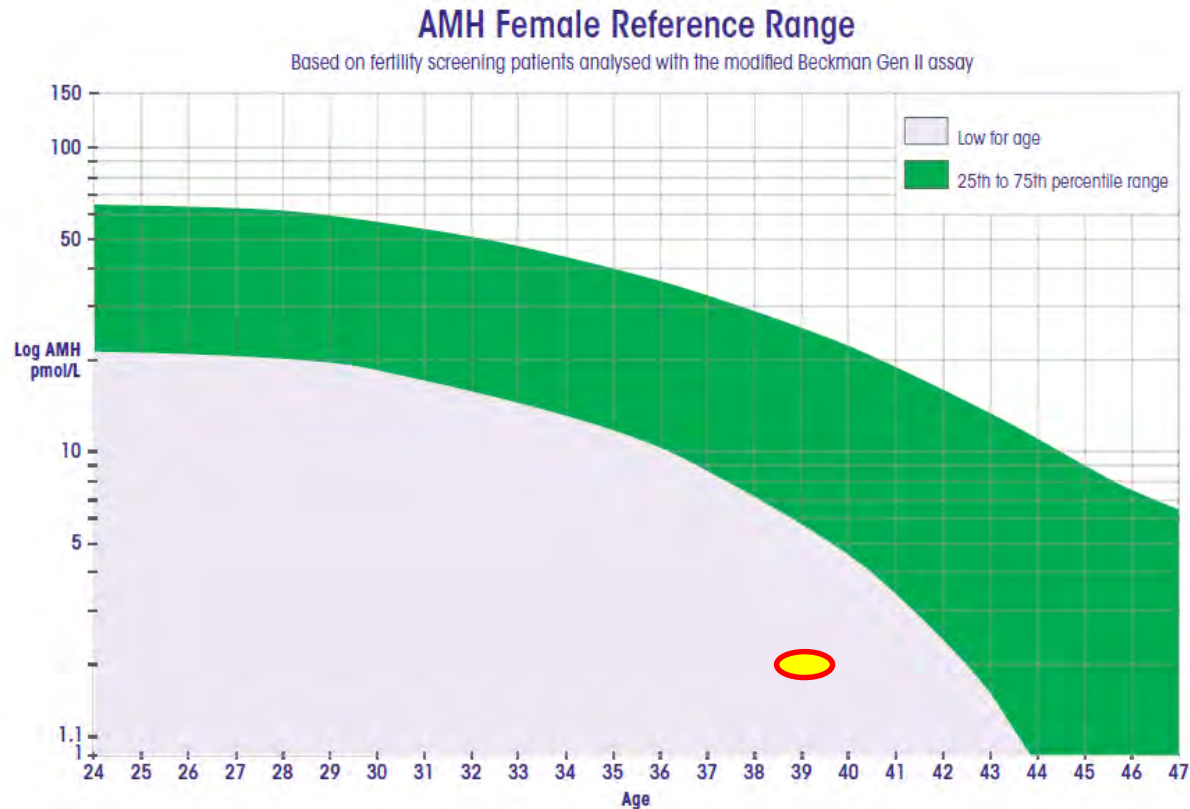


- AMH is a member of the TGF- $\beta$  family
- AMH is produced by the granulosa cells of growing preantral and small antral follicles up to 6-8 mm in diameter
- AMH levels correlate with NGF numbers assessed histologically

*Hansen et al. 2011*

- Comparatively little intra- and inter-cycle variability

# AMH = 2 pmol/L



# Case study: Mrs PM

- Investigation results:
  - Semen analysis (WHO 2010):
    - Concentration  $> 15$  M/ml
    - Progressive motility  $\geq 32\%$
    - Morphology  $\geq 4\%$
  - Partner's SA
    - Concentration = 10 M/ml
    - Progressive motility = 20%
    - Morphology = 1%

# Case study: Mrs PM - Treatment

- Diagnoses:
  - Advanced female age with reduced ovarian reserve
  - Significant male factor
- Treatment:
  - Weight loss and stop smoking
  - IVF with ICSI

# Breakout sessions

Station	Topic	Facilitator
Station 1	HealthPathways	Louise Kluczkowski, Brisbane North PHN
Station 2	Bladder diaries/pelvic floor exercises	Margaret Bambrick, Continence Therapist  Helen Edwards, Physiotherapist
Station 3	Vaginal pessaries	Dr Mahilal Ratnapala - Director O & G Caboolture Hospital
Station 4	Mirena	Dr Anna Catchpole Dr Paavi Davidson True Relationships and Reproductive Health

# RACGP

- This workshop has been approved for 40 Category 1 points, including a Women's Health specific requirement



- To be eligible:
  - Complete predisposing activity
  - Attend workshop
  - Complete reinforcing activity





Thank you and  
good afternoon