

   
Healthcare Education Research

**Fertility & preconception care:  
an update for health professionals**

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Healthcare Education Research

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Victorian Assisted Reproductive Treatment Authority (VARTA) and  
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**What we know from research**

- Most people want and expect to have children
- Men want children as much as women do
- Knowledge about factors that affect fertility limited



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### Five Fertility Factors

- Age
- Obesity
- Smoking
- Alcohol
- Timing of intercourse



*Your fertility*  

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### Female age and fertility

- Fertility starts to decline around age 30
- By age 35 the decline accelerates
- By age 40 fallen by half
- Increased risk of miscarriage AND
- Obstetric and neonatal complications

*Your fertility*  

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### Male age and fertility

- Sperm quality and fertility decrease with increasing age
- When controlling for maternal age TTP significantly longer for men aged >45 than for younger men
- Older paternal age increases risk of autism and schizophrenia in offspring

*Your fertility*  

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### Age and fertility

- People underestimate the age when fertility starts to decline by about 10 years!



• Hammarberg et al, Knowledge about factors that influence fertility among Australians of reproductive age: a population-based survey. Fertility and Sterility 2013, 99(2):502-507



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### Lifestyle factors

- Obesity and smoking
  - Preconception damage to DNA in sperm and eggs
  - Reduce fertility
  - Increase risk of miscarriage
  - Increase risk of obstetric and neonatal complications
- Alcohol
  - Affect male and female fertility, but the level of consumption associated with risk is unclear



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### Current trends

-  • Increasing age of childbearing
  - Average maternal age was 30.1 in 2013
  - 22.5% of women were aged ≥35
-  • Increasing prevalence of overweight and obesity
  - 50% of women and 70% of men aged 25-44 years
-  • 1 in 7 Australians of reproductive age is a smoker
-  • 30% of men and 10% of women between 18-35 years old consume alcohol at risky levels



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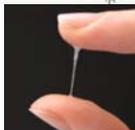
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### Timing of intercourse

- Poor awareness of the 'fertile window' in the menstrual cycle



- Hammarberg et al. Knowledge about factors that influence fertility among Australians of reproductive age: a population-based survey. *Fertility and Sterility* 2013, 99(2):502-507.
- Hampton et al. Fertility-awareness knowledge, attitudes, and practices of women seeking fertility assistance. *Journal of Advanced Nursing* 2013, 69(5):1076-1084.



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### Consequences

- Increased risk of childlessness or having fewer children than planned
- More age-related infertility
- More use of assisted reproductive technology (ART) and its associated psychological, physical and financial costs



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### What to do?

- Multi-pronged approach to help people achieve childbearing goals
  - School curricula
    - Fertility protection
  - Health promotion
  - Primary care settings
    - Reproductive life plan
    - Preconception health care
    - Resources to help



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**Jean Hailes**  
Healthcare Education Research

**Your fertility**

**Ms Sandra Villella**  
Dip.App.Sci.(Nat), M.App.Sci.(Acu)  
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**Your fertility** **Jean Hailes**

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### Optimisation of natural fertility

- Smoking cessation.
  - Smokers more likely to be infertile
  - Women exposed to smoking take longer to conceive
  - Maternal smoking increases the risk of low birth weight and birth defects.
  - Earlier menopause
  - Smoking can also damage sperm DNA.
- Limit caffeine to 1 cup(max 2)/day
- Alcohol- Avoid (minimise) alcohol when trying to conceive and avoid in pregnancy

**Your fertility** **Jean Hailes**

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### Healthy eating



**HEALTHY EATING PYRAMID**

Enjoy a variety of food and be active every day!

**Your fertility** **Jean Hailes**

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### Preconception diet

- Whole food diet, avoid processed foods
- Crowd out unhealthy choices- with healthy choices
- Brightly coloured fruit & vegetables
  - Antioxidants, anti-inflammatory
  - Vegetables half the plate
- Lean protein most meals
  - Fist size
  - Legumes
  - Fish 3 times per week
    - Avoid flake, swordfish, fresh tuna, sea perch, marlin
- Wholegrains- no white
- Small handful of raw nuts
  - Walnuts, almonds
- Good oils- olive oil, macadamia, avocado, flaxseed oil
  - Avoid 'bad fats' in commercial baked goods'
- 'Sometimes food' – sometimes only



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### Antenatal supplementation

- Ideally 3 months prior to conception

Antenatal multivitamin/mineral formula preferable, to include:

- Folic acid 500µg acid
  - Folinic acid?
  - Cofactors essential: B6, B2, B12
- Iodine 150-250µg
  - Women with known thyroid disease should consult endocrinologist before taking an iodine supplement
- Zinc
- Additional Vitamin D 1600-4000 iu daily



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### Obesity

- Associated with multiple adverse reproductive outcomes such as ovulation dysfunction, miscarriage, and infertility
- (Adverse pregnancy outcomes such as preeclampsia, foetal growth restriction, gestational diabetes)



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### Maternal obesity and adverse reproductive outcomes

- Multiple proposed mechanisms
  - Altered hormonal milieu
  - Chronic inflammation
- Adipose tissue is an active organ secreting hormones and cytokines called adipokines.
- Adipokines: may affect follicular maturation and promote granulosa and oocyte cell death through creation of reactive oxygen species (ROS)
  - Tumour necrosis factor alpha (TNF- $\alpha$ ), interleukin 6, free fatty acids, adiponectin are adipokines that promote a chronic inflammatory state- may alter the hypothalamic-pituitary-ovarian axis signalling and affect reproductive function.
- Hyperinsulinemia increases the risk for miscarriage.



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### Maternal weight loss

- Maternal weight loss in the preconception period may improve some reproductive functions including ovulation, time to achieve pregnancy, and miscarriage rates.
- Overweight or obese patients should be appropriately counselled on the benefits of weight loss at their initial infertility or preconception appointment



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### How much weight loss is needed ?

- Modest weight loss of 5-10% of body weight- resumption of ovulation and improves pregnancy rate
- Diet: energy restriction
  - Low GI and higher protein (30%) probably preferable
- Exercise: decreases adipose tissue, improves metabolic function of remaining adipose tissue, and reduces inflammation.
- International guidelines for obesity management recommend 225-300 min/week of moderate intensity physical activity for overweight or obese adults.
  - 210 minutes of moderate intensity exercise/125 minutes of vigorous intensity exercise/week for Type 2 diabetes or insulin resistance
  - no more than 48 hours between exercise sessions



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### Other considerations

- Stress
  - Illicit drugs
  - Prescription medications
  - Environmental toxins
  - Pesticides, endocrine disruptors, chemicals
  - Hobbies and occupation
  - Heavy metals
  - Radiation
- (Sharma et al 2013)




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Healthcare Education Research

**Your fertility**

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**Your fertility** **Jean Hailes**

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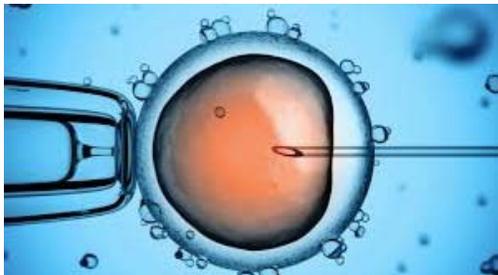
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**If I have trouble later, I'll just use IVF**



**Your fertility** **Jean Hailes**

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**Overestimating the ability of IVF to solve fertility problems**

- IVF can dramatically improve pregnancy prognosis for:
  - Severe male factor
  - Blocked fallopian tubes
  - Endometriosis
  - Unexplained infertility for women  $\leq 34$   
(That has been **fully investigated**)

**Your fertility** **Jean Hailes**

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### Advanced Egg Age (>35)

- Difficulty achieving good egg numbers
- Lower fertilization rates
- Lower numbers of usable eggs and embryos
- High chromosome imbalance risk



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### Chance of IVF live birth >40 (ANZARD 2012)

- LBR at 40 years <5% per cycle
- LBR at 43 years <1% per cycle
- Cost of IVF cycle to tax payer, approx \$10K per cycle



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### Risk factors for infertility

- ↑Age
- Pelvic STI
- Endometriosis
- Asherman's
- Fibroids
- Iatrogenic
- Obesity
- Smoking



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### Reasons for delay

- Single status at 30
- Partner non-committed to parenthood
- Education
- Career
- Economic stability



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### Obstetric risk factors for advanced maternal age

- Hypertension
- Pre-eclampsia
- Gestational diabetes
- Preterm birth
- Extremes of birthweight
- Operative delivery
- Post-partum incontinence



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### Timing: importance in referral

- Recognise the biological definition of advanced maternal age
- Investigate women >34 TTC
  - Patent fallopian tubes
  - Ovulation
  - Reasonable sperm
- Refer after **6 months infertility**
- Egg freezing for single women in early 30s



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### Limits of IVF

- No proven intervention to reverse effects of ovarian aging
- No enhancing effect on egg quality
- Of limited benefit at age >40
- At age >45 – donor oocyte mandatory



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### Case study 1:

*An opportunity to talk about reproductive life planning*

- Paula, 27 years old presents for her pap smear
- Ryan, 30 comes to discuss vaccinations for an overseas trip



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### RACGP 2012 Guidelines

- “...developing a reproductive life plan that includes whether they want to have children...”
- “...the number, spacing and timing of intended children...”
- Optimising health before conceiving



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### Opportunities to talk fertility in primary care

- Reproductive health consultations
  - PAP smear
  - Contraceptive counselling
  - STI check
- Other consultations
  - Health checks
  - Immunisation before travel





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### One Key Question

- 'Would you like to become pregnant in the next year?'
  - To ensure that more pregnancies are wanted, planned, and as healthy as possible.

[www.onekeyquestion.org](http://www.onekeyquestion.org)






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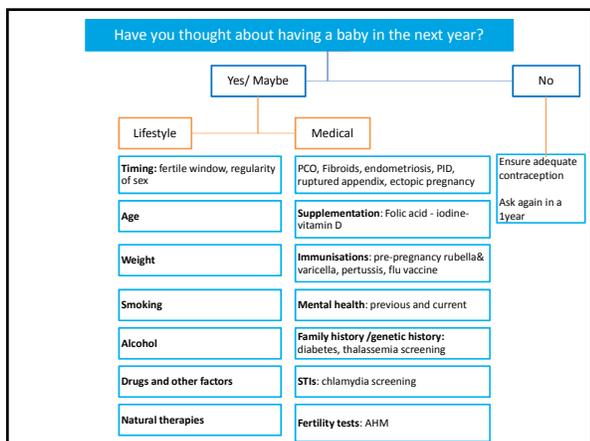
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## Useful resources

- Your Fertility
  - Understanding ovulation
  - Thinking about having a baby
  - Fertility facts for health professionals
- APNA Family Planning Decision Support Tool  
(Download from resources folder)






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### Thinking about having a baby?

Talk to your doctor!

Here is what men and women can do to increase their chance of getting pregnant and having a healthy baby.

1. Learn about the top five fertility factors.
2. Complete the Preconception health checklist at [www.yourfertility.org.au](http://www.yourfertility.org.au) in take to your doctor.
3. Visit your doctor to discuss how to optimize your chance of conceiving and having a healthy baby.
4. Visit [www.yourfertility.org.au](http://www.yourfertility.org.au) for more information.

Age

Weight

Smoking

Alcohol

Timing

#### Top Five Fertility Factors

##### Age

Fertility declines with age, so if you are thinking about having a baby, consider trying earlier rather than later. On average, women's fertility starts to decline in their late 20s and declines more rapidly after age 35. The monthly chance of conceiving is about 20% for a woman in her twenties, 10% up to 4 a very old.

Most fertility experts recommend ideal childbearing years are the ages of 20 to 29. You have the most fertile eggs in this time period.

Consider seeing a fertility specialist if:

- You have a partner in a long-term relationship and you have not got pregnant for a year or more.
- You have a partner in a relationship of 6 months, have had to get pregnant for six months or more.

##### Weight

Size matters! Studies show that fertility and the health of the baby during and after childbirth are affected by the BMI (body mass index) of both parents.

- Being overweight can result in hormone imbalances that affect an ovulation and sperm quality.
- Being very overweight lowers fertility and increases the risk of pregnancy complications.
- A healthy diet together with regular exercise can help reduce and maintain weight in the healthy range.
- Your doctor can guide you in the right direction if you want to lose weight.




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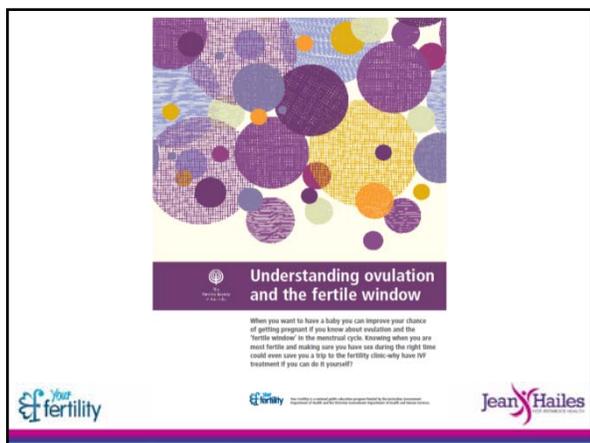
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### Understanding ovulation and the fertile window

When you want to have a baby you can improve your chance of getting pregnant if you know about ovulation and the 'fertile window' in the menstrual cycle. Knowing when you are most fertile and making sure you have sex during the right time could even save you a trip to the fertility clinic, why have IVF treatment if you can do it yourself?




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### Lifestyle & nutrition

- Take the opportunity to inform the patients of the importance of commencing antenatal multivitamin/mineral supplement 3 months prior to conception
- Clean up diet and lifestyle – preconception care diet handout



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### Case study 2: Scenario 1

*A 28-34 year old woman*

"I'd love to be a mum – I'm hoping I'll meet someone"



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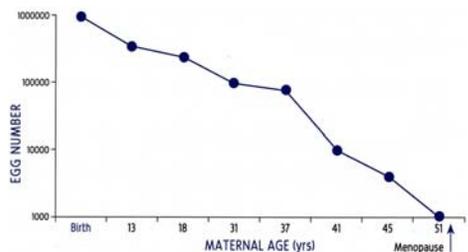
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### Female fertility and age



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## Education messages

### Future planning

- Fertility declines after 35
- Delaying conception is a major risk factor for female infertility
- Consider AMH screening
- Egg freezing

### Immediate action

- Contraception advice
- Lifestyle advice
- STI screening
- Cervical surveillance

Action now, preventing future problems




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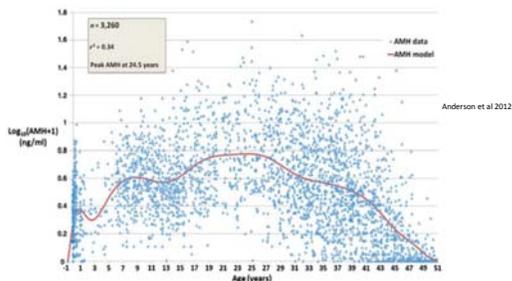
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## AMH as marker of ovarian reserve




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## www.yourfertility.org.au

- ☞ Evidence-based information
- ☞ Animations
- ☞ Case studies videos
- ☞ Fertility quiz
- ☞ Ovulation calendar
- ☞ Preconception health checklist
- ☞ Section for health professionals
- ☞ Blog with updates on new research
- ☞ Facebook and Twitter




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### Lifestyle & nutrition

- Dietary & lifestyle factors to optimise natural fertility
- Nutrition- antenatal formula
- Stress minimisation and management



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### Scenario 2

A 38+ year old woman



'I'd love to be a mum but I haven't met the right partner yet.'



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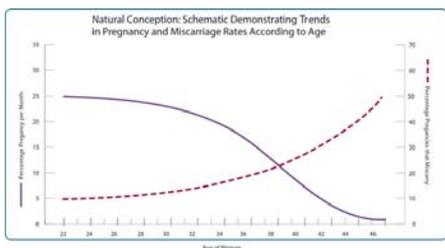
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### Female fertility and age



Reproductive Aging: Guidelines for First Line Physicians for Investigation of Infertility Problems (Canadian Fertility and Andrology Society, 2004).



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**Discuss her options: empower your patient to make informed choices**

- Educate about age related infertility
- Donor sperm conception
  - IUI
  - IVF
- Egg freezing
- AMH testing
- **Referral for specialist advice**




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**Case study 3**

*Pre-pregnancy planning*

- Stacey 29 & Rob 32 present to discuss their plans to start trying to have a baby
- They are both overweight
- Rob smokes 20 cigarettes a day




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**Preparing for pregnancy**

- Preconception care
- Menstrual cycle
- Timing




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### Lifestyle & nutrition

- Smoking cessation for male - discuss options
- Nutritional advice- education about impact of obesity and the benefits of modest weight loss of 5-10%
- Diet : avoid pro-inflammatory foods and encourage foods that are "anti-inflammatory"
- Regular reviews to encourage weight loss goals
- Specifically ensure Vitamin D replete as obesity increases need for Vitamin D
- Lifestyle- exercise specific recommendations: 225-300 min/week of moderate intensity physical activity for overweight or obese adults. ( 1 hour 5 days per week)




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### Case 4: It's not happening

#### Sub-fertility

- Ana 32 presents to discuss her fertility
- She and her partner have been trying to conceive for about 10 months with no success



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### Nutrition & lifestyle

This may be when patient first accesses natural therapist

- Ensure all preconception nutrients
- Refer to fertility specialist if not already managed
- Optimisation of fertility with diet
- Avoidance of environmental toxins,
- Stress minimisation and management
- Herbal medicines and antioxidant supplements



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### Recommended management

- Lifestyle optimisation
- Antenatal/Genetic screening
- Address modifiable risk factors (eg. TSH, smoking, weight, diet, folate)
- Supervised conservative management
- Consider family aspirations (not just first baby) in timing specialist referral



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### Semen analysis

Volume	2.5-6 mls
Sperm concentration	> 15 million sperm/ml
Motility	>32% motile
Normal forms	>4%




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### Why is sperm compromised?

- Holistic assessment of the male partner
- Lifestyle modification
- Underlying disease state?
- Substance abuse




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### Endometriosis assessment

- Can be poor correlation between symptoms and disease severity
- Bimanual examination
- 80% cases at laparoscopy positive for endometriosis after 12 months unexplained infertility




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### Ovarian reserve assessment

- Pelvic USS assessment for anatomical issues
- E.g. endometrial polyps, fibroids, hydrosalpinges
- Antral follicle count (follicular phase)
- AMH



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### Treatment options

- OI – needs specialist USS monitoring
- IUI
- IVF/ICSI/IMSI
- PGS/PGD
- Donor egg/sperm/embryo



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### Unexplained infertility

- Often complex: age/partner specific
  - Karyotype
  - Immune responses poorly understood
  - Endometriosis
  - Age/egg quality – no in-vivo test
- IVF/PGD can often be diagnostic as well as therapeutic



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