

Highlight: Fertility and adiposity

12 July 2022

EASO Summer School

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Infertility

- Infertility is a disease of the male or female reproductive system defined by the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse
- Infertility can be primary or secondary
 - Primary infertility: when a pregnancy has never been achieved
 - Secondary infertility: when at least one prior pregnancy has been achieved

Prevalence of infertility

15%



of couples have trouble
conceiving

9%



of women ages 15-44 years
reported infertility problems

10%



of men ages 15-44 years
reported infertility problems

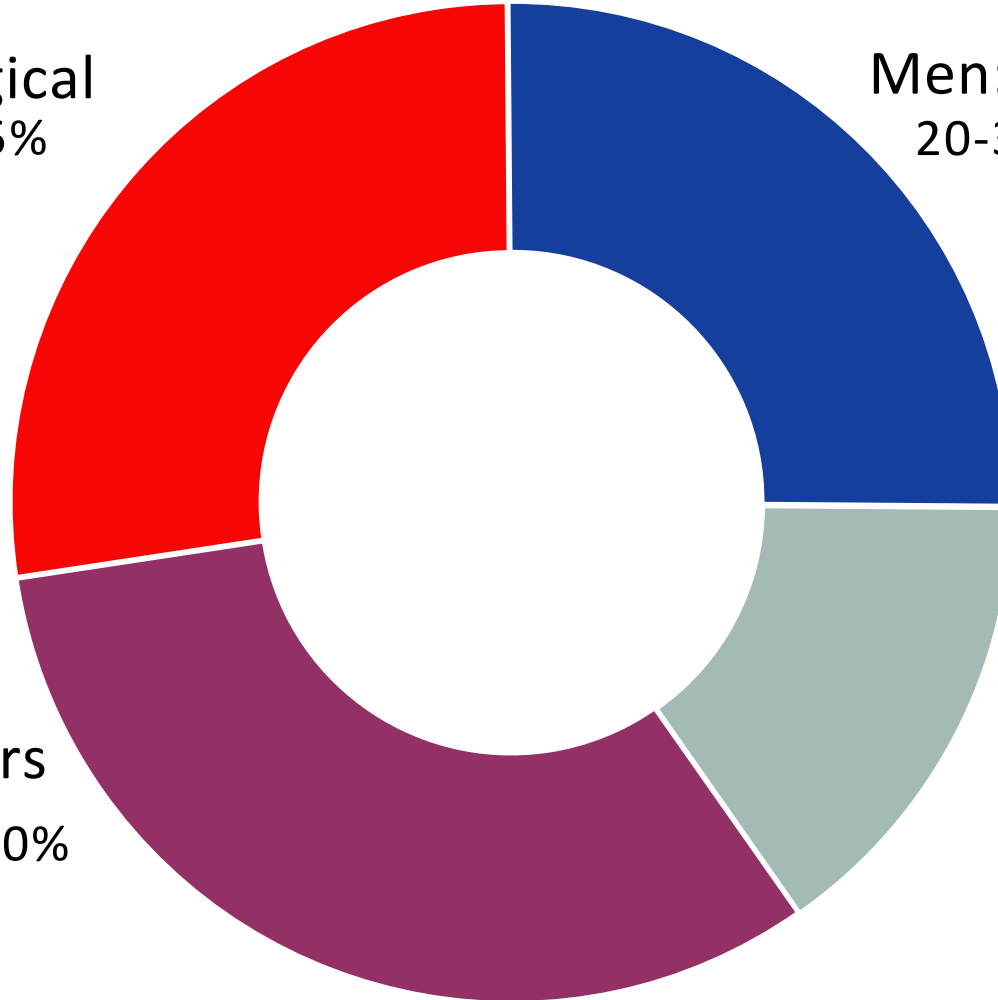
Causes of infertility

Women: physiological
20-35%

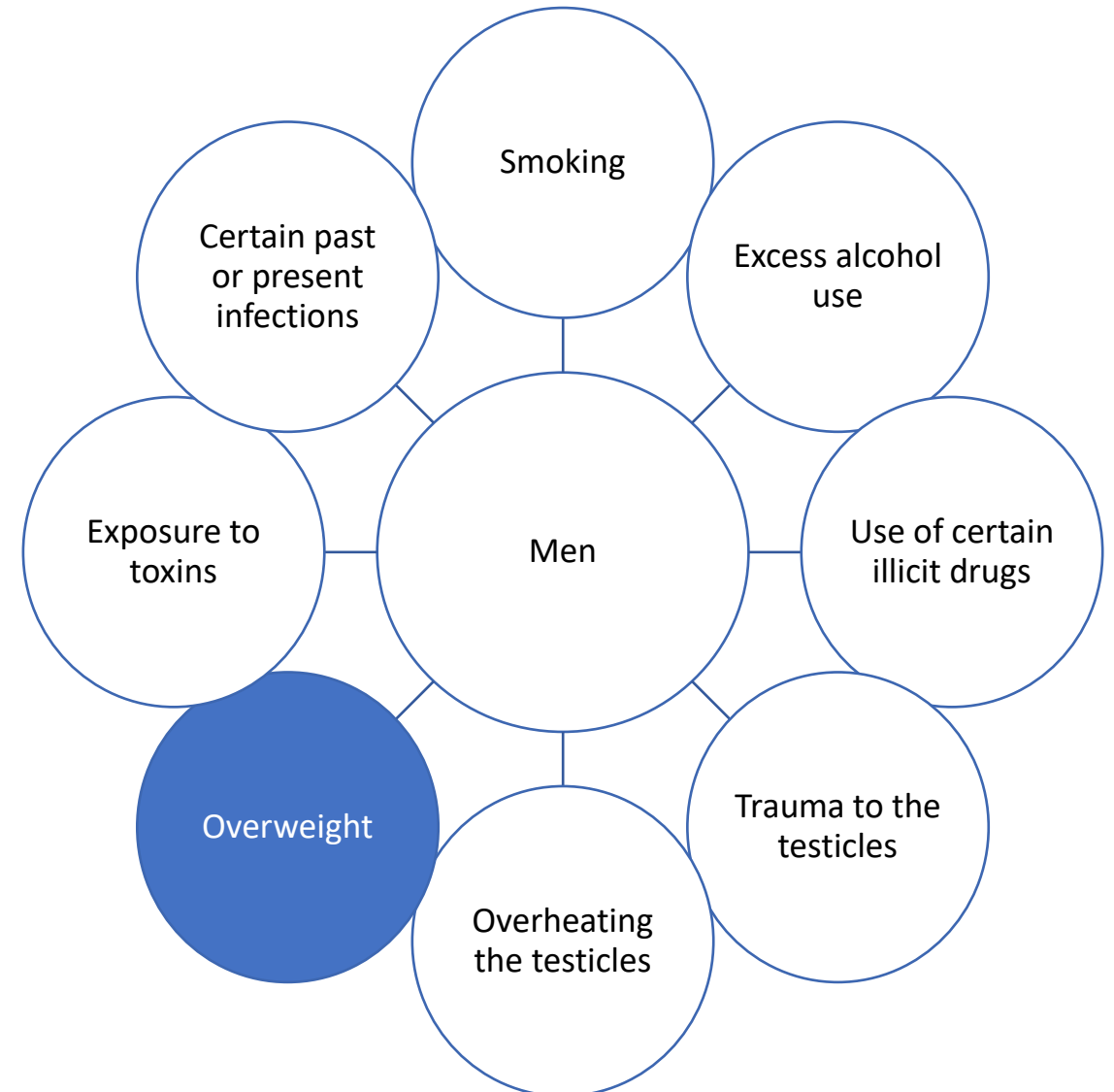
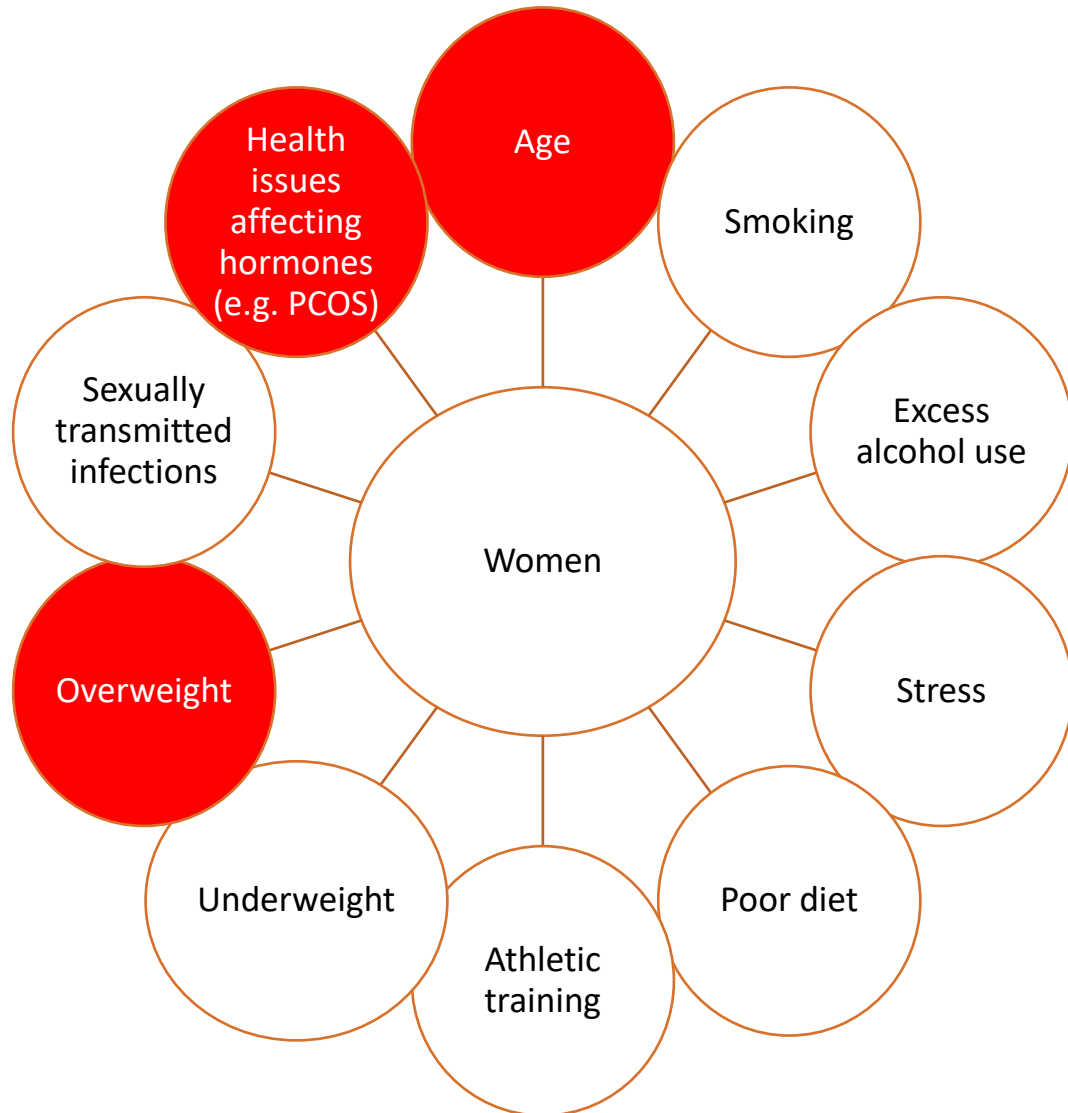
Men: physiological
20-30%

Both partners
25-40%

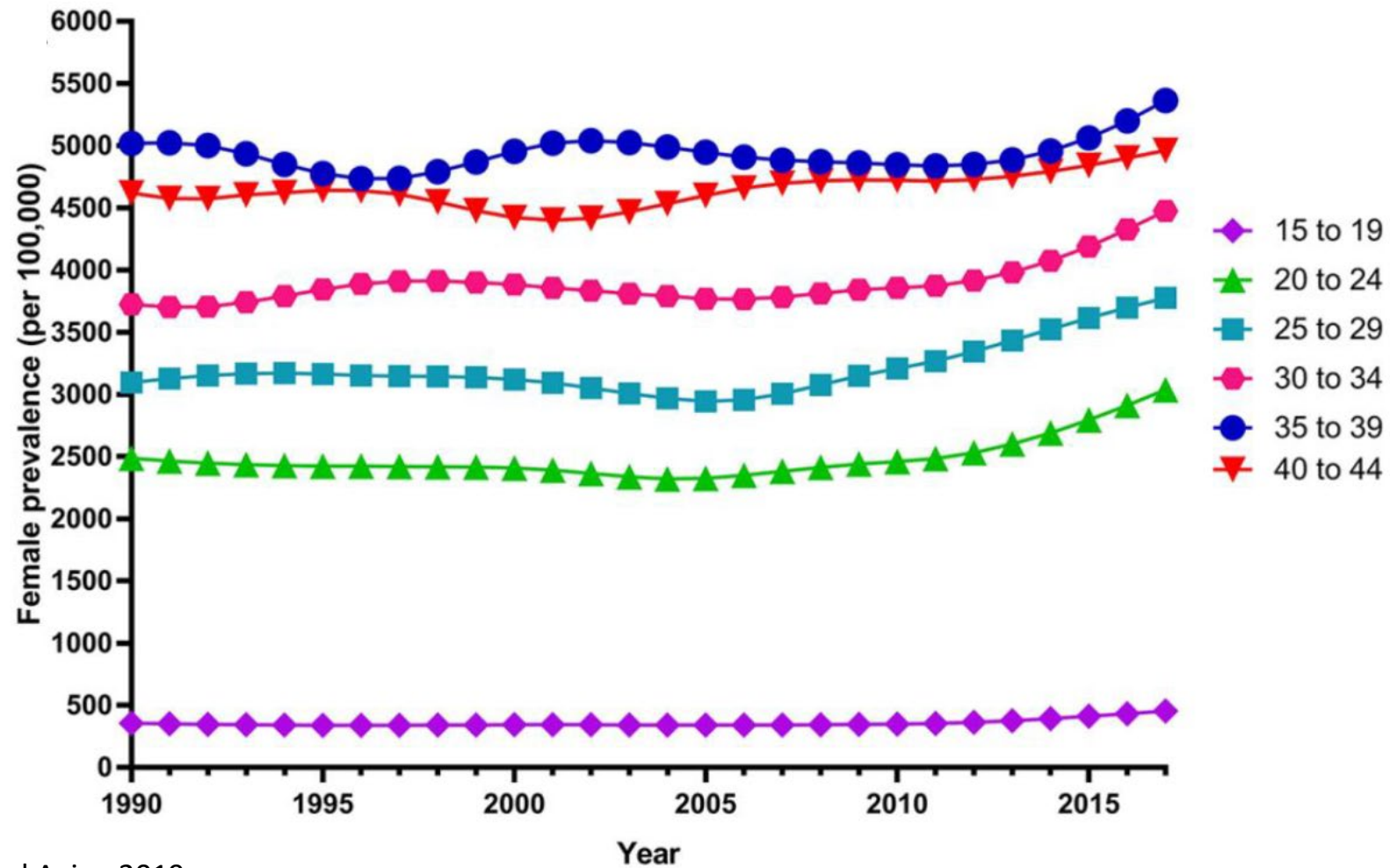
Unknown
10-20%



Risk factors for infertility

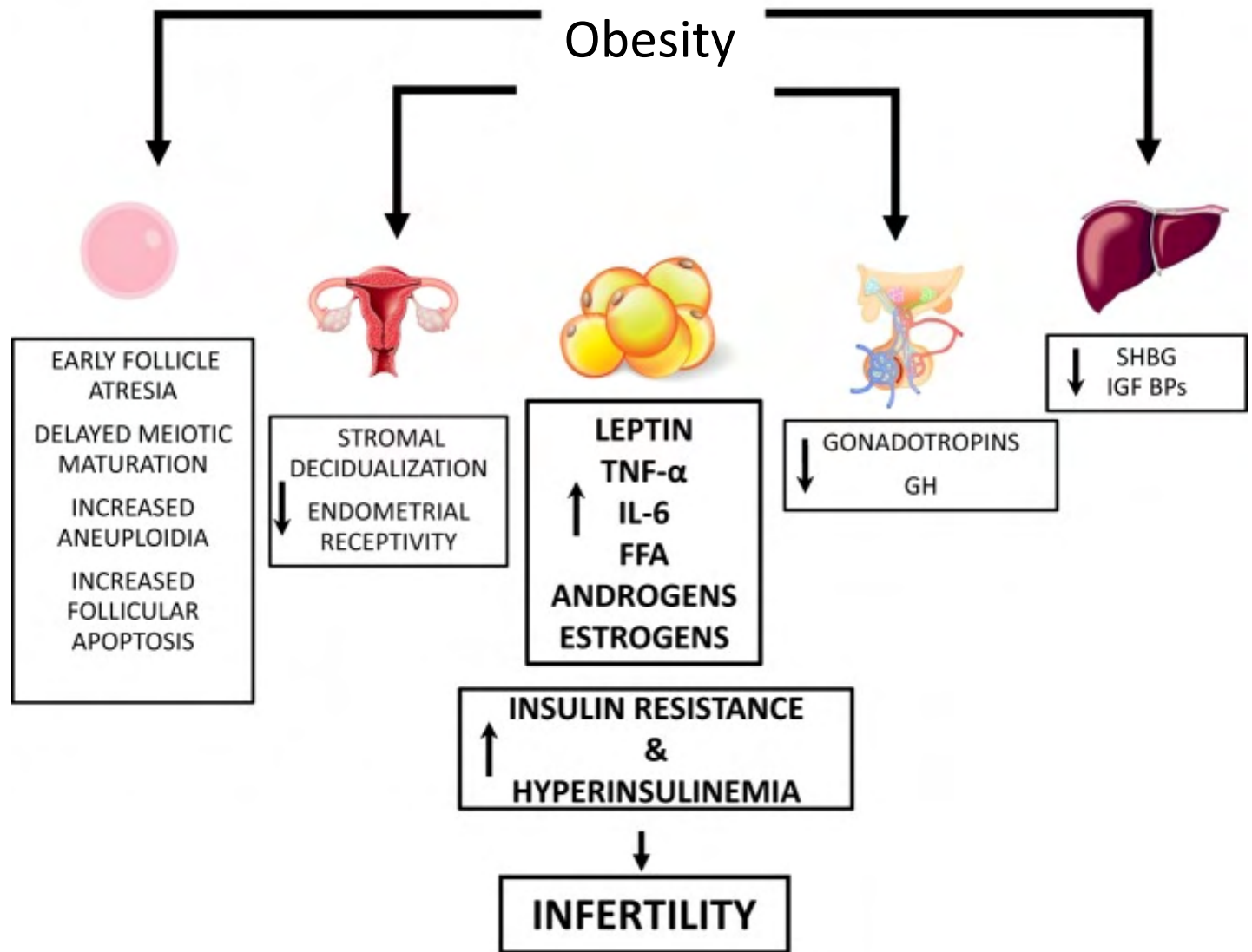


Prevalence of infertility in women by age



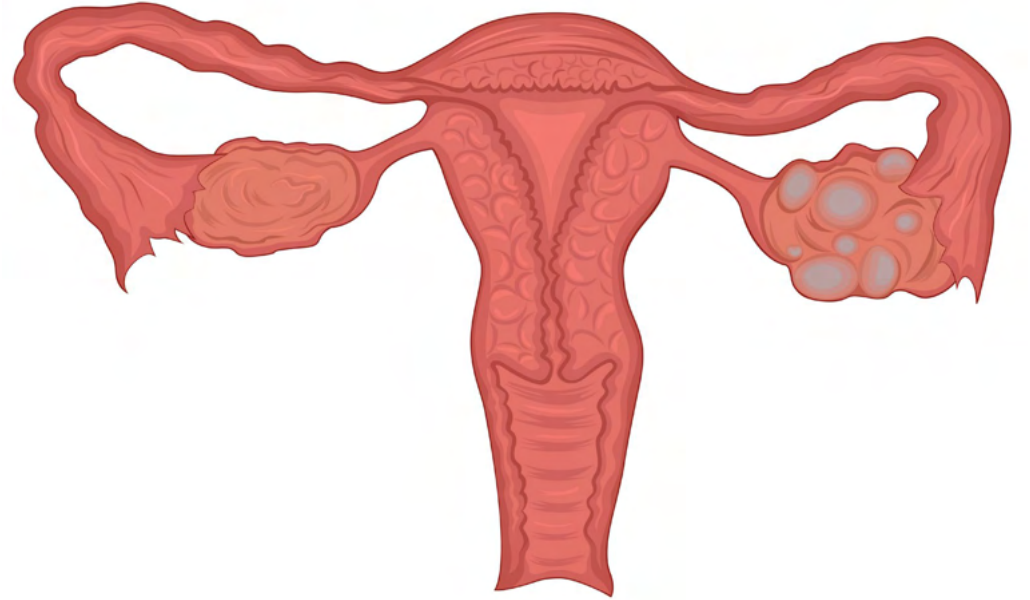
Source: Sun et al Aging 2019

Potential mechanisms linking obesity in women to infertility

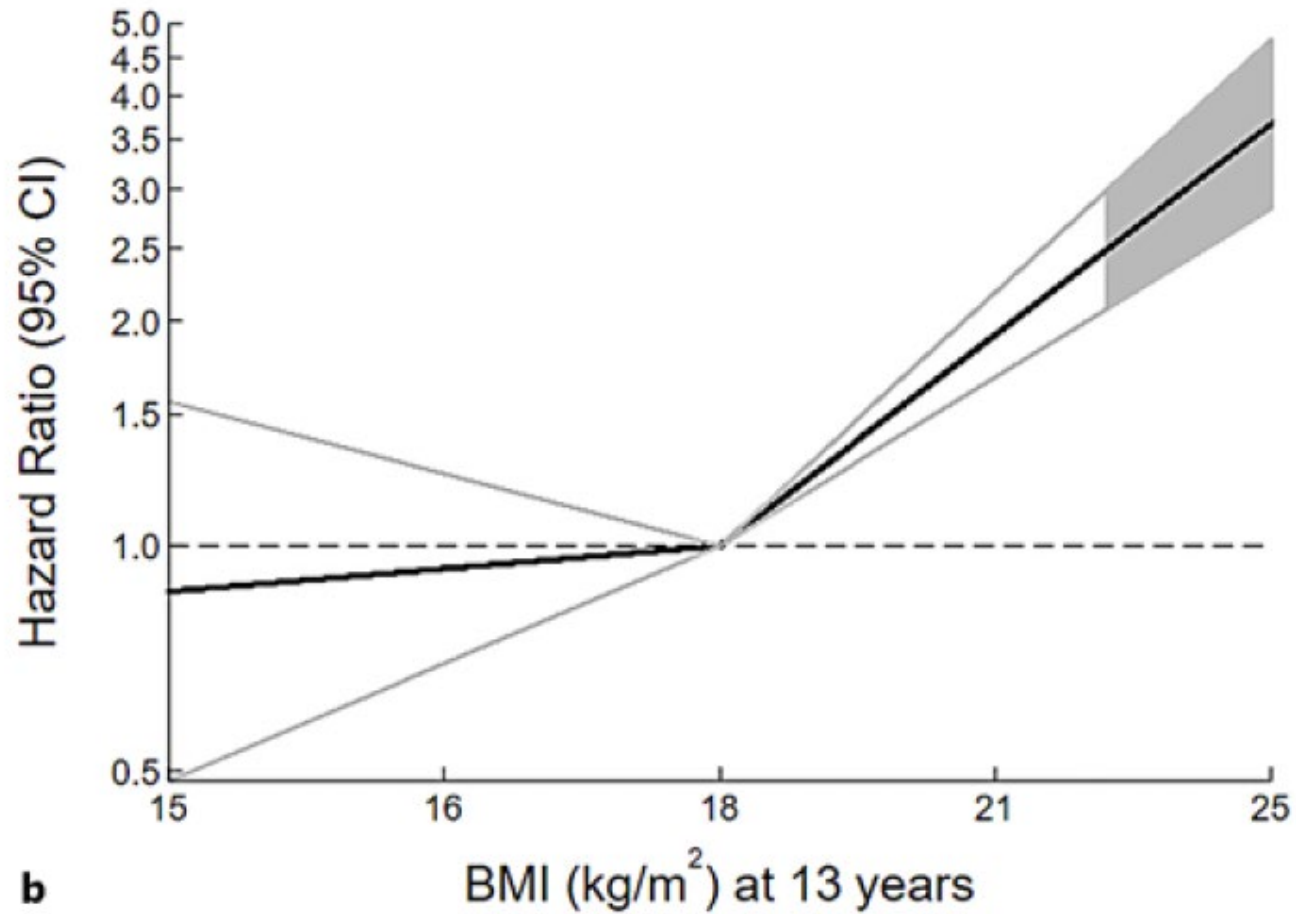


Polycystic ovary syndrome (PCOS)

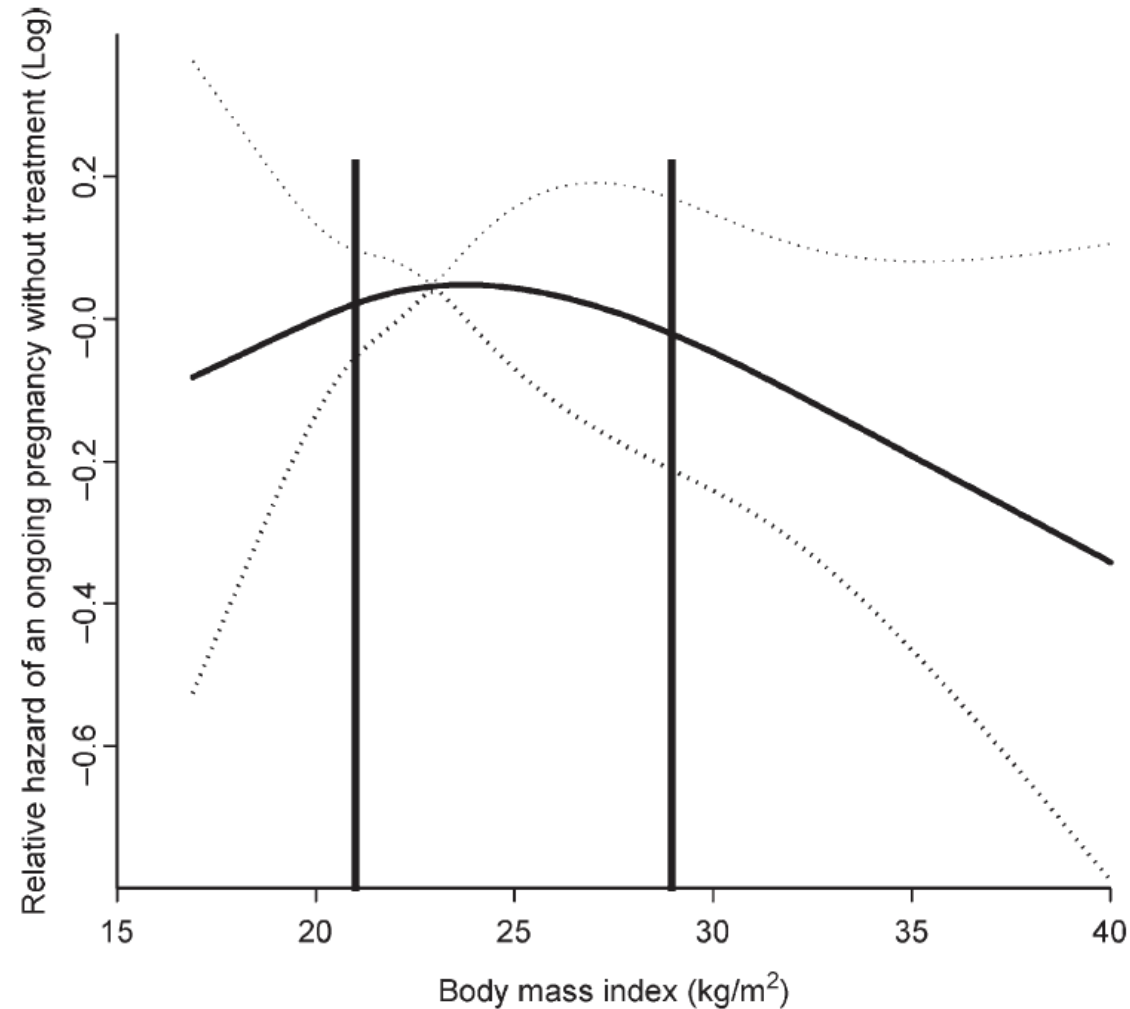
- Signs
 - Irregular periods
 - Excess androgens
 - Polycystic ovaries
- Causes
 - Excess insulin
 - Low grade inflammation
 - Heredity
 - Excess androgen
 - Obesity (also as a consequence)
- Impact: accounts for up to 85% of ovulatory causes of infertility



Adolescent BMI and PCOS

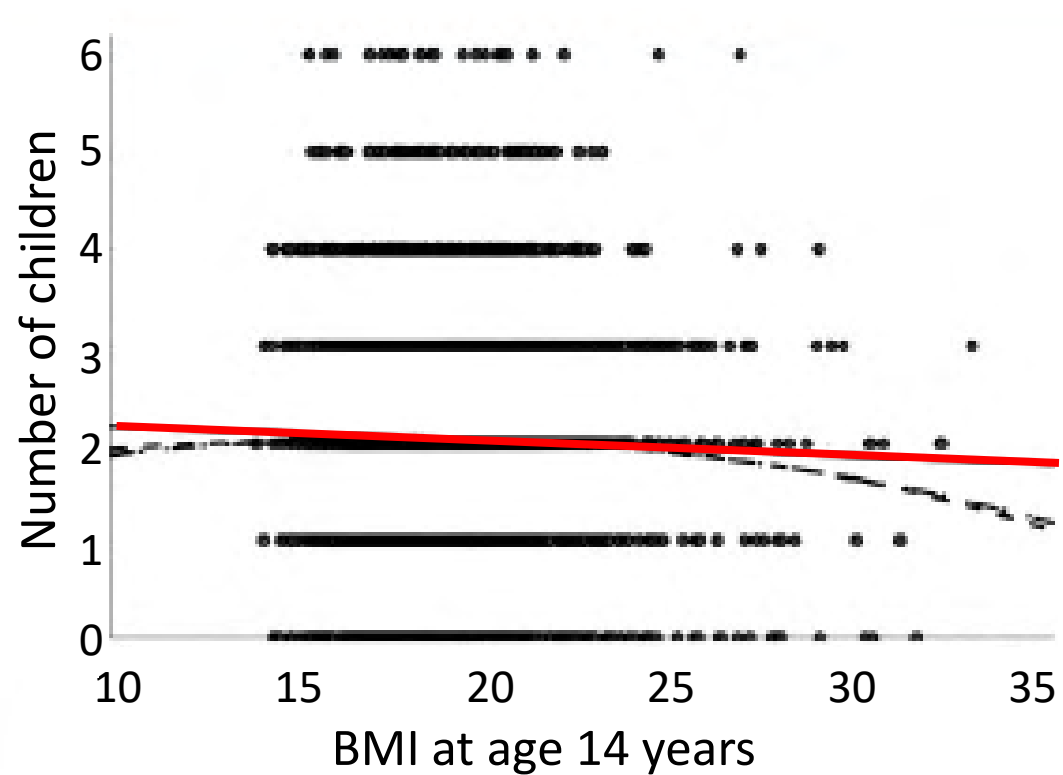


BMI and relation to ongoing spontaneous pregnancy in women

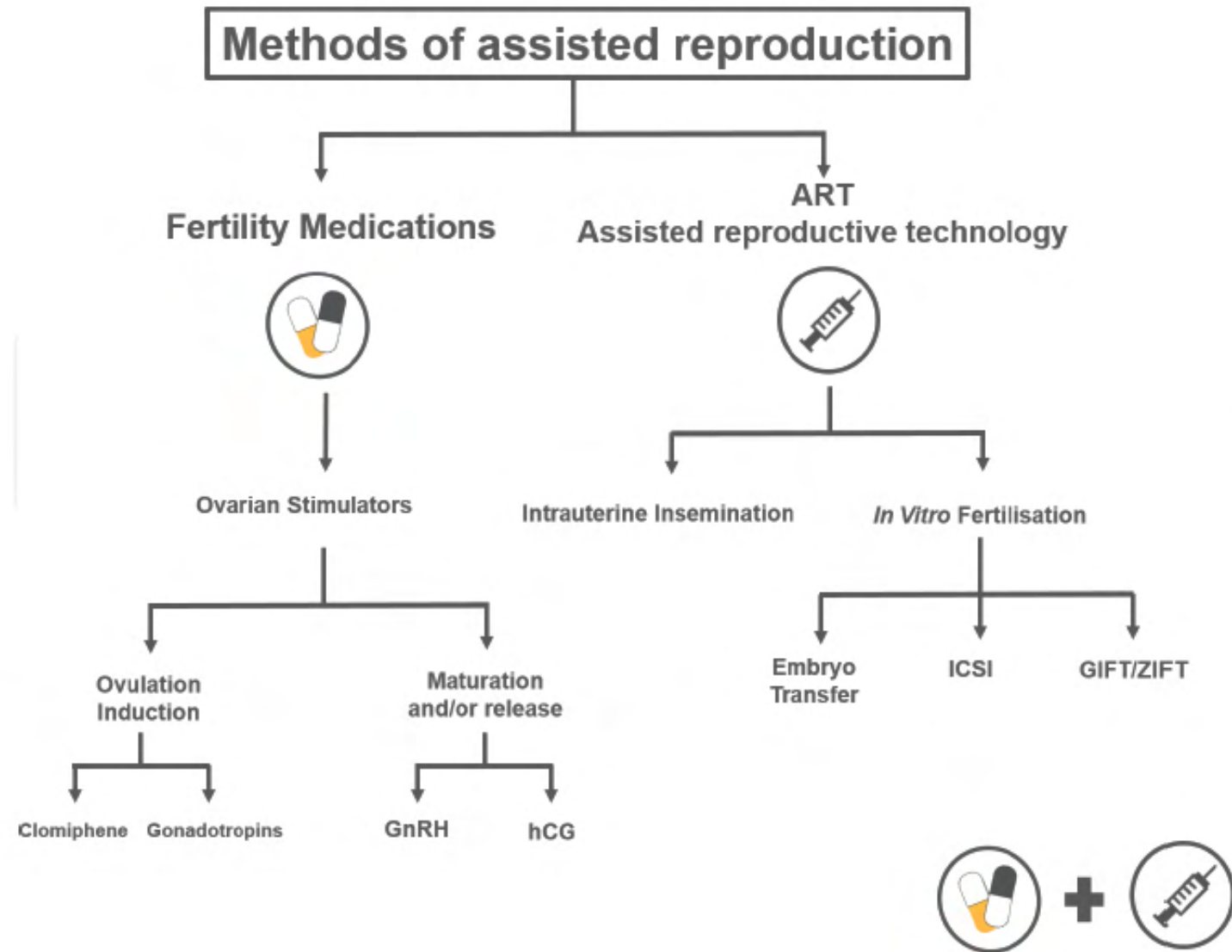


Source: Van der Steeg Human Repro 2008

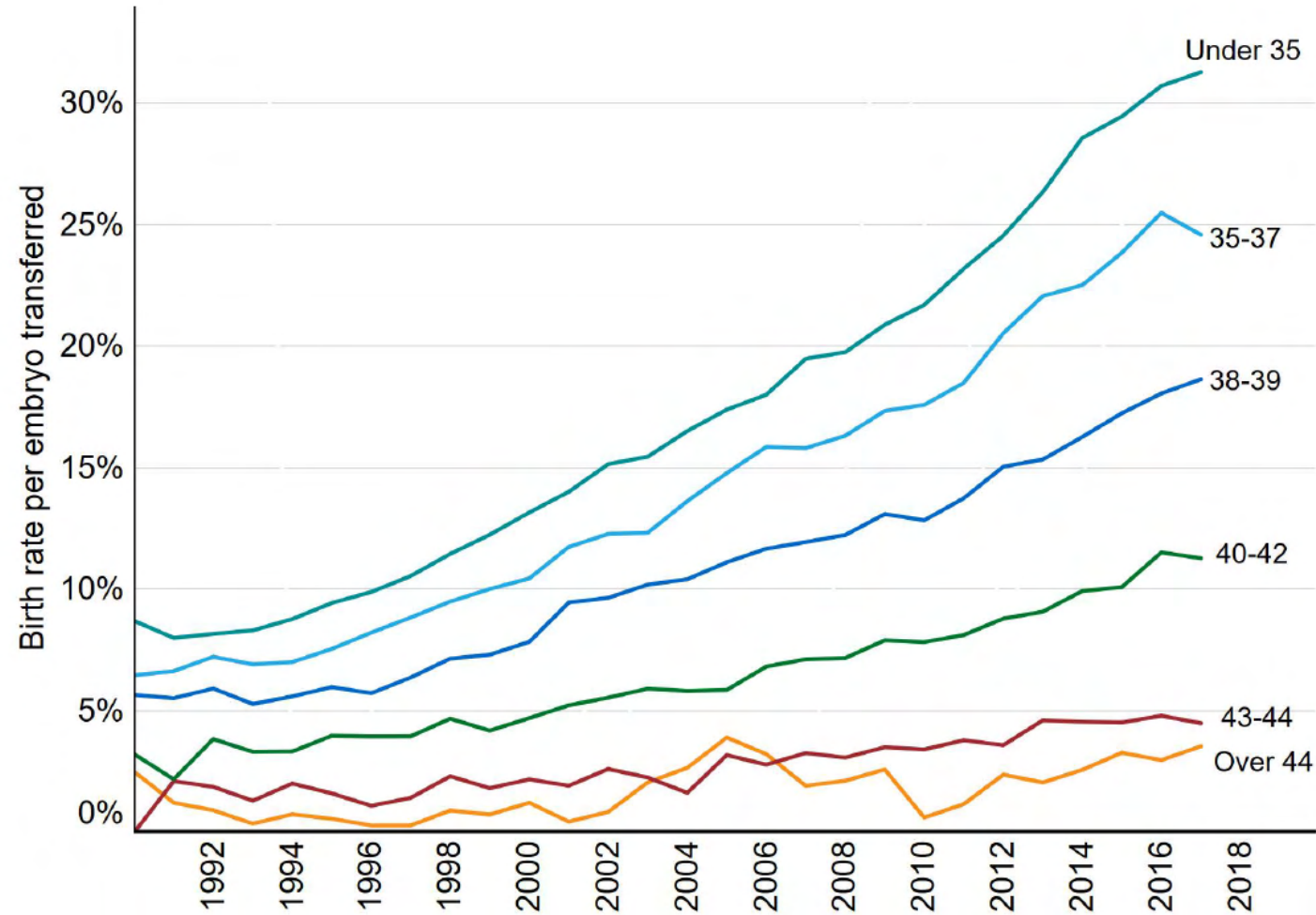
Adolescent BMI number of children by age 50 years



Fertility treatment



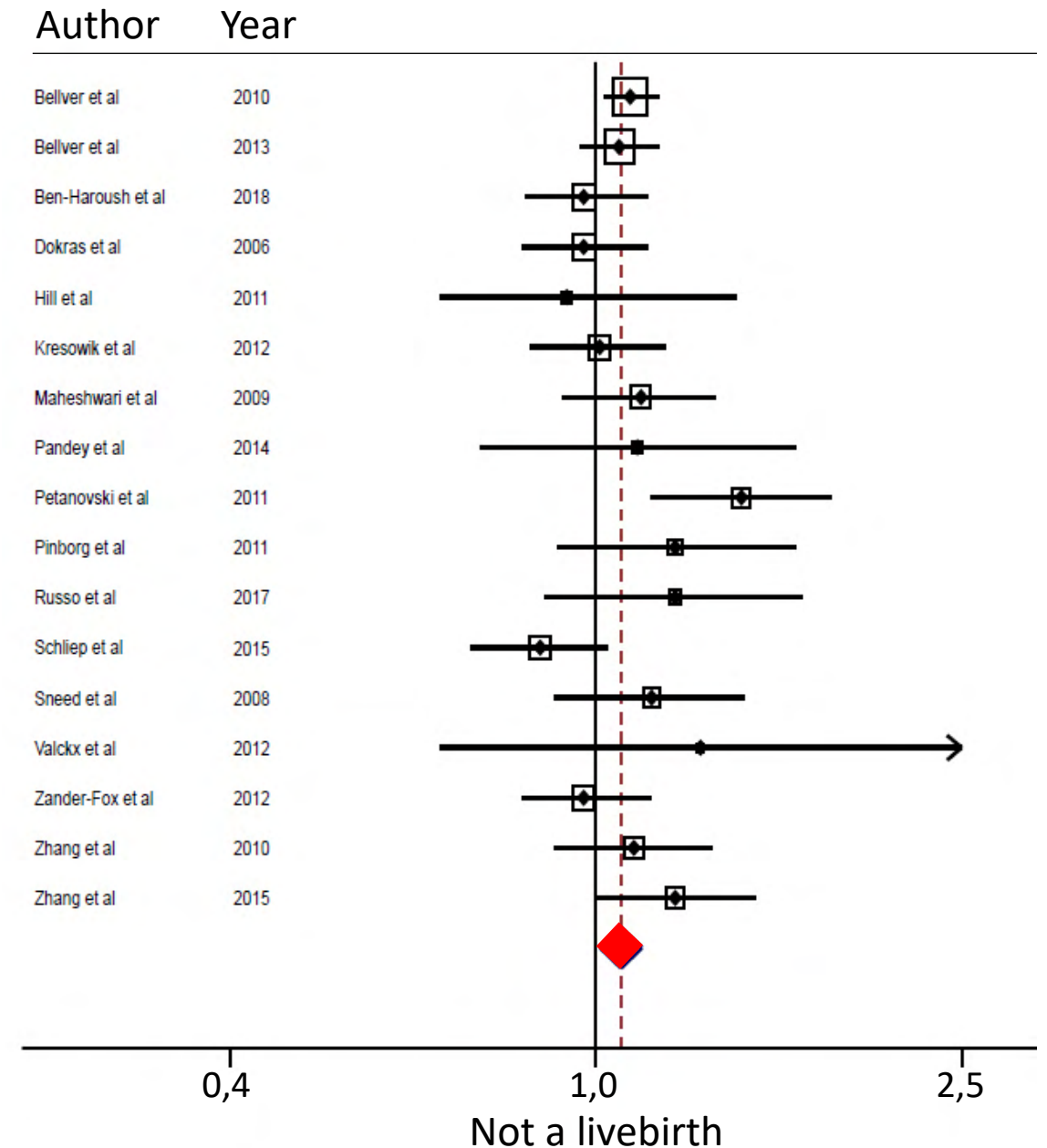
Age and ART success



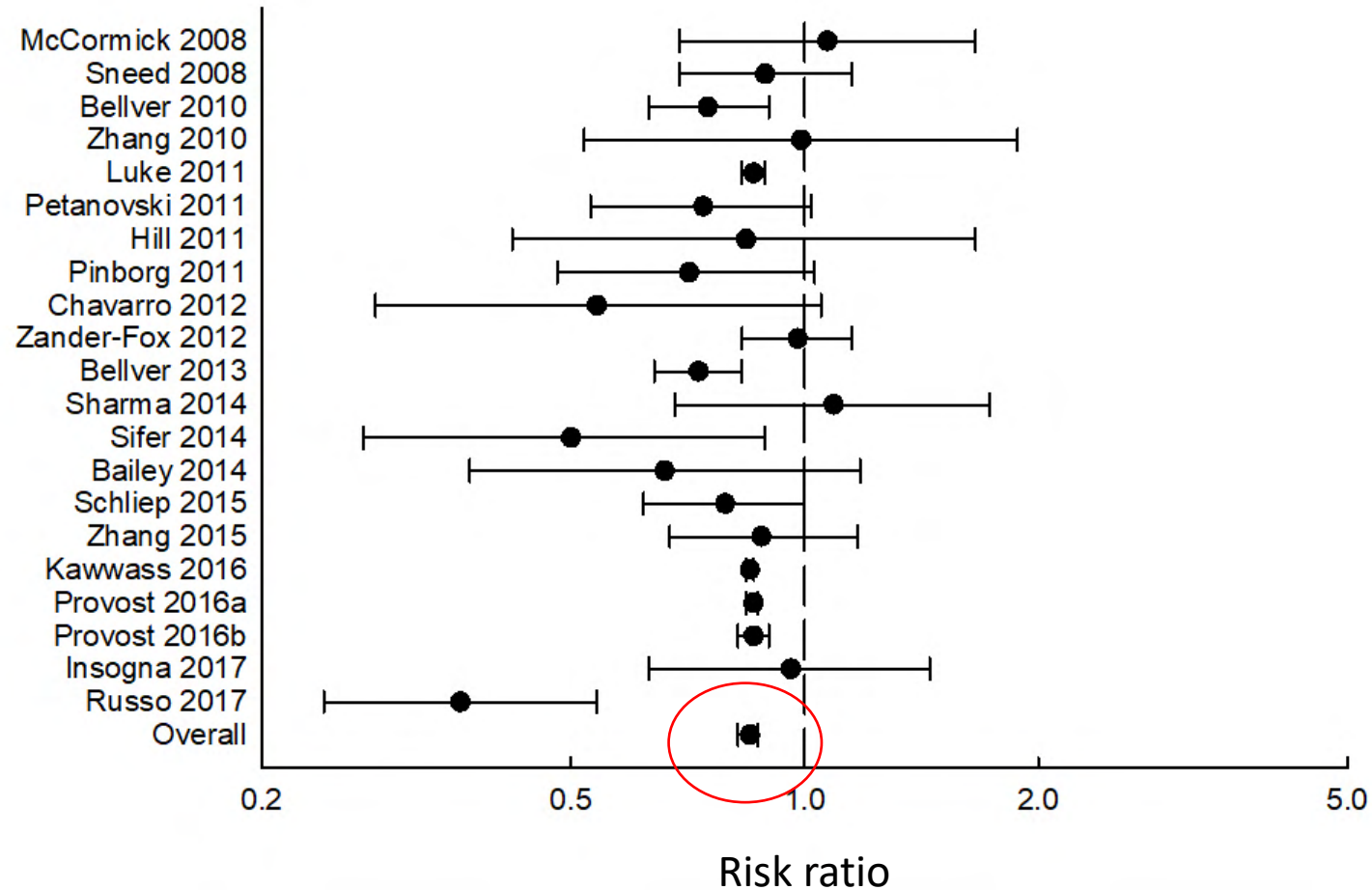
Source: UK Human Fertilisation & Embryology Authority 2020

Overweight and livebirth following ART

- Comparison between women with BMI <25.0 versus 25.0-29.9
- Slightly higher risk of not having a liveborn infant among women with overweight
 - 1,07 (1,01-1,12)



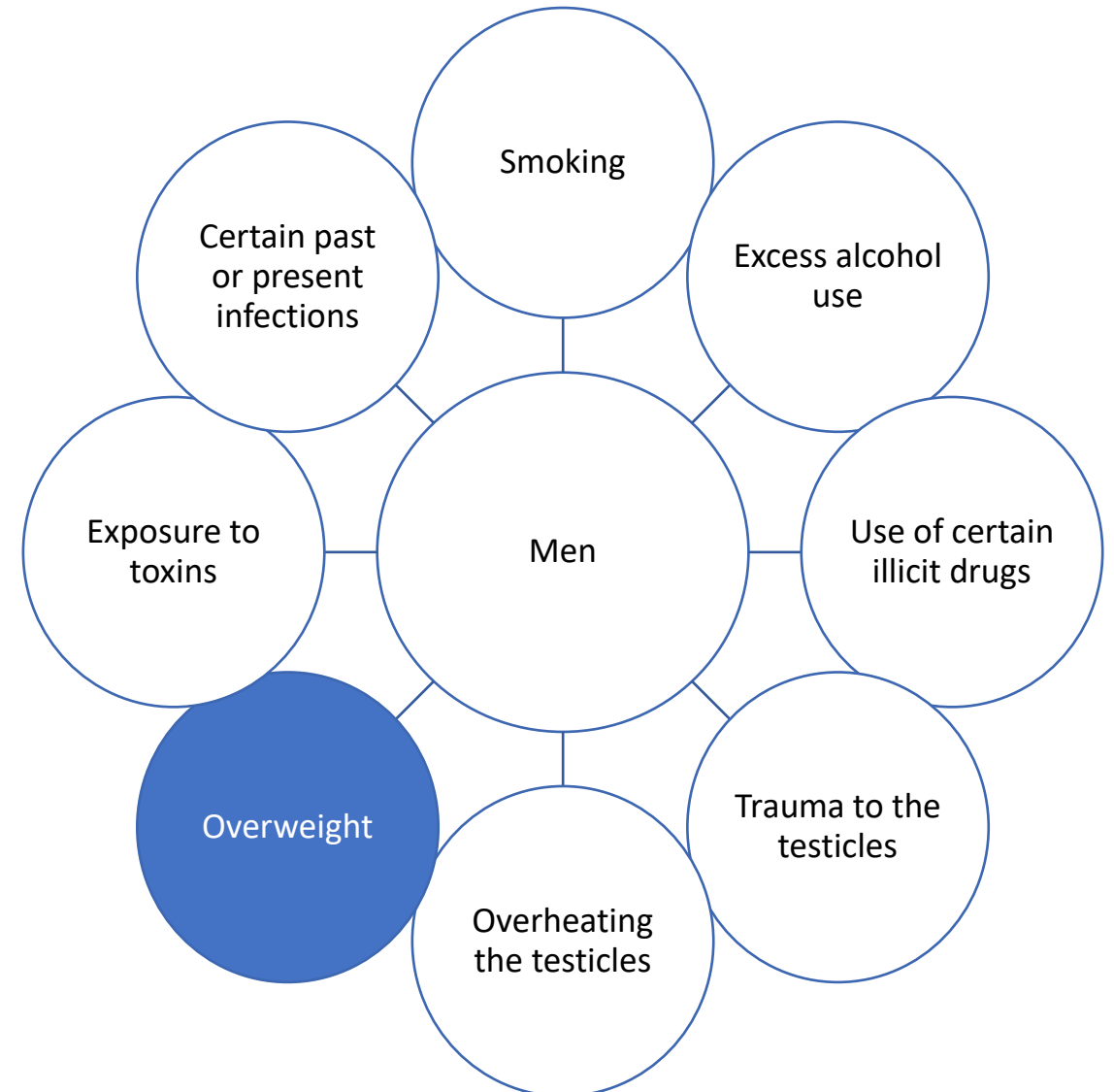
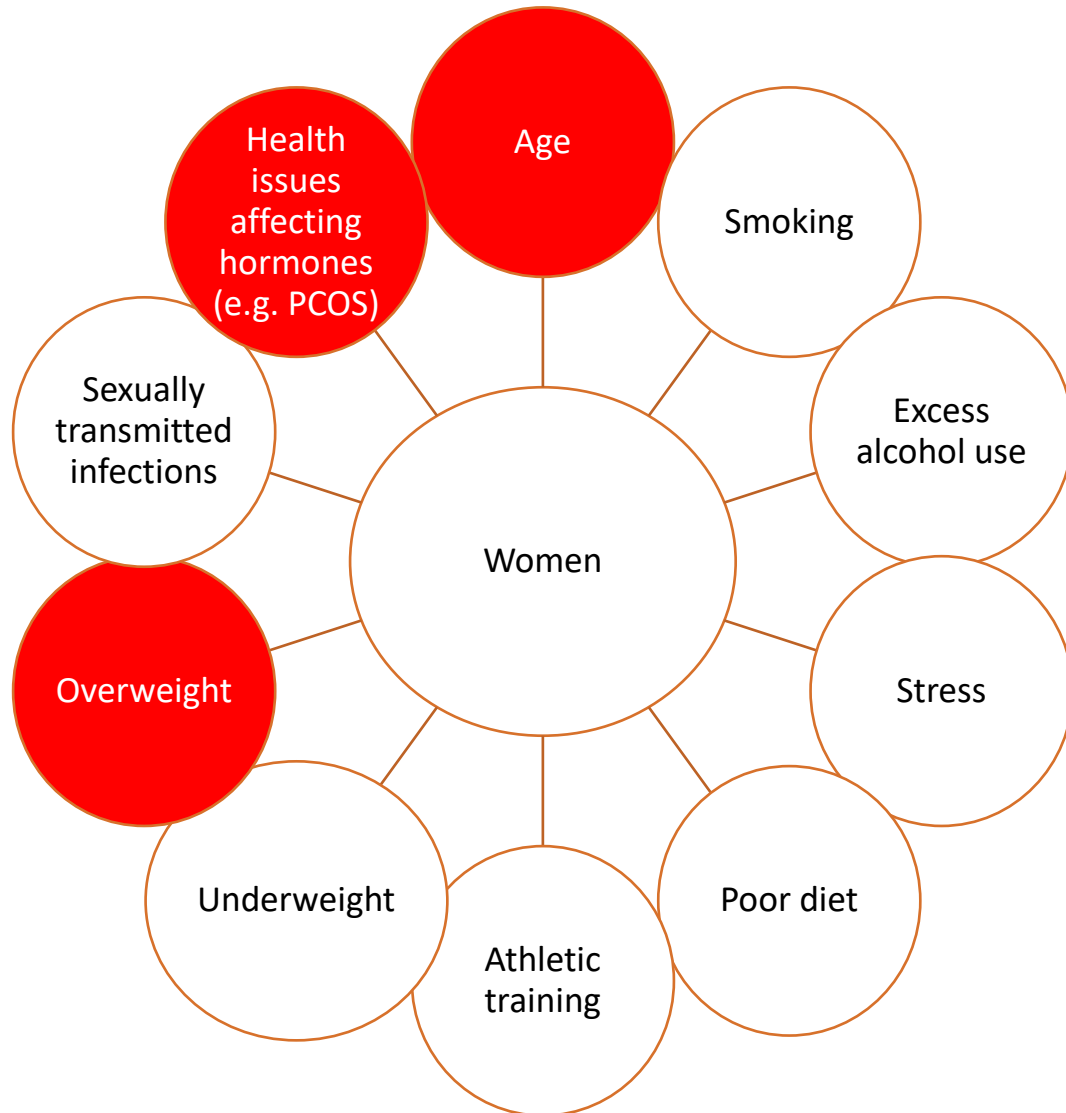
Obesity and livebirth following IVF



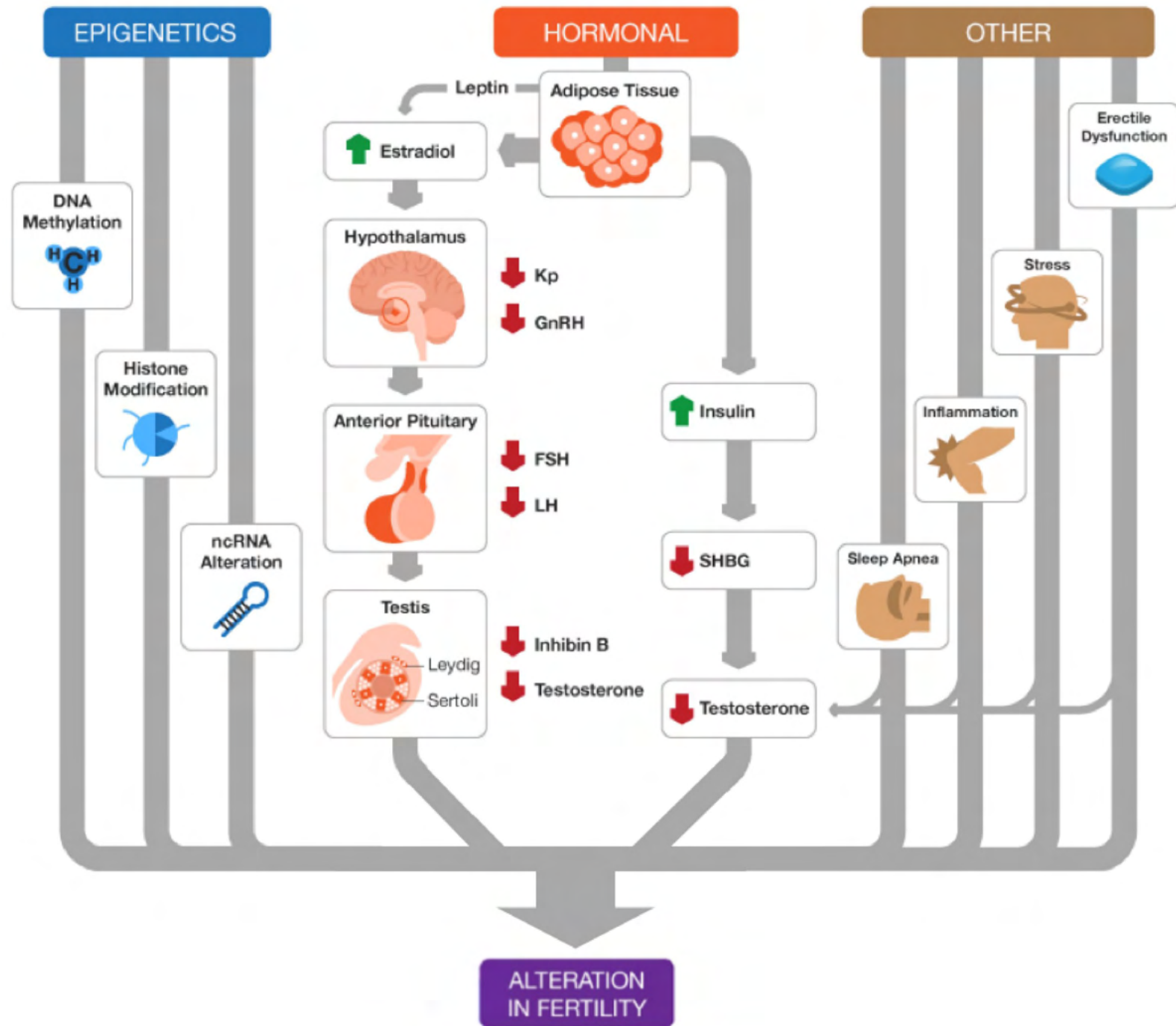
Preconception lifestyle intervention in women with obesity and infertility

	Standard lifestyle	Intensive lifestyle
Good live birth	29/191 (15.2%)	23/188 (12.2%)
Live birth	42/191 (22.0%)	38/188 (20.2%)
Singleton live birth	39/42 (92.9%)	32/38 (84.2%)
Twin live birth	3/42 (7.1%)	6/38 (15.8%)
Birth weight, grams	<i>N</i> = 42	<i>N</i> = 36
	3,105.9 ± 794.4	3,198.9 ± 711.7

Risk factors for infertility

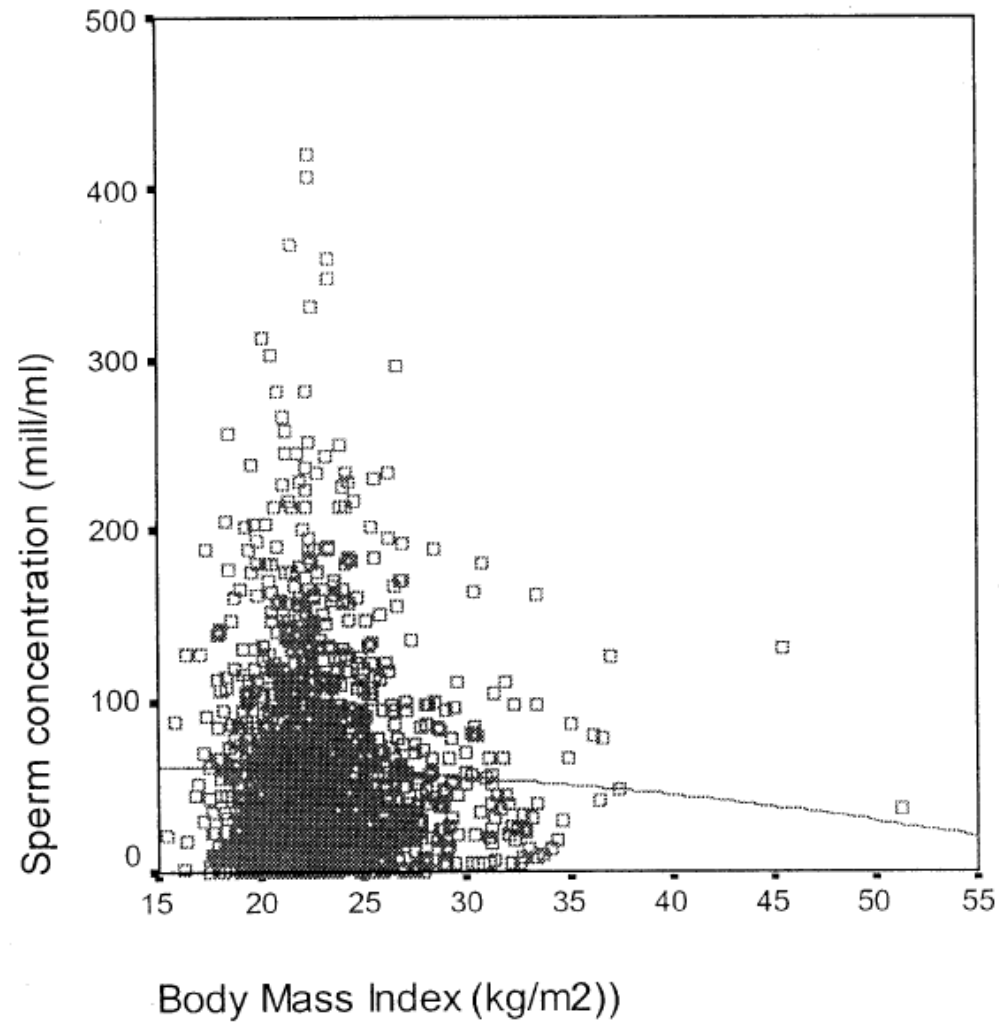


Potential mechanisms linking obesity in men to infertility



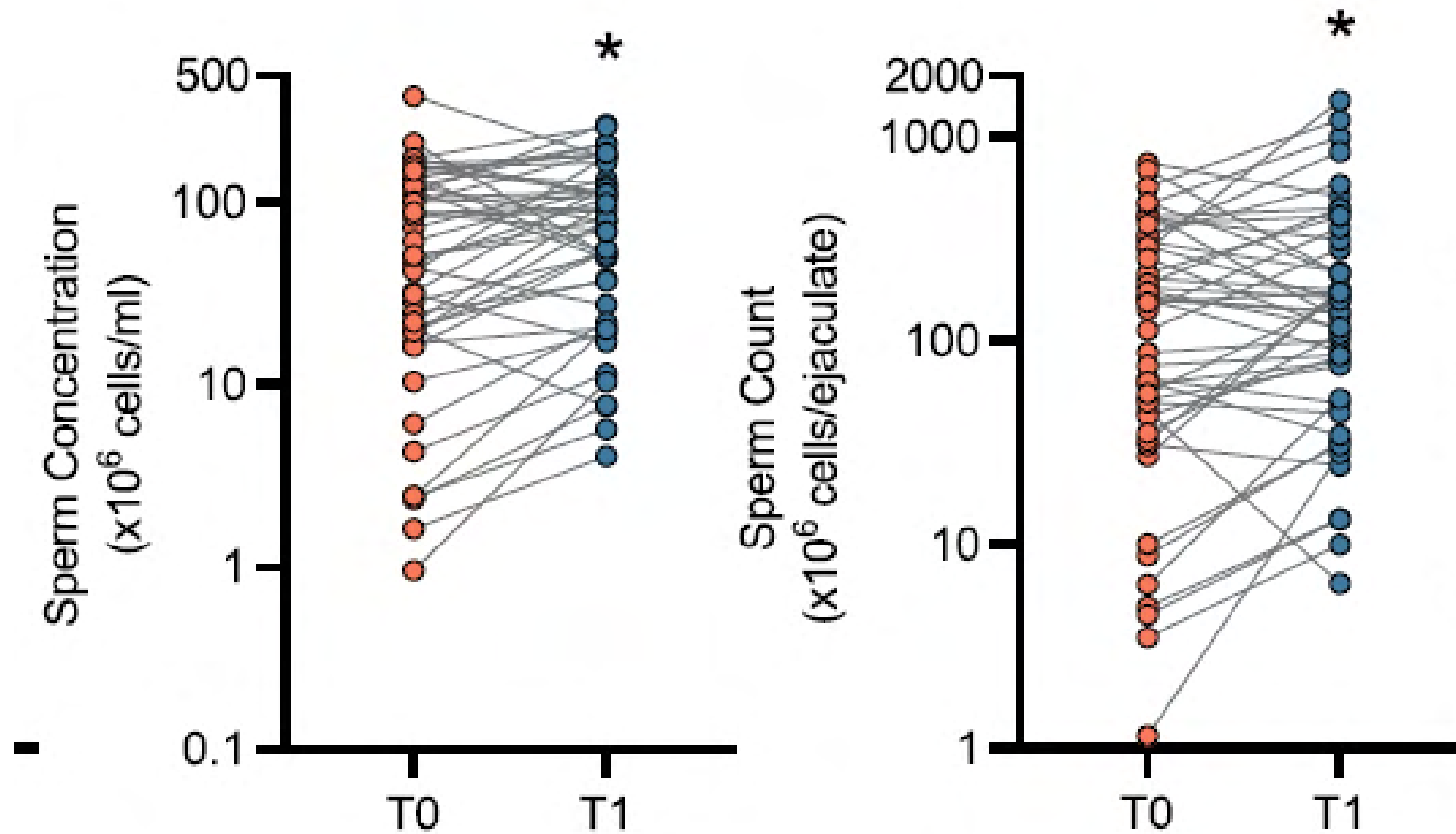
Source: Craig J et al Fert Steril 2017

BMI and sperm count in men

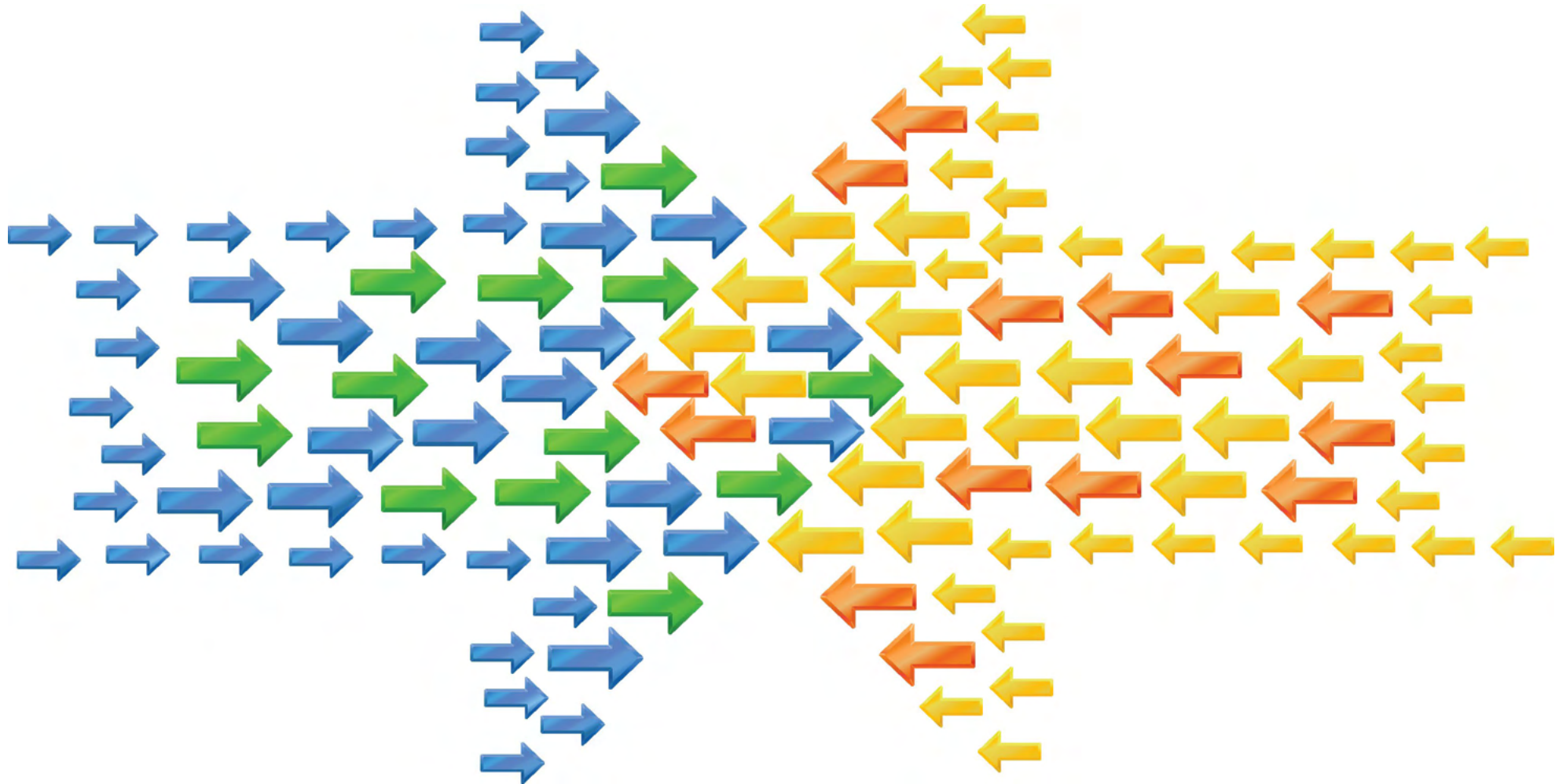


Source: Kold-Jensen Fert Steril 2004

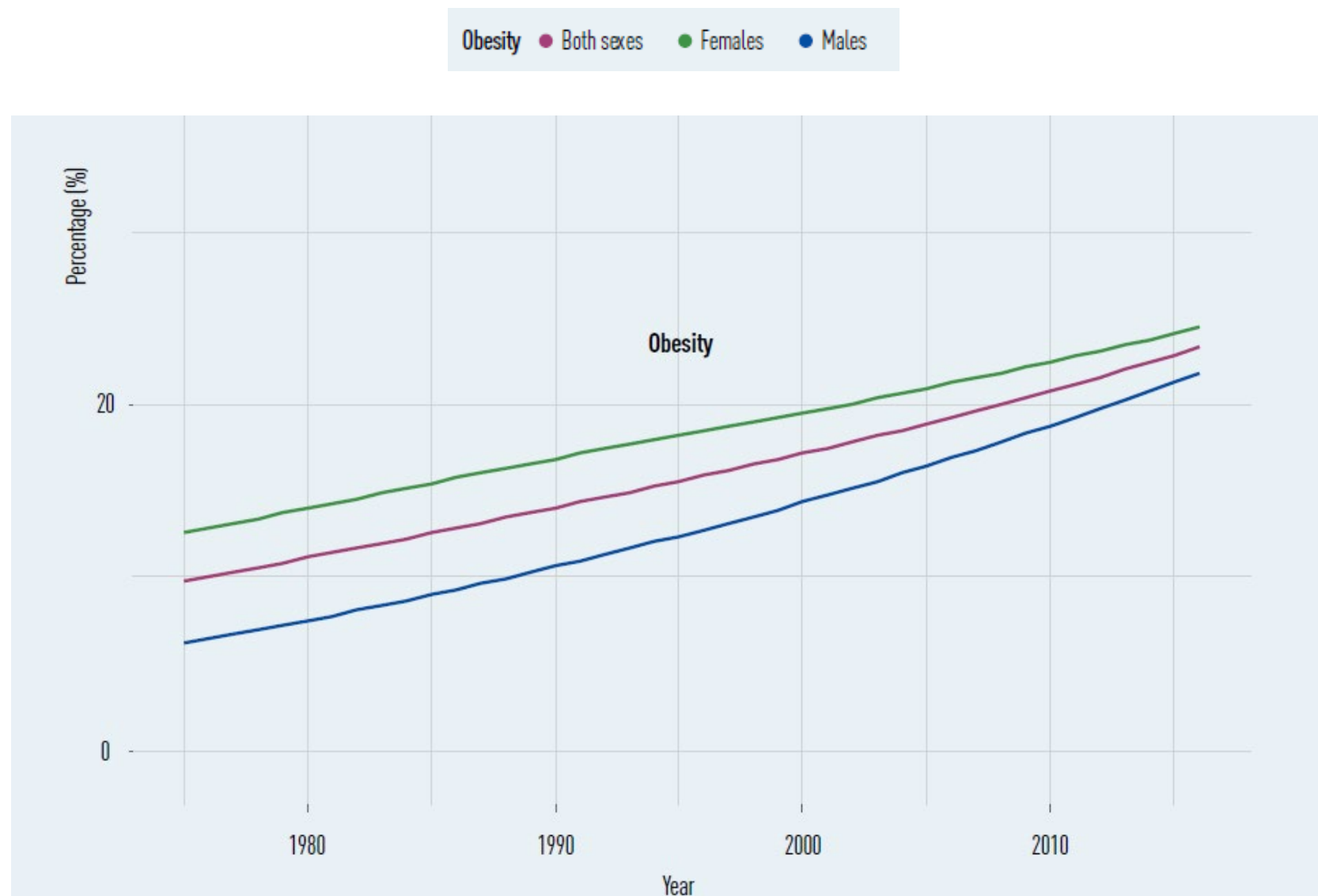
Weight loss improves sperm concentration and count



Obesity epidemic and infertility



European prevalence of obesity in adults

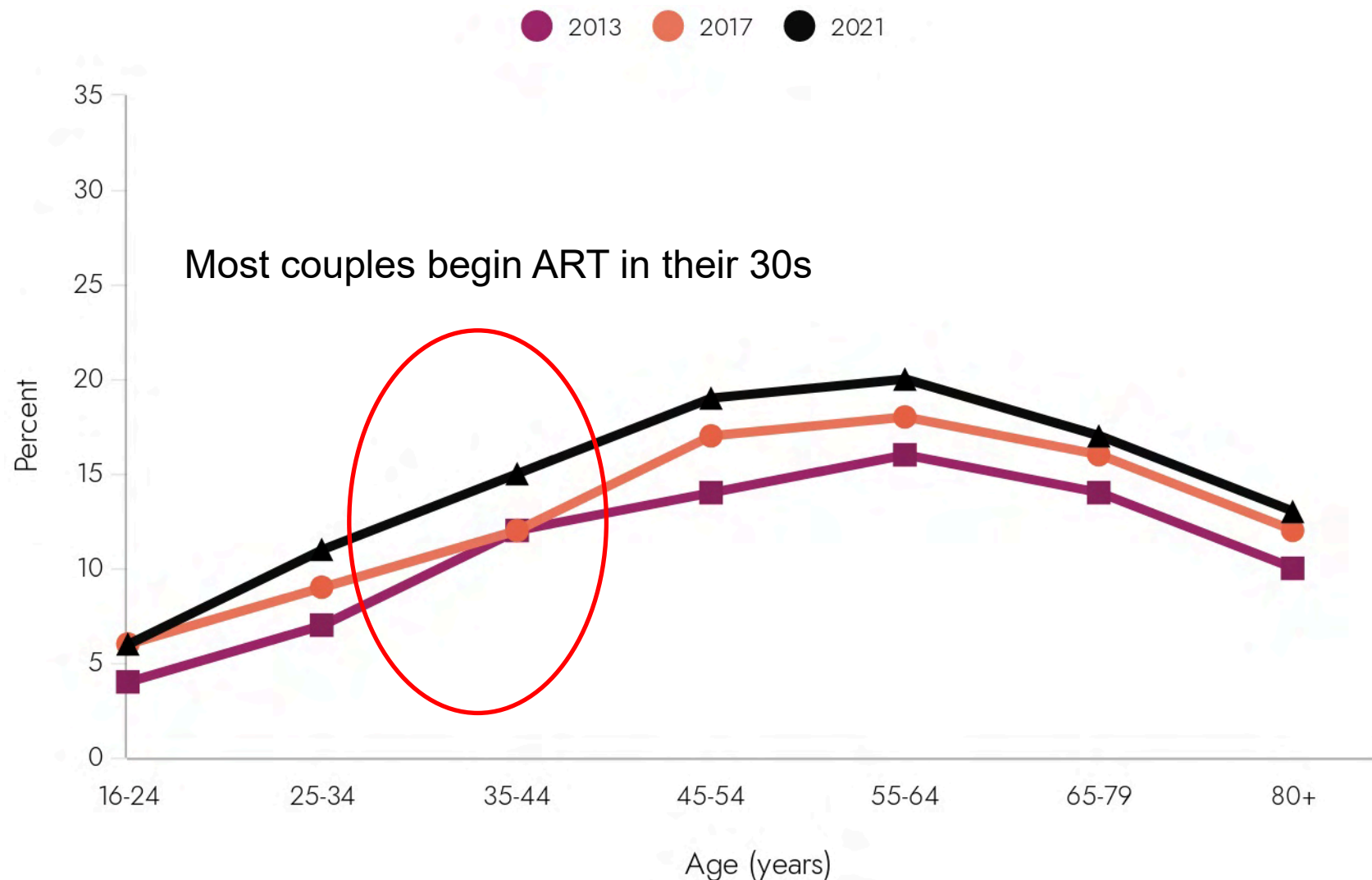


Source: WHO European Regional Obesity Report 2022. Copenhagen: WHO Regional Office for Europe

Denmark: time trends in obesity by age in women

100%

OF VALUES
ARE
HIGHER IN
2021
THAN
2013



BMI and ART access

- Ongoing discussion if access to ART be limited to women without obesity
- Most countries and clinics have cut-offs, but there is not a consensus
 - Average value of 38 kg/m²
 - Assessed on individual basis
- Raises important issues of bias, stigma, social justice

Conclusions

- Obesity, as a chronic and relapsing disease, affects all body systems, including fertility in women *and* men
- In women, obesity is associated with a longer time to pregnancy and lower success rates following ART
 - Results are based only on BMI
 - Studies vary widely in quality
- In men, obesity is associated with reduced sperm concentration and count
- BMI tends to increase with age, and most individuals start ART in their 30s
- BMI is a criteria for ART access (in addition to age)

Perspective and discussion

Thank you

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