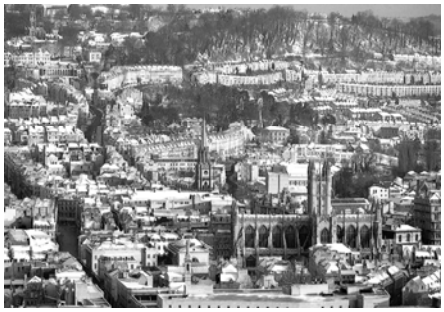
The effect of lifestyle on fertility

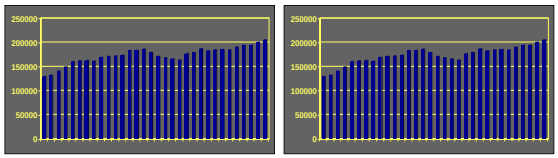
Helen Kendrew
Fertility Service Manager/Matron

Bath



Most people who eat too much, drink too much, smoke too much and have too much sex with too many people, do not end up with problems of infertility!

Therapeutic termination of pregnancy England and Wales 1976 - 2007



1976 1986 1996 2006

22.6% of all conceptions in 2006

Bath Fertility Centre Office of National Statistics and UK Department of Health

- Health care professionals need to offer advice.
- Lifestyle advice easy to give, hard to take
- Patients want advice on how to improve their chances of success
- Passivity of treatment

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Body mass index

- Normal BMI between 18 – 25
- Underweight ↓ 15
- Pre obese 25 – 30
- Obese class 1 = 30
- Obese class 2 = 35 – 40
- Obese class 3 = 40 - 60

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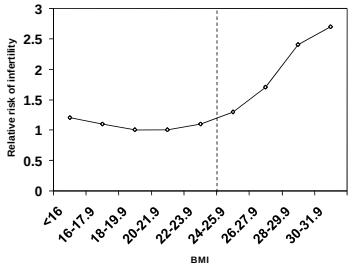
Relative risk of anovular infertility vs BMI

46718 parous vs 2527 infertile US nurses

BMI recorded at age 18

BMI > 23.9 carries increased risk of later anovular infertility



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Rich-Edwards et al, 1994

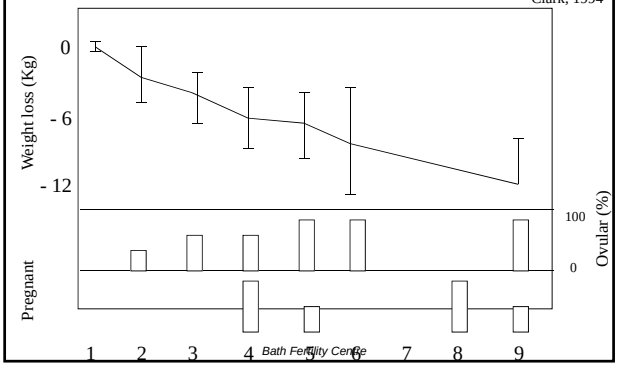
Obesity and infertility

- Multiple endocrine and metabolic disturbances (+/- PCOS)
- Adverse effects on
  - follicle growth and endocrinology
  - endometrial growth and implantation
  - oocyte & embryo development
  - ovulation
- Adverse effect on IVF
  - increased FSH requirement
  - longer stimulation period
  - fewer oocytes and embryos
- Increased risks of
  - miscarriage
  - pregnancy complications
  - problems at/ after delivery

Spandorfer, 2004, Fedorcsak, 2004, Wittemer, 2000, Metwally, 2008

Impact of weight loss and exercise on ovulation and pregnancy

Clark, 1994



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Weight loss programmes generally ineffective

- Jessop Hospital Fertility Clinic audit
  - 6% reached their target weight in 4 years despite access to dietician
  - Only 15% of those who reached the target managed to maintain their weight for > 6 months
- Pharmacological interventions are sporadically effective (metformin, orlistat)
- Bariatric surgery shows promise but carries risk

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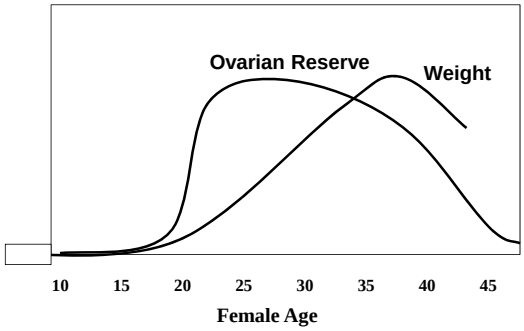
Age related decline in ovarian reserve and impact of diet/ exercise on body mass



Should we offer ART to obese women?

"If they can't lose weight then they can't have a child"

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Should we offer ART to obese women?

No

- Risks to mother and baby are too high
- 78/261 deaths in 2000 - 02 Confidential Enquiry were obese
  - 25% had BMI >35
- Why not just wait until they lose weight?

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Yes

- Careful antenatal and intrapartum care can lead to good outcome in most cases where there is not 'morbid obesity' with BMI > 35
- Obese women should be informed of their increased medical risk but should make their own decisions
- Non-infertile obese women conceive frequently, and no Governmental licence is required

Maheshwari 2008

Beware 'obese-ism'!

Denial of access to treatment on grounds of obesity may transgress Article 12 (The right to marry and found a family) and Article 14 (prohibition of discrimination) of the Human Rights Act

What about the effect of cigarette smoking on ART outcome?

Impact of smoking on ART outcome meta-analysis

- Lower live birth rate per cycle of IVF/ ICSI
  - OR 0.54, 95% CI 0.30-0.99 (4 studies)
- Lower clinical pregnancy rate per cycle among smokers
  - OR 0.56, 95% CI 0.43-0.73 (8 studies)
- Clinical pregnancy rates per embryo transfer
  - One study found a significant reduction
    - 20% in 39 smokers compared to 48.3% in 146 non-smokers
  - Two found no significant difference between smoking and non-smoking groups
- Significantly higher risk of spontaneous miscarriage
  - OR 2.65, 95% CI 1.33-5.30

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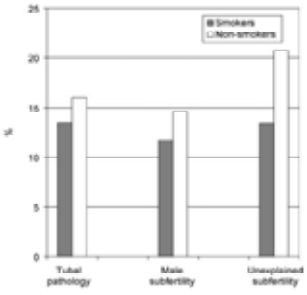
Waylen et al, 2008

Cigarette smoking affects IVF outcome

N= 8457
All first cycle IVF



(OR for LB 0.73)

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Lintsen, 2005

Caffeine and fertility

- 1990 - Georgia USA - 2817 *parous* women followed until next conception
  - No relation between caffeine consumption (up to 250 mg/ day) and subfertility or delay to next conception
- 1997 - Denmark, Poland, Germany, Italy, Spain - 3187 women *trying for first pregnancy*
  - Increase risk of delay to first conception if caffeine > 500mg/ day
    OR 1.45, 95% CI 1.03 - 2.04
  - Additive effect of smoking
- 1998 - Copenhagen - 423 healthy couples *trying for first pregnancy* followed for 6 cycles
  - Non smoking women with high caffeine intake (> 700mg/day) had a non-significant reduction in fecundity compared with non-caffeine drinkers
    OR 0.63 95% CI 0.25 - 1.60

 Joesoef, 1990; Bolumar, 1997; Jensen, 1998

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No evidence that two cups of coffee per day have adverse effect on fertility

 Joesoef, 1990; Bolumar, 1997; Jensen, 1998

Diet and fertility

- 2002 - Hong Kong - 157 IVF couples studies for consumption of seafood with high mercury content
  - High blood mercury concentration correlated with high consumption of seafood and length of infertility and inversely with IVF outcome
- 2006 - Scotland - 602 women undergoing infertility treatment
  - folate and vitamin B12 concentration do not affect IVF outcome
- 2007 - USA - dietary score from 17544 healthy women trying to conceive
  - "Fertility diet" with low saturated fat, low carbohydrate, high vegetable & low animal protein reduced risk of *anovular* infertility

 Choy, 2002; Haggarty, 2006; Chavarro, 2007;

Alcohol and fertility

- Denmark - 1995 - 430 healthy couples trying to conceive for the first time
  - Monitored over 6 cycles
  - Delayed time to conception if the woman drank > 6 units per week
  - No effect of < 6 drinks per week
- Relationship not observed in Italian women
- Sweden 2004 - female "high consumers" of alcohol have more consultations for infertility
- No correlation between alcohol consumption and AFC or serum inhibin B/ FSH
- Women who drink alcohol 5 - 7 times per week defer menopause by 2 years over non-drinkers

Jensen, 1999; Parazzini, 2004; Eggert, 2004; Kinney, 2006, 2007

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No evidence that moderate alcohol intake influences fertility

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Jensen, 1999; Parazzini, 2004; Eggert, 2004; Kinney, 2006, 2007

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Stress and fertility

- Stress can lead to anovulation and hence infertility
- Numerous studies of 'stress hormones' during IVF, with conflicting results
- Infertile couples have increased stress in questionnaire studies
  - cause or effect?
- Acupuncture to reduce 'stress' during IVF
  - No benefit at time of oocyte collection
  - Possible small effect at time of embryo transfer
- Modern life is inevitably stressful!

Nelson, 2008; Cheong 2008;

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in absence of anovulation affects fertility

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The ying and yang of lifestyle change in infertility

- Lose weight
- More exercise
- No smoking
- No alcohol
- No caffeine
- No seafood
- No animal protein
- Vitamin and mineral supplements
- Testicular cooling
- Track ovulation
- Meticulously timed intercourse

stress

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romance

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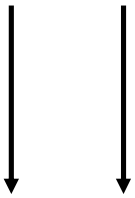
romance relationship



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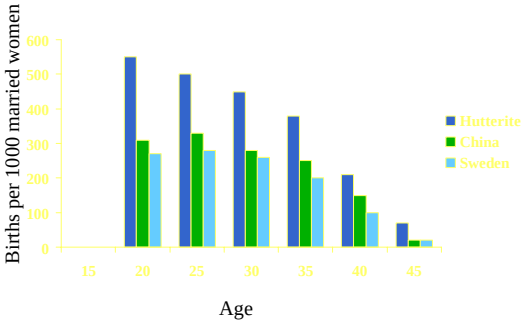
Where ‘lifestyle’ really makes a difference

But there’s not much you can do about it…….

Effect of female age on birthrate



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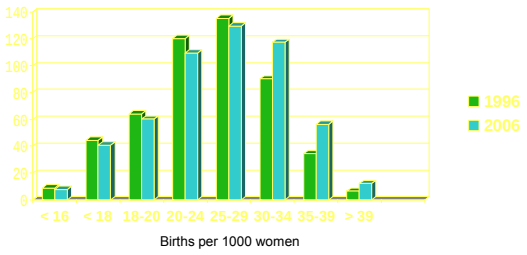
Delaying pregnancy, a modern phenomenon



Bath Fertility Centre UK Office of National Statistics

Monthly frequency of intercourse

Age	USA	France	UK
16 - 20	11.0	12.5	9.9
25 - 29	9.0	10.9	6.9
35 - 39	6.8	7.8	5.5
> 45	-	3.2	1.5

Married women (with husband available)

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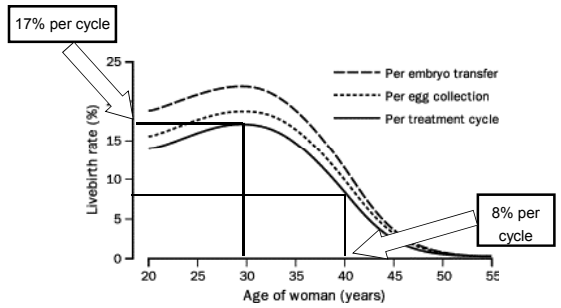
Can IVF solve the problem for the older patient?

Not in 1994



Templeton, 1996, Nikolau & Templeton, 2004

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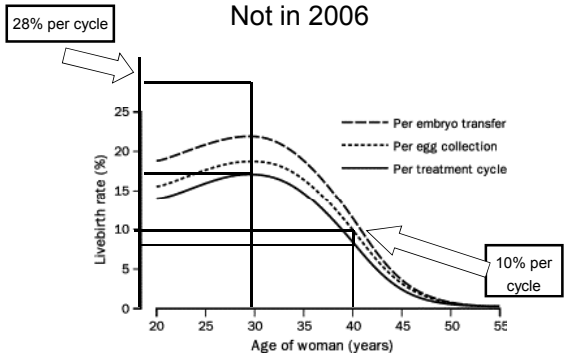

Templeton, 1996, Nikolau & Templeton, 2004

National policies and legislation to encourage couples to have children earlier

1. Reduce direct costs of having children (eg, tax benefits, cash transfers)
2. Increase length of parental leave with government support for employers and small companies
3. Increase childcare provision for pre-school children
4. Provide part-time employment opportunities
5. Protect promotion prospects during parental leave
6. Increase awareness of effect of age on fertility

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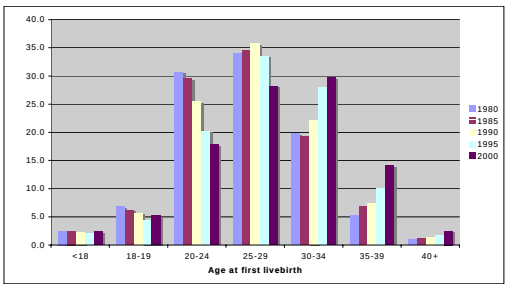
Changing approaches to childbirth



Bath Fertility Centre UK Office of National Statistics

Conclusion

- Most people just get pregnant
- Lifestyle change might be beneficial to health but *'healthy'* versus *'normal'* lifestyles for infertile couples need testing in randomised controlled trials
- Most evidence of benefit for lifestyle change comes from studies of the extremes of behaviour
- Radical lifestyle changes can have drawbacks
- Guilt is the new black

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Acknowledgements

- Professor William Ledger
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- Mr David Walker
- Bath Fertility Centre team