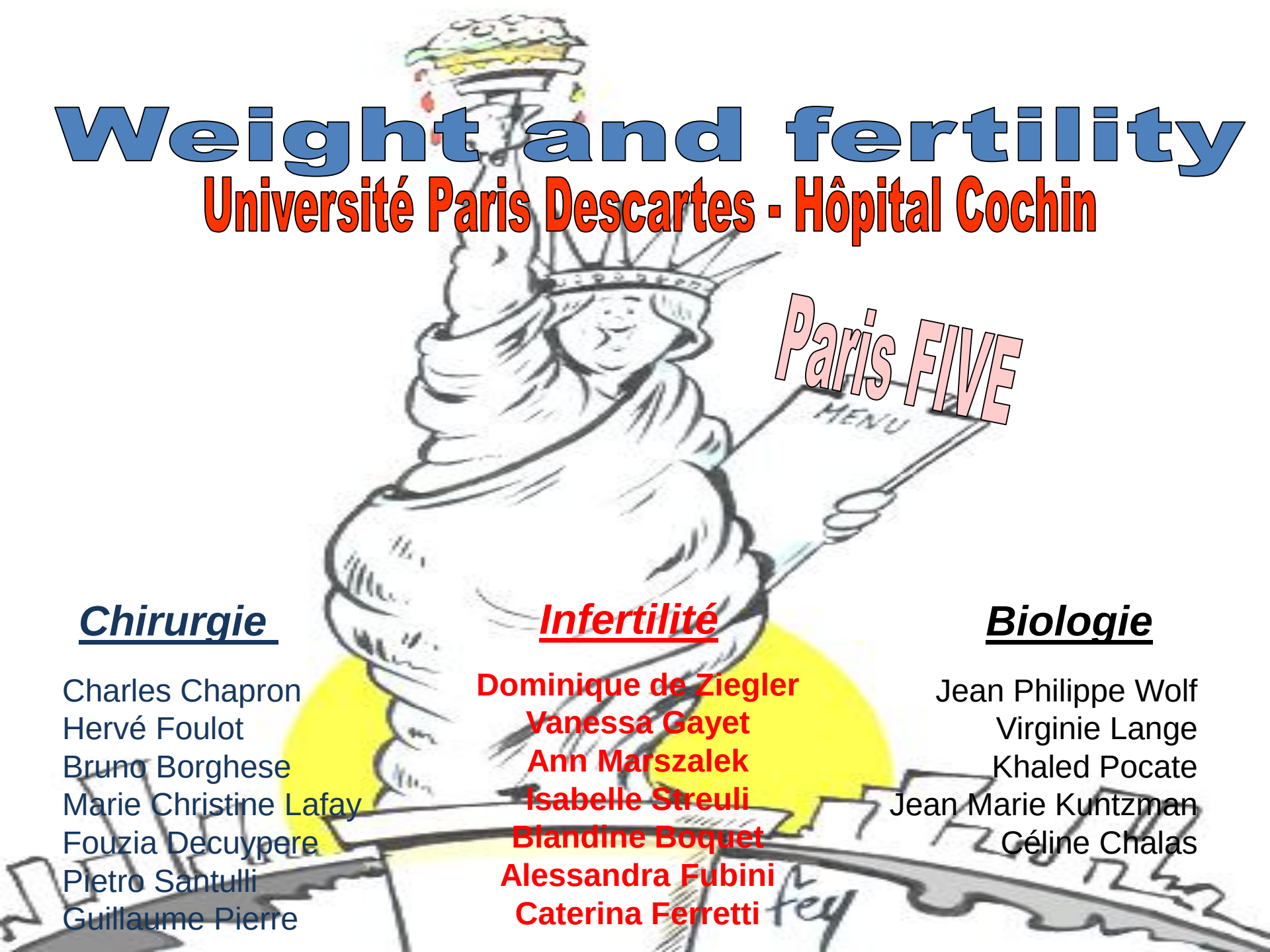
Weight and fertility

Université Paris Descartes - Hôpital Cochin



Chirurgie

Charles Chapron
Hervé Foulot
Bruno Borghese
Marie Christine Lafay
Fouzia Decuypere
Pietro Santulli
Guillaume Pierre

Infertilité

Dominique de Ziegler
Vanessa Gayet
Ann Marszalek
Isabelle Streuli
Blandine Boquet
Alessandra Fubini
Caterina Ferretti

Biologie

Jean Philippe Wolf
Virginie Lange
Khaled Pocate
Jean Marie Kuntzman
Céline Chalas

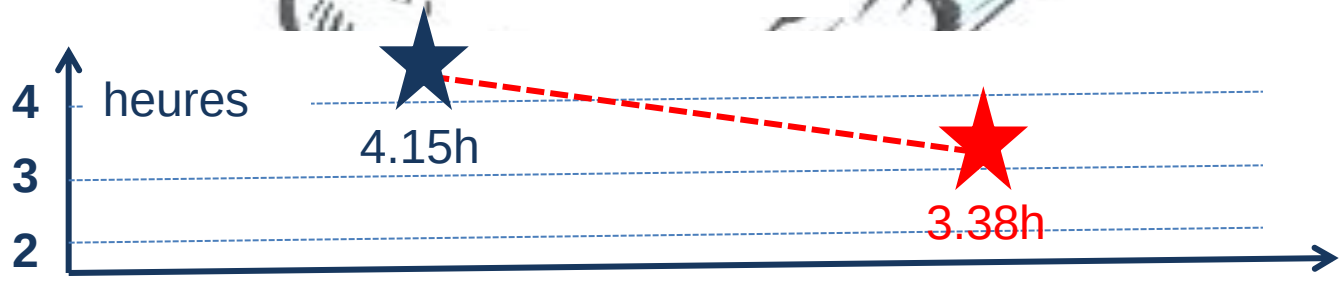
Weight and fertility

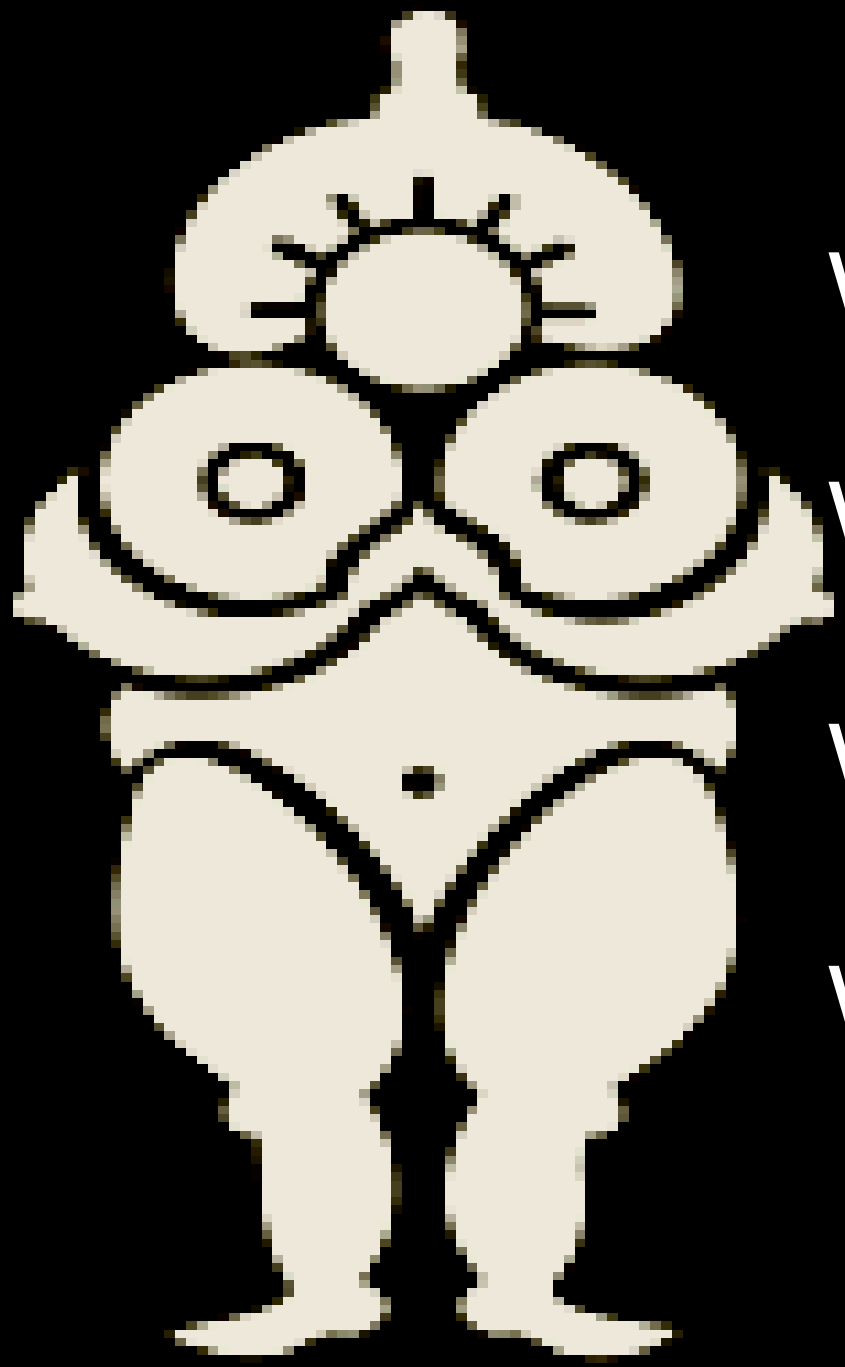
Université Paris Descartes - Hôpital Cochin

Conflits d'intérêt

Je suis génétiquement programmé à devenir obèse et le serais sans mesures draconiennes.

Marathon





Wt and fertility

Wt, FSH and ovulation

Wt and implantation

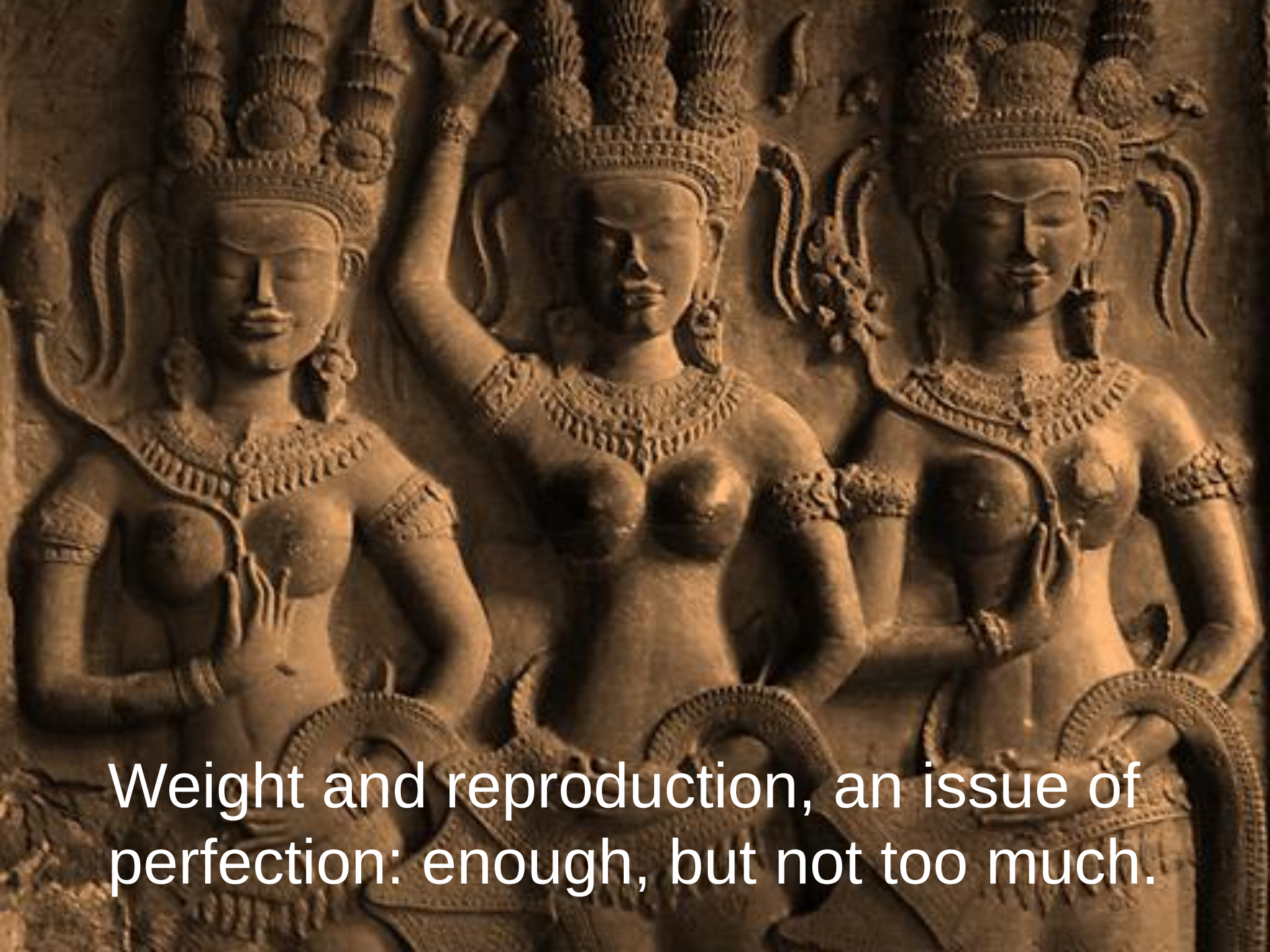
Wt loss and fertility

Wt and fertility

Wt, FSH and ovulation

Wt and implantation

Wt loss and fertility



Weight and reproduction, an issue of perfection: enough, but not too much.

Weight and fertility

Odds ratios (OR) for sub fecundity (TTP >12 months)

Human Reproduction Vol.22, No.6 pp. 1634–1637, 2007
Advance Access publication on March 7, 2007
doi:10.1093/humrep/dem035

Subfecundity in overweight and obese couples

C.H.Ramlau-Hansen[1,2,5], A.M.Thulstrup[2], E.A.Nohr[3], J.P.Bonde[2], T.I.A.Sørensen[4] and J.Olsen[1]

Danish National Birth Cohort were interviewed during and 18 months after pregnancy. Information on body mass index (BMI) and waiting time to pregnancy (TTP) was available for **47,835** couples

Ramlau CH et al. Human Reprod 2007;22:1634-7.

Weight and fertility

Odds ratios (OR) for sub fecundity (TTP >12 months)

Table 1. Odds ratios (ORs) for subfecundity (time to p of > 12 months) according to categories of men's and women's BMI

Women's BMI (kg/m^2)	Men's BMI (kg/m^2)				
	<18.50 OR (95% CI)	18.50–24.99 OR (95% CI)	25.00–29.99 OR (95% CI)	≥30 OR (95% CI)	Women[a] OR (95% CI)
<18.50	N/A	1.00 (0.82–1.22)	1.20 (0.94–1.53)	1.95 (1.06–3.58)	1.02 (0.88 to 1.18)
18.50–24.99	0.69 (0.34–1.38)	1.00 (Reference group)	1.18 (1.10–1.27)	1.53 (1.32–1.77)	1.00
25.00–29.99	1.63 (0.67–4.01)	1.36 (1.23–1.50)	1.41 (1.28–1.56)	1.79 (1.49–2.14)	1.27 (1.18–1.36)
≥30	3.79 (1.48–9.74)	1.74 (1.51–2.02)	2.07 (1.82–2.36)	2.74 (2.27–3.30)	1.78 (1.63–1.95)
Men[b]	0.97 (0.61–1.54)	1.00	1.15 (1.09–1.22)	1.49 (1.34–1.64)	—

N/A, too few observations.

All OR's are adjusted for men's and women's age, number of previous pregnancies, and socio-economic group. For the marginal values, we also adjusted for partners BMI.

[a]OR for $trend_{(normal\ weight,\ overweight,\ obese)} = 1.32\ (1.26–1.37),\ P < 0.001$.

[b]OR for $trend_{(normal\ weight,\ overweight,\ obese)} = 1.19\ (1.14–1.24),\ P < 0.001$.

Ramlau CH et al. Human Reprod 2007;22:1634-7.

Weight and fertility

Odds ratios (OR) for sub fecundity (TTP >12 months)

Table 1. Odds ratios (ORs) for subfecundity (time to p of > 12 months) acc gories o MI

Women's BMI (kg/m^2)	Men's BMI (kg/m^2)				
	<18.50 OR (95% CI)	18.50–24.99 OR (95% CI)	25.00–29.99 OR (95% CI)	≥30 OR (95% CI)	Women[a] OR (95% CI)
<18.50	N/A	1.00 (0.82–1.22)	1.20 (0.94–1.53)	1.95 (1.06–3.58)	1.02 (0.88 to 1.18)
18.50–24.99	0.69 (0.34–1.38)	1.00 (Reference group)	1.18 (1.10–1.27)	1.53 (1.32–1.77)	1.00
25.00–29.99	1.63 (0.67–4.01)	1.36 (1.23–1.50)	1.41 (1.28–1.56)	1.79 (1.49–2.14)	1.27 (1.18–1.36)
≥30	3.79 (1.48–9.74)	1.74 (1.51–2.02)	2.07 (1.82–2.36)	2.74 (2.27–3.30)	1.78 (1.63–1.95)
Men[b]	0.97 (0.61–1.54)	1.00	1.15 (1.09–1.22)	1.49 (1.34–1.64)	—

N/A, too few observations.

All OR's are adjusted for men's and women's age, number of previous pregnancies, and socio-economic group. For the marginal values, we also adjusted for partners BMI.

[a]OR for trend$_{\text{(normal weight, overweight, obese)}}$ = 1.32 (1.26–1.37), $P < 0.001$.

[b]OR for trend$_{\text{(normal weight, overweight, obese)}}$ = 1.19 (1.14–1.24), $P < 0.001$.

Ramlau CH et al. Human Reprod 2007;22:1634-7.

Weight and fertility

Odds ratios (OR) for sub fecundity (TTP >12 months)

Table 1. Odds ratios (ORs) for subfecundity (time to p of > 12 months) acc gories o MI

Women's BMI (kg/m^2)	Men's BMI (kg/m^2)				
	<18.50 OR (95% CI)	18.50–24.99 OR (95% CI)	25.00–29.99 OR (95% CI)	≥30 OR (95% CI)	Women[a] OR (95% CI)
<18.50	N/A	1.00 (0.82–1.22)	1.20 (0.94–1.53)	1.95 (1.06–3.58)	1.02 (0.88 to 1.18)
18.50–24.99	0.69 (0.34–1.38)	1.00 (Reference group)	1.18 (1.10–1.27)	1.53 (1.32–1.77)	1.00
25.00–29.99	1.63 (0.67–4.01)	1.36 (1.23–1.50)	1.41 (1.28–1.56)	1.79 (1.49–2.14)	1.27 (1.18–1.36)
≥30	3.79 (1.48–9.74)	1.74 (1.51–2.02)	2.07 (1.82–2.36)	2.74 (2.27–3.30)	1.78 (1.63–1.95)
Men[b]	0.97 (0.61–1.54)	1.00	1.15 (1.09–1.22)	1.49 (1.34–1.64)	—

N/A, too few observations.

All OR's are adjusted for men's and women's age, number of previous pregnancies, and socio-economic group. For the marginal values, we also adjusted for partners BMI.

[a]OR for trend$_{(\text{normal weight, overweight, obese})}$ = 1.32 (1.26–1.37), $P < 0.001$.

[b]OR for trend$_{(\text{normal weight, overweight, obese})}$ = 1.19 (1.14–1.24), $P < 0.001$.

Ramlau CH et al. Human Reprod 2007;22:1634-7.

Weight and fertility

Odds ratios (OR) for sub fecundity (TTP >12 months)

Table 1. Odds ratios (ORs) for subfecundity (time to p of > 12 months) acc gories o MI

Women's BMI (kg/m^2)	Men's BMI (kg/m^2)				
	<18.50 OR (95% CI)	18.50–24.99 OR (95% CI)	25.00–29.99 OR (95% CI)	≥30 OR (95% CI)	Women[a] OR (95% CI)
<18.50	N/A	1.00 (0.82–1.22)	1.20 (0.94–1.53)	1.95 (1.06–3.58)	1.02 (0.88 to 1.18)
18.50–24.99	0.69 (0.34–1.38)	1.00 (Reference group)	1.18 (1.10–1.27)	1.53 (1.32–1.77)	1.00
25.00–29.99	1.63 (0.67–4.01)	1.36 (1.23–1.50)	1.41 (1.28–1.56)	1.79 (1.49–2.14)	1.27 (1.18–1.36)
≥30	3.79 (1.48–9.74)	1.74 (1.51–2.02)	2.07 (1.82–2.36)	2.74 (2.27–3.30)	1.78 (1.63–1.95)
Men[b]	0.97 (0.61–1.54)	1.00	1.15 (1.09–1.22)	1.49 (1.34–1.64)	—

N/A, too few observations.

All OR's are adjusted for men's and women's age, number of previous pregnancies, and socio-economic group. For the marginal values, we also adjusted for partners BMI.

[a]OR for trend$_{(\text{normal weight, overweight, obese})}$ = 1.32 (1.26–1.37), $P < 0.001$.

[b]OR for trend$_{(\text{normal weight, overweight, obese})}$ = 1.19 (1.14–1.24), $P < 0.001$.

Ramlau CH et al. Human Reprod 2007;22:1634-7.

Weight and fertility

Human Reproduction Vol.22, No.2 pp. 414–420, 2007 doi:10.1093/humrep/del400
Advance Access publication November 9, 2006.

Obesity and time to pregnancy

D.C.Gesink Law[1,2,4], R.F.Maclehose[3] and M.P.Longnecker[1]

[1]Epidemiology Branch, National Institute of Environmental Health Sciences, National Institutes of Health, Department of Health and Human Services, Research Triangle Park, NC, [2]Department of Microbiology, Montana State University, Bozeman, MT and [3]Biostatistics Branch, National Institute of Environmental Health Sciences, National Institutes of Health, Department of Health and Human Services, Research Triangle Park, NC, USA

n = 7,327 pregnancies

Table III. Association between body mass index (BMI) and time to pregnancy based on 7327 pregnancies for women in the Collaborative Perinatal Project who were trying to become pregnant[a]

BMI model[b]	FOR (95% CI)[c] Underweight	FOR (95% CI)[c] Optimal	FOR (95% CI)[c] Overweight	FOR (95% CI)[c] Obese
Age-adjusted model (n = 7327)	0.94 (0.86, 1.03)	1	0.84 (0.77, 0.92)	0.72 (0.63, 0.83)
Final adjusted model[d] (n = 7327)	0.95 (0.87, 1.04)	1	0.92 (0.84, 1.01)	0.82 (0.72, 0.95)
Final model by smoking[e]				
Non-smoker	1.03 (0.90, 1.16)	1	0.89 (0.79, 1.00)	0.81 (0.67, 0.99)
Smoker	0.89 (0.78, 1.01)		0.97 (0.85, 1.11)	0.83 (0.68, 1.02)

Gesink DC et al. Human Reprod 2007;22:714-10.

Weight and fertility

Human Reproduction, Vol.25, No.1 pp. 253–264, 2010
Advanced Access publication on October 14, 2009 doi:10.1093/humrep/dep360

human reproduction

ORIGINAL ARTICLE *Reproductive epidemiology*

An internet-based prospective study of body size and time-to-pregnancy

Lauren A. Wise[1,2,5], Kenneth J. Rothman[1,3], Ellen M. Mikkelsen[4], Henrik Toft Sørensen[1,4], Anders Riis[4], and Elizabeth E. Hatch[1]

[1]Department of Epidemiology, Boston University School of Public Health, Boston, MA, USA [2]Slone Epidemiology Center, Boston University, 1010 Commonwealth Ave, 4th floor, Boston, MA 02215, USA [3]RTI Health Solutions, Research Triangle Park, Durham, NC, USA [4]Department of Clinical Epidemiology, Aarhus University Hospital, Aarhus, Denmark

[5]Correspondence address. E-mail: lwise@bu.edu

n=1,651

Wise LA et al. Human Reprod 2010;25:253-64.

Weight and fertility

Table IV Anthropometric measures at baseline and time to pregnancy, by parity status at baseline

Nulliparous

Parous

BMI (kg/m²)	No.	No.	djusted model[a] FR	95% CI	Adjusted model[b] FR	95% CI	s		Adjusted model[a] FR	95% CI	Adjusted model[b] FR	95% CI
<20	98	637	0.76	0.60–0.98	0.82	0.63–1.06	63	206	1.43	1.00–2.03	1.61	1.08–2.39
20–24	441	2411	1.00	(ref.)	1.00	(ref.)	225	1005	1.00	(ref.)	1.00	(ref.)
25–29	101	742	0.73	0.57–0.93	0.65	0.49–0.86	98	436	1.00	0.75–1.33	0.85	0.61–1.17
30–34	36	335	0.60	0.41–0.88	0.51	0.32–0.82	49	234	0.89	0.61–1.31	0.68	0.43–1.09
≥35	20	249	0.46	0.28–0.76	0.39	0.22–0.69	18	85	1.00	0.56–1.79	0.73	0.38–1.39
Weight change since age 17 years (kg)												
<−5	30	207	0.78	0.51–1.19	0.83	0.53–1.30	18	35	2.88	1.37–6.08	3.01	1.40–6.48
−5 to 4	222	1212	1.00	(ref.)	1.00	(ref.)	139	537	1.00	(ref.)	1.00	(ref.)
5–9	235	1425	0.90	0.73–1.10	0.88	0.72–1.08	95	411	0.92	0.67–1.25	0.91	0.67–1.25
10–14	112	673	0.96	0.74–1.25	0.96	0.74–1.24	86	413	0.77	0.56–1.06	0.77	0.56–1.06
≥15	97	857	0.64	0.49–0.83	0.65	0.49–0.85	115	570	0.76	0.56–1.03	0.76	0.56–1.04
Waist circumference (cm)												
<74	239	1500	1.00	(ref.)	1.00	(ref.)	98	441	1.00	(ref.)	1.00	(ref.)
74–79	149	838	1.02	0.77–1.34	1.03	0.78–1.36	82	393	0.99	0.60–1.64	1.13	0.67–1.90
80–86	147	806	1.18	0.91–1.53	1.24	0.95–1.62	112	468	1.02	0.63–1.63	1.26	0.76–2.07
≥87	161	1230	0.90	0.68–1.18	1.32	0.89–1.93	161	664	1.14	0.69–1.88	1.67	0.94–2.98
WHR												
<0.75	197	1187	1.00	(ref.)	1.00	(ref.)	77	378	1.00	(ref.)	1.00	(ref.)
0.75–0.79	137	1104	0.86	0.61–1.22	0.89	0.63–1.25	86	342	1.24	0.82–1.89	1.29	0.85–1.94
0.80–0.84	157	786	1.14	0.81–1.62	1.23	0.88–1.73	114	579	1.17	0.72–1.89	1.22	0.75–2.00
≥0.85	205	1297	1.04	0.80–1.36	1.18	0.91–1.54	176	667	1.40	0.94–2.09	1.53	0.98–2.39

FR = fecundability ratio; CI = confidence interval; No. = number of pregnancies.
[a]Adjusted for age, partner's age, cycle regularity, cycle length, partner's BMI (in female BMI analysis only), physical activity, smoking, alcohol intake and intercourse frequency.
[b]Adjusted for factors in 'a' as well as waist circumference (in BMI analyses), female BMI (in all analyses except weight change) and BMI at age 17 (in weight gain analyses).

Wise LA et al. Human Reprod 2010;25:253-64.

Weight and fertility

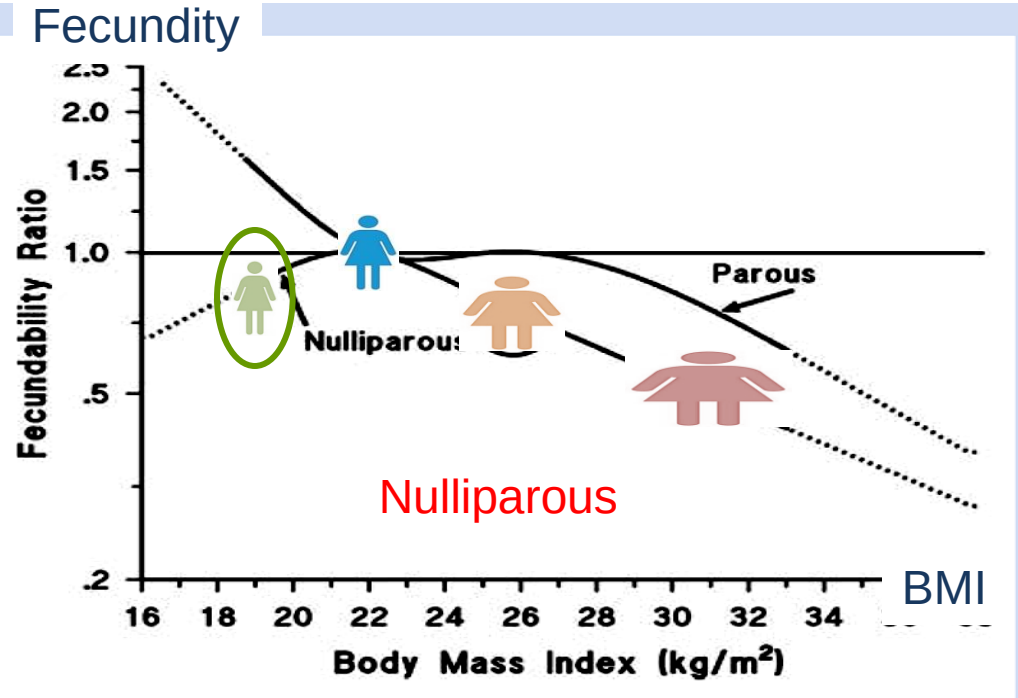


Figure 1 Relation between female BMI and fecundability, by parity status at baseline, fitted by restricted cubic splines.
Reference level for fecundability ratio is a BMI of 22 kg/m^2. The dotted line segments represent ranges beyond the last knot used in the spline fitting, denoting tail ranges that have less information. The curves are adjusted for age, partner's age, cycle regularity, cycle length, partner's BMI, physical activity, smoking, alcohol intake, intercourse frequency and waist circumference.

Wise LA et al. Human Reprod 2010;25:253-64.

Weight and fertility

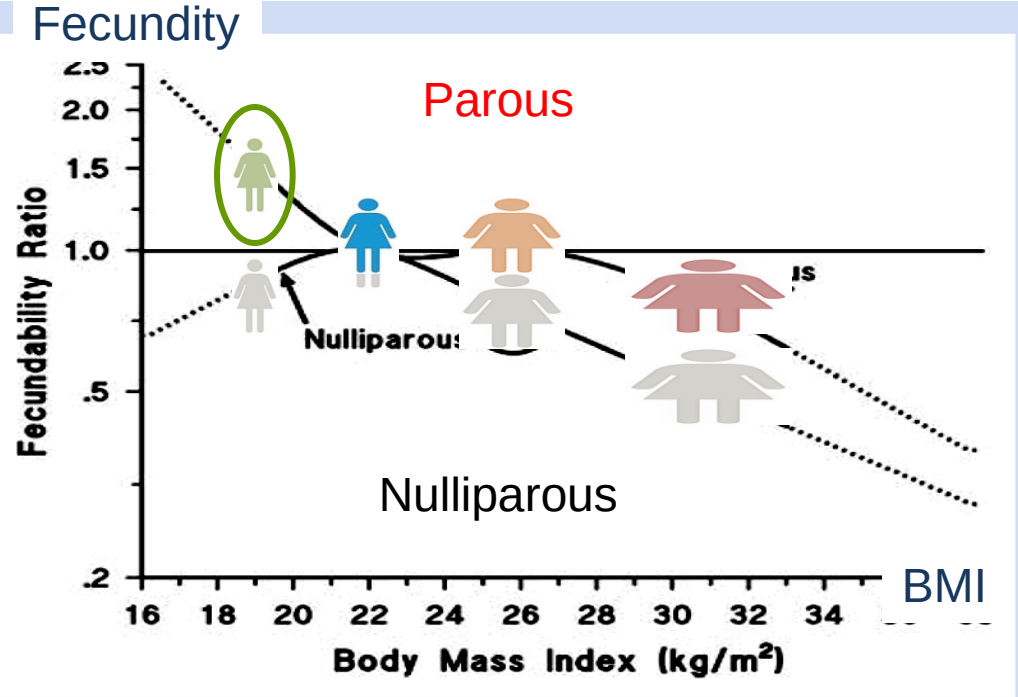


Figure 1 Relation between female BMI and fecundability, by parity status at baseline, fitted by restricted cubic splines.
Reference level for fecundability ratio is a BMI of 22 kg/m^2. The dotted line segments represent ranges beyond the last knot used in the spline fitting, denoting tail ranges that have less information. The curves are adjusted for age, partner's age, cycle regularity, cycle length, partner's BMI, physical activity, smoking, alcohol intake, intercourse frequency and waist circumference.

Wise LA et al. Human Reprod 2010;25:253-64.

Weight and fertility

Human Reproduction, Vol.24, No.1 pp. 226–232, 2009
Advanced Access publication on September 26, 2008 doi:10.1093/humrep/den357

human reproduction

ORIGINAL ARTICLE *Reproductive epidemiology*

Waiting time to pregnancy according to maternal birthweight and prepregnancy BMI

E.A. Nohr[1,6], M. Vaeth[2], S. Rasmussen[3], C.H. Ramlau-Hansen[4], and J. Olsen[1,5]

[1]Department of Epidemiology, Institute of Public Health, University of Aarhus, Vennelyst Boulevard 6, Building 260, 8000 Aarhus C, Denmark [2]Department of Biostatistics, Institute of Public Health, University of Aarhus, 8000 Aarhus C, Denmark [3]Department of Health Statistics, National Board of Health, 2300 Copenhagen S, Denmark [4]Department of Occupational Medicine, Aarhus University Hospital, 8000 Aarhus C, Denmark [5]Department of Epidemiology, UCLA School of Public Health, Los Angeles, CA, USA

[6]Correspondence address. Tel: +45 8942 6087; Fax: +45 8613 1580; E-mail: ean@soci.au.dk

Danish cohort: n = 92,274

Nohr EA. Human Reprod 2009;24:226-32

Weight and fertility

Table I Waiting time to pregnancy by categories of maternal birthweight and timing of birth

	Maternal birthweight											
	Women born term						Women born preterm					
	Total	≤2500 g	25–3000 g	30–4000 g	40–4500 g	>4500 g	Total	≤1500 g	15–2000 g	20–3000 g	30–3500 g	>3500 g
Waiting time to pregnancy												
TTP	9 859	742	3422	13 836	1551	308	2185	97	282	1439	288	79
		%	%	%	%	%		%	%	%	%	%
<6 months	12 682	58.4	62.4	64.6	64.5	58.1	1383	59.8	62.8	63.6	63.9	62.0
6–12 months	2637	14.0	13.8	12.9	15.0	12.7	289	11.3	12.4	13.8	13.2	7.6
>12 mo	2388	14.2	12.0	12.1	10.1	15.6	261	20.6	11.7	11.1	11.8	17.7
Not planned	2085	12.9	11.5	10.1	9.9	13.6	237	8.3	13.1	10.7	9.7	12.7
Missing	67	0.5	0.4	0.3	0.5	0.0	15	0.0	0.0	0.8	1.4	0.0

In all birthweight categories, the upper limit is contained in the interval, i.e 25–3000 is 2501–3000.

Danish cohort: n = 92,274

Nohr EA. Human Reprod 2009;24:226-32

Weight and fertility

Table I Waiting time to pregnancy by categories of maternal birthweight and timing of birth

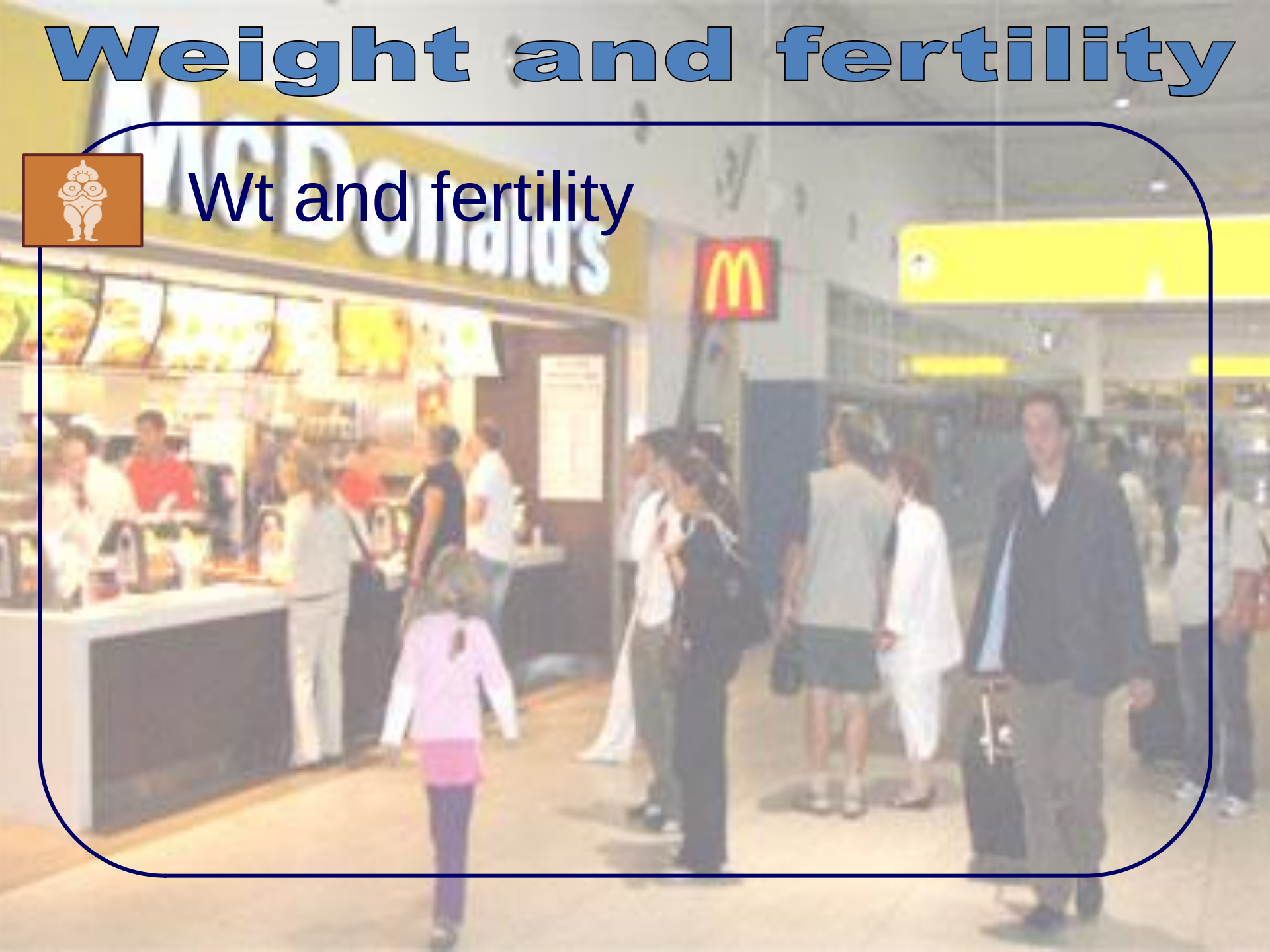
	Mater…						Women born preterm					
	Wom…											
	Total	≤2500 g	25–3000 g	30–4000 g	40–4500 g	>4500 g	Total	≤1500 g	15–2000 g	20–3000 g	30–3500 g	>3500 g
Waiting time to pregnancy												
TTP	9 859	742	3422	13 836	1551	308	2185	97	282	1439	288	79
		%	%	%	%	%		%	%	%	%	%
<6 months	12 682	58.4	62.4	64.6	64.5	58.1	1383	59.8	62.8	63.6	63.9	62.0
6–12 months	2637	14.0	13.8	12.9	15.0	12.7	289	11.3	12.4	13.8	13.2	7.6
>12 mo	2388	14.2	12.0	12.1	10.1	15.6	261	20.6	11.7	11.1	11.8	17.7
Not planned	2085	12.9	11.5	10.1	9.9	13.6	237	8.3	13.1	10.7	9.7	12.7
Missing	67	0.5	0.4	0.3	0.5	0.0	15	0.0	0.0	0.8	1.4	0.0

In all birthweight categories, the upper limit is contained in the interval, i.e 25–3000 is 2501–3000.

Nohr EA. Human Reprod 2009;24:226-32

Weight and fertility

Wt and fertility



Weight and fertility

Wt and fertility

L'**hypotrophie** inhibe la production de GnRH par l'hypothalamus basal dans un intérêt de sauvegarde maternelle.

L'**hypertrophie** (obésité) a des effets plus sournois sur la fertilité du couple.

Wt and fertility

Wt, FSH and ovulation

Wt and implantation

Wt loss and fertility

Weight and fertility

FERTILITY AND STERILITY®
VOL. 80, NO. 1, JULY 2003

Published by Elsevier Inc.
Printed on acid-free paper in U.S.A.

OVULATION INDUCTION

Effect of obesity on recombinant follicle-stimulating hormone absorption: subcutaneous versus intramuscular administration

Michael P. Steinkampf, M.D.,[a] Karen R. Hammond, M.S.N., C.R.N.P.,[a] John E. Nichols, M.D.,[a,b] and Scott H. Slayden, M.D.[a,c]

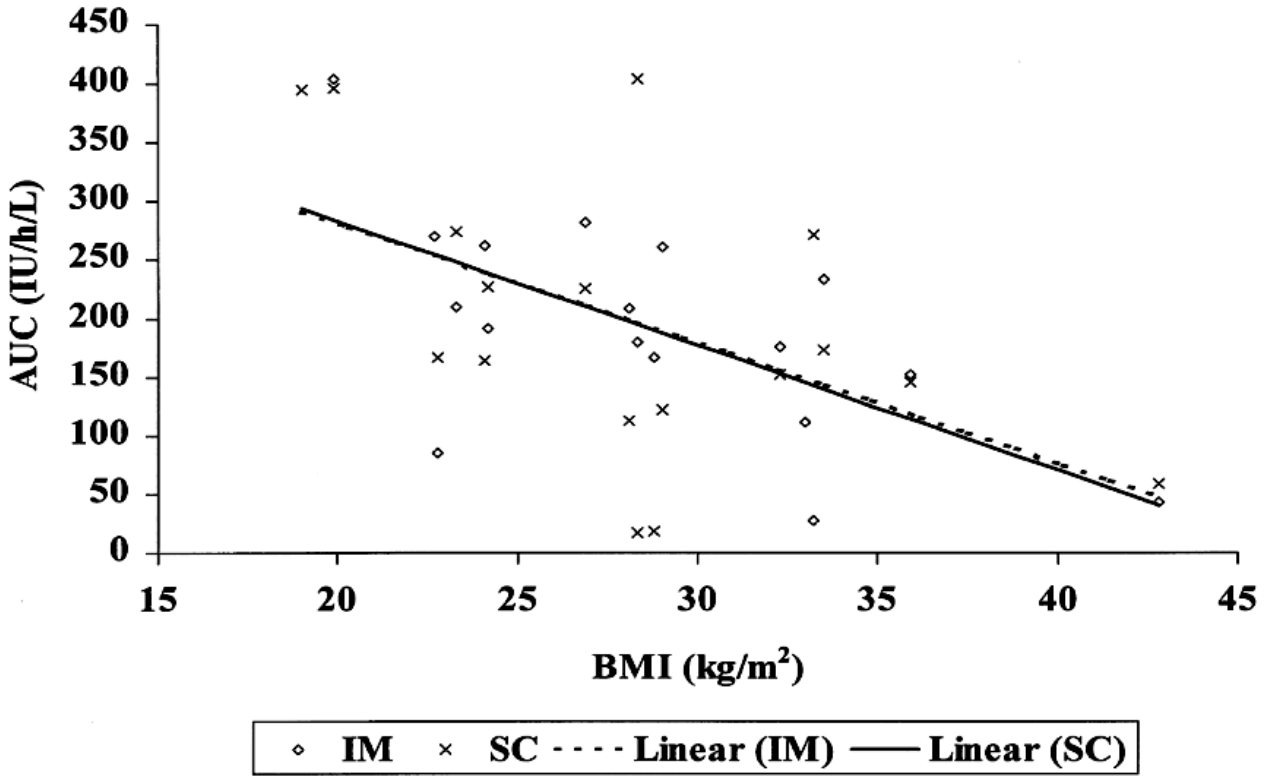
Department of Obstetrics and Gynecology, University of Alabama at Birmingham, Birmingham, Alabama

Weight serum FSH

Steinkampf MP et al. FS 2003

Weight and fertility

Correlation between BMI and extent of absorption (area under curve, or AUC) after 300 IU of rFSH was injected IM or SC Strength of linear relationships tested with Pearson product moment correlation. $R_{IM} = -0.637$, $P=.0059$; $R_{SC} = -0.526$, $P=.030$.

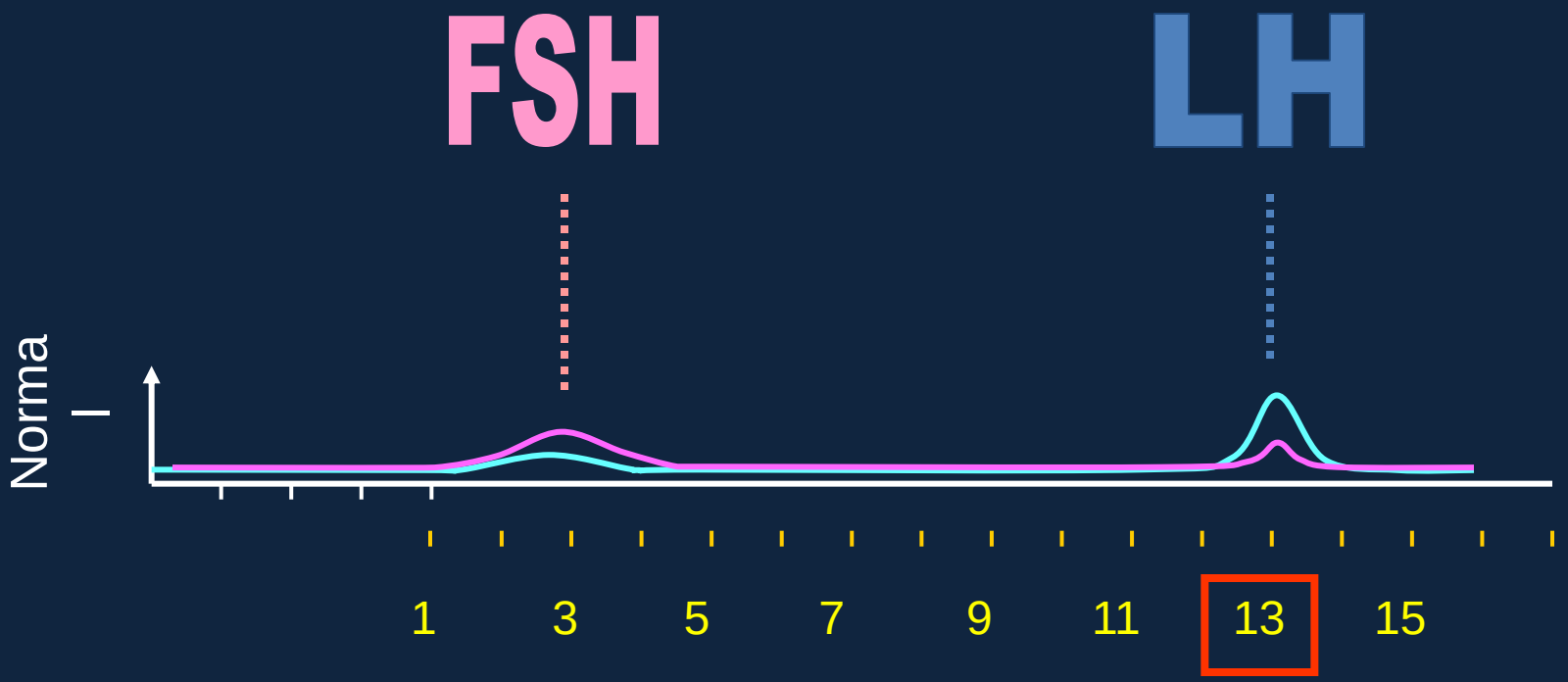


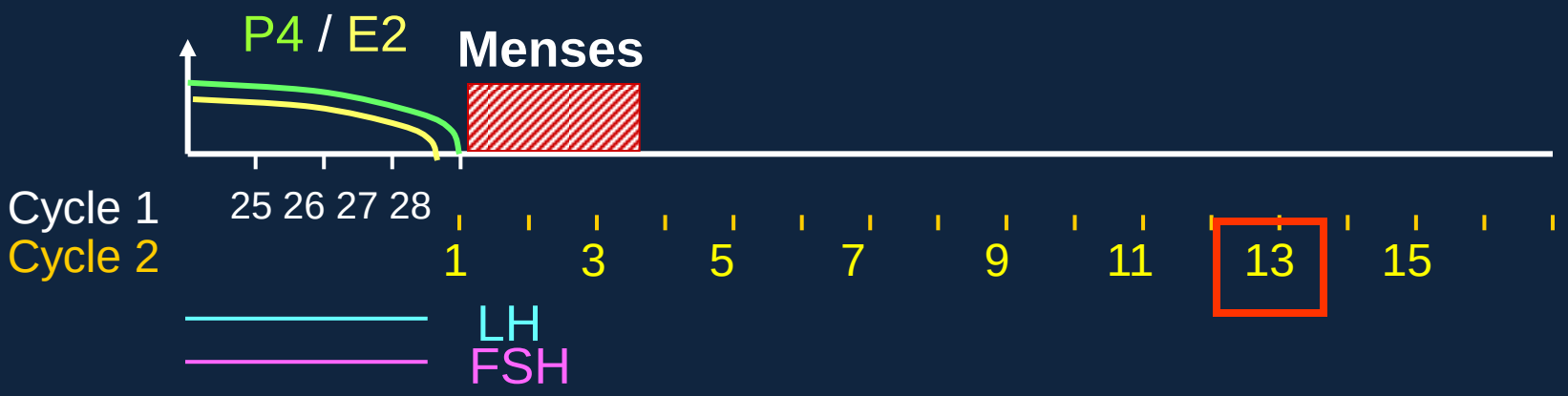
Steinkampf. Obesity and rFSH absorption: SC vs. IM. Fertil Steril 2003.

Weight serum FSH

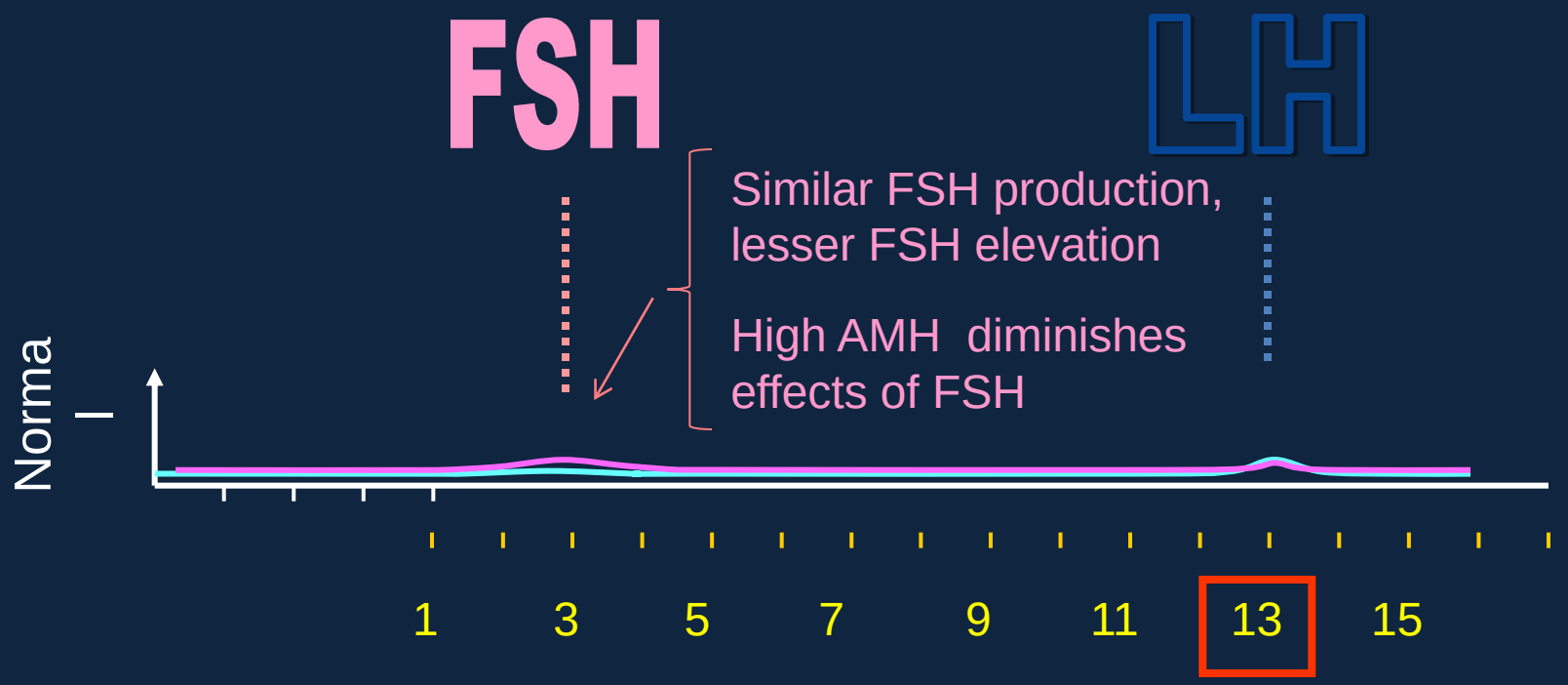
Steinkampf MP et al. FS 2003

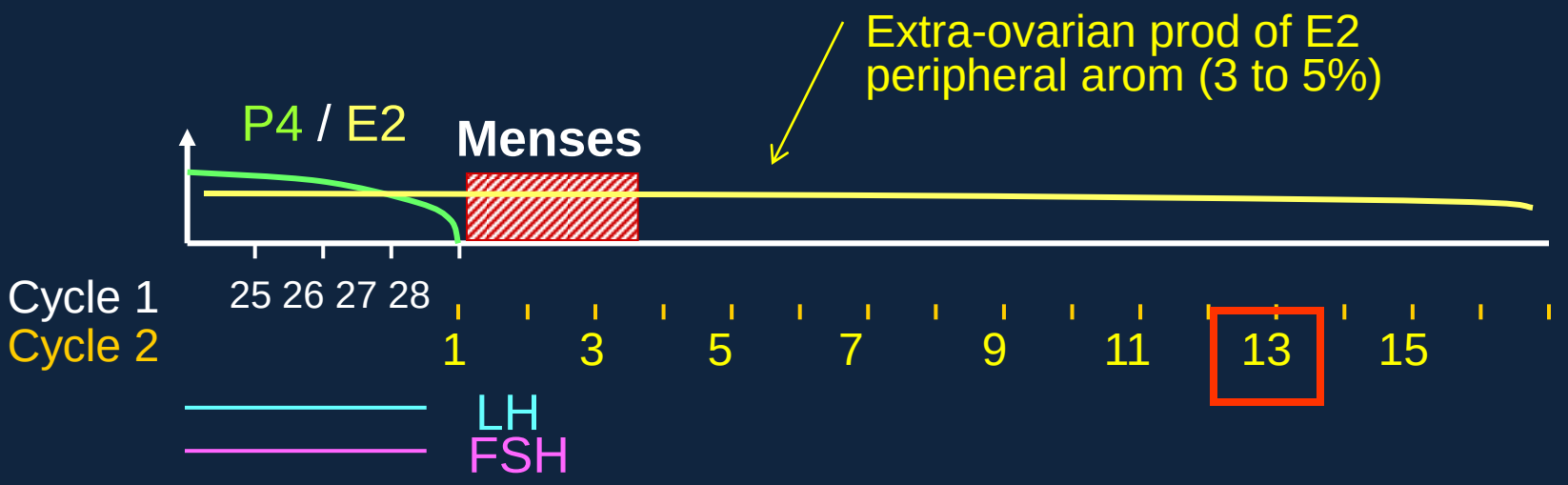
Weight and fertility





Weight and fertility





Weight and fertility

DOI: 10.1111/j.1471-0528.2006.01034.x
www.blackwellpublishing.com/bjog

Fertility and assisted reproduction

The influence of body weight on response to ovulation induction with gonadotrophins in 335 women with World Health Organization group II anovulatory infertility

AH Balen,[a] P Platteau,[b] AN Andersen,[c] P Devroey,[b] P Sørensen,[d] L Helmgaard,[d] J-C Arce[d]

[a] Department of Obstetrics and Gynaecology, Leeds General Infirmary, Leeds, UK [b] Center for Reproductive Medicine, Vrije Universiteit Brussel (VUB), Brussels, Belgium [c] Fertility Clinic, Rigshospitalet, Copenhagen, Denmark [d] Clinical Research & Development, Ferring Pharmaceuticals A/S, Copenhagen, Denmark
Correspondence: Dr AH Balen, Department of Obstetrics and Gynaecology, Leeds General Infirmary, Leeds LS2 9NS, UK.
Email adam.balen@leedsth.nhs.uk

Accepted 15 June 2006. Published OnlineEarly 14 August 2006.

More FSH/hMG used for lesser responses.

Weight and response to COS

Balen AH et al. 2006.

Weight and fertility

Anti-Müllerian hormone reduces follicle sensitivity to follicle-stimulating hormone in human granulosa cells

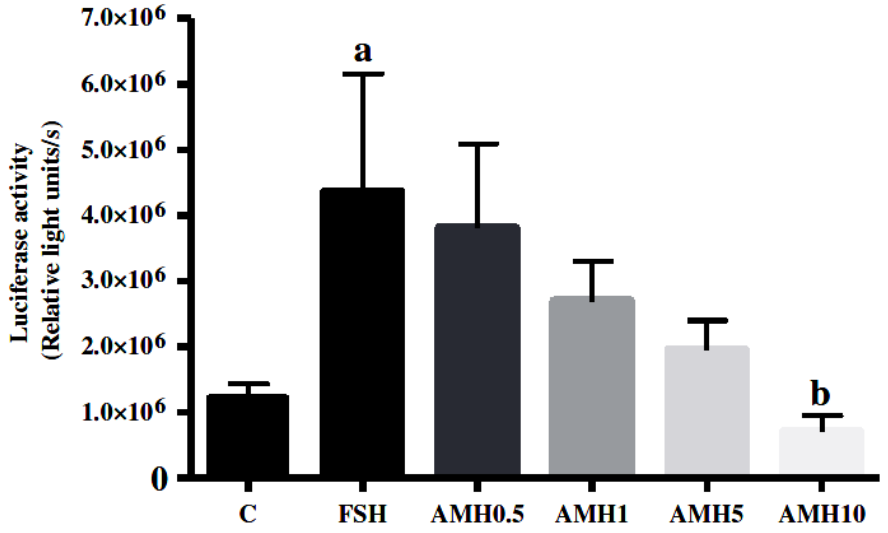
Laura Pellatt, Ph.D.,[a] Suman Rice, Ph.D.,[a] Nafi Dilaver, B.Sc.,[a] Amira Heshri, B.Sc.,[a] Raymond Galea, M.B., B.S.,[b] Mark Brincat, Ph.D.,[b] Kristy Brown, Ph.D.,[c] Evan R. Simpson, Ph.D.,[c] and Helen D. Mason, Ph.D.[a]

Pellatt L et al. Fertil Steril 2011

Weight and fertility

FIGURE 3

Promoter II activity in KGN cells treated with FSH (5 ng/mL) and anti-Müllerian hormone (AMH) doses (in nanograms per milliliter) for 24 hours (n = 3). Activity was measured by a luciferase activity assay and expressed as relative light units per second. Values are expressed as mean ± SEM (analysis of variance [ANOVA] $P = .01$. post hoc test, different letters indicate different significances at $P < .05$). C = control.



Pellatt. AMH affects follicle sensitivity to FSH. Fertil Steril 2011.

Pellatt L et al. Fertil Steril 2011

Weight and fertility

Serum AMH and the severity of PCOS

Am J Physiol Endocrinol Metab 296: E238–E243, 2009.
First published October 28, 2008; doi:10.1152/ajpendo.90684.2008.

Anti-Müllerian hormone levels reflect severity of PCOS but are negatively influenced by obesity: relationship with increased luteinizing hormone levels

Athanasia Piouka,[1] Dimitrios Farmakiotis,[1] Ilias Katsikis,[1] Djuro Macut,[2] Spiros Gerou,[3] and Dimitrios Panidis[1]

[1]Division of Endocrinology and Human Reproduction, 2nd Department of Obstetrics and Gynecology, Aristotle University of Thessaloniki, Greece; [2]Institute of Endocrinology, Diabetes and Diseases of Metabolism, Clinical Centre of Serbia, Belgrade, Serbia and Montenegro; and [3]"Analysis" Laboratories, Thessaloniki, Greece

Submitted 22 August 2008; accepted in final form 23 October 2008

AMH and degree PCOS

Plouka et al. Am J Physiol Endocrinol Metab 2009;296:238-43.

Weight and fertility

Serum AMH and the severity of PCOS

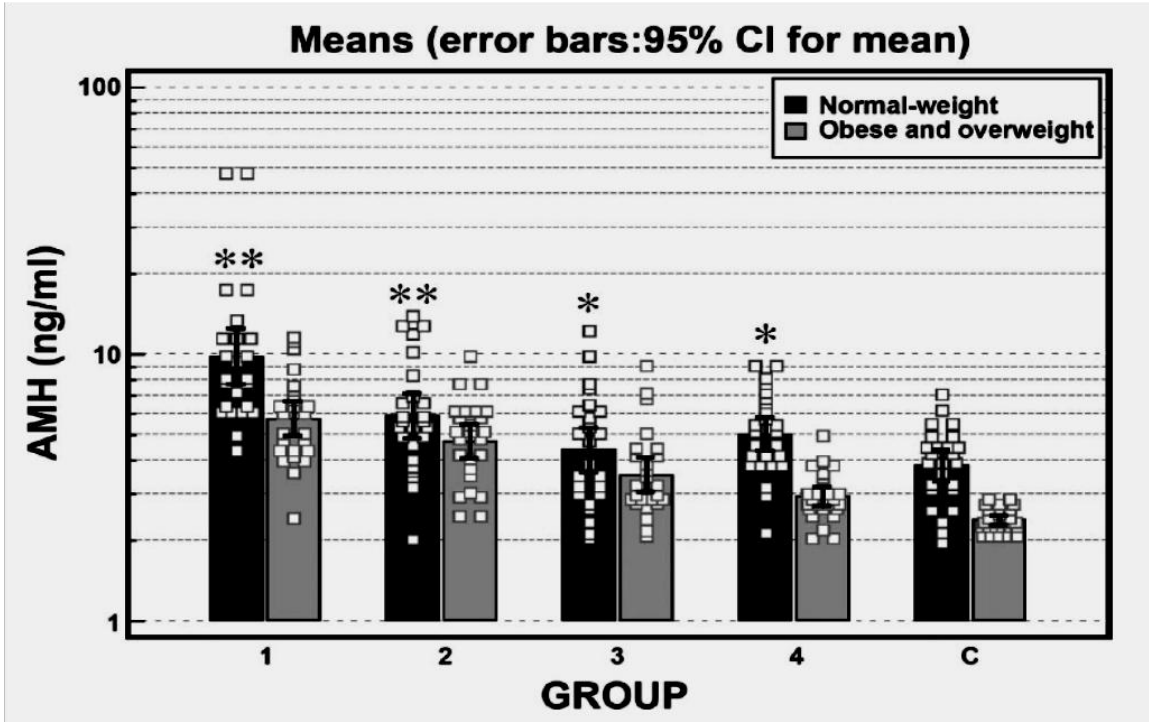


Fig. 1. Serum anti-Müllerian hormone (AMH) levels in the 4 basic phenotypes of normal-weight vs. obese and overweight women with polycystic ovary syndrome (PCOS *groups 1–4*) and healthy control subjects (C): scatter plot and means ± SD on a logarithmic scale. CI, confidence interval.

AMH and degree PCOS

Plouka et al. Am J Physiol Endocrinol Metab 2009;296:238-43.

Weight and fertility

AMH predicts impact of wt loss on reproductive outcome

Human Reproduction, Vol.24, No.8 pp. 1976–1981, 2009
Advanced Access publication on April 20, 2009 doi:10.1093/humrep/dep101

human reproduction

ORIGINAL ARTICLE *Reproductive endocrinology*

The effect of weight loss on anti-Müllerian hormone levels in overweight and obese women with polycystic ovary syndrome and reproductive impairment

R.L. Thomson[1,2], J.D. Buckley[1], L.J. Moran[2], M. Noakes[2], P.M. Clifton[2], R.J. Norman[3], and G.D. Brinkworth[2,4]

Weight and AMH

Thomson RL et al. Human Reprod 2009;24:1976-81.

Weight and fertility

AMH predicts impact of wt loss on reproductive outcome

Table I Weight, waist circumfere…esistance, hormonal parameters and A…nd following weight loss for women who responded with i…productive function and those who did …sponders)

	Responders ($n = 26$)		Non-responders ($n = 26$)	
	Baseline	**Change**	**Baseline**	**Change**
Weight (kg)	104.2 ± 4.3	−11.7 ± 1.2*	99.0 ± 3.7	−6.4 ± 0.9
Waist circumference (cm)	103.9 ± 2.8	−12.3 ± 1.3*	99.8 ± 2.2	−8.4 ± 1.0
Insulin (mU/l)	15.9 ± 1.4	−4.2 ± 0.7	16.8 ± 1.7	−4.2 ± 1.2
HOMA2	2.05 ± 0.18	−0.56 ± 0.10	2.15 ± 0.21	−0.53 ± 0.14
Testosterone (nmol/l)	2.50 ± 0.15	−0.48 ± 0.11	2.68 ± 0.14	−0.28 ± 0.10
SHBG (nmol/l)	31.0 ± 2.8	9.0 ± 2.1	31.1 ± 2.1	4.4 ± 1.9
FAI	9.38 ± 1.21	−3.51 ± 0.81	9.89 ± 0.97	−1.71 ± 0.76
AMH pmol/L	23.5 ± 3.7†	−1.9 ± 1.6	32.5 ± 2.9	−1.6 ± 1.8

Values are presented as mean ± SE. HOMA2, homeostatic model assessment of insulin resistance; SHBG, sex-hormone-binding globulin; FAI, free androgen index; AMH, anti-Müllerian hormone.

*$P < 0.02$, significantly greater reduction in responders compared with non-responders.

†$P < 0.03$, significantly lower when compared with non-responders at baseline.

Participants who improved their reproductive function to wt loss had lower AMH levels and experienced greater wt loss.

Weight and AMH

Thomson RL et al. Human Reprod 2009;24:1976-81.

Weight and fertility

Wt, FSH and ovulation

Weight and fertility

Wt, FSH and ovulation

Weight excess negatively affects FSH levels, thus impairing follicular recruitment and in turn ovulation.

Excess AMH impairs FSH action on granulosa cells.

In PCOS, AMH inversely correlated to chances of conceiving following wt loss.

Wt and fertility

Wt, FSH and ovulation

Wt and implantation

Wt loss and fertility

Weight and fertility

OB and implantation: SART data

Human Reproduction, Vol.26, No.1 pp. 245–252, 2011
Advanced Access publication on November 11, 2010 doi:10.1093/humrep/deq306

human reproduction

ORIGINAL ARTICLE *Reproductive epidemiology*

Female obesity adversely affects assisted reproductive technology (ART) pregnancy and live birth rates†

Barbara Luke[1,2,*], Morton B. Brown[3], Judy E. Stern[4], Stacey A. Missmer[5], Victor Y. Fujimoto[6], and Richard Leach[1]
A SART Writing Group

[1]Department of Obstetrics, Gynecology, and Reproductive Biology, Michigan State University, B227 West Fee Hall, 48824 East Lansing and Grand Rapids, MI, USA [2]Department of Epidemiology, Michigan State University, East Lansing, MI, USA [3]Department of Biostatistics, School of Public Health, University of Michigan, Ann Arbor, MI, USA [4]Dartmouth-Hitchcock Medical Center, Lebanon, NH, USA [5]Department of Epidemiology, Harvard School of Public Health, and Brigham and Women's Hospital, Boston, MA, USA [6]Department of Obstetrics, Gynecology, and Reproductive Sciences, University of California, San Francisco, CA, USA

Luke B. et al. HR 2011;26:245-52.

Weight and fertility

OB and implantation: SART data

Conclusions: Higher BMI is associated with an increased failure to achieve a clinical intrauterine gestation;

This risk was overcome with the use of donor oocytes.

Yes, but.

Luke B. et al. HR 2011;26:245-52.

Weight and fertility

OB and implantation: IVI data

Obesity and poor reproductive outcome: the potential role of the endometrium

José Bellver, M.D., Marco A. B. Melo, M.D., Ernesto Bosch, M.D., Vicente Serra, M.D., José Remohí, M.D., and Antonio Pellicer, M.D.

Departments of Reproduction and Maternal–Fetal Medicine, Instituto Valenciano de Infertilidad, Universidad de Valencia, Valencia, Spain

Donor egg model w/ oocytes from young lean donors. n=6,500 cycles

Bellver J. et al. FS 2007;88:446-51.

TABLE 1

Descriptive characteristics of the study group (n = 2656).

	< 20 kg/m² (n = 471)	20–24.9 kg/m² (n = 1613)	25–29.9 kg/m² (n = 450)	≥ 30 kg/m² (n = 122)	*P* value
Age of recipient	38.9 ± 4.9[a]	39.1 ± 5.1	39.7 ± 5.2[b]	39.9 ± 5.7	.03[a,b]
Number of donated oocytes	11.3 ± 3.4	11.0 ± 3.4	11.0 ± 3.8	10.5 ± 3.3	NS
Use of GnRH agonist (%)	75.0	71.4	72.3	64.5	NS
Days of estrogen therapy	32.8 ± 15.8	32.3 ± 11.8	31.9 ± 12.1	32.0 ± 16.5	NS
Endometrial thickness	9.1 ± 0.6	8.5 ± 0.8	8.6 ± 0.3	9.2 ± 0.6	NS
No. of transferred embryos	2.4 ± 0.7	2.3 ± 0.7	2.4 ± 0.7	2.4 ± 0.7	NS
Day of embryo development	3.6 ± 1.2	3.5 ± 1.4	3.4 ± 1.2	3.4 ± 1.1	NS
Transferred blastocysts (%)	115 (25.0)	342 (21.7)	86 (19.5)	23 (19.0)	NS
Implantation rate % (CI 95%)	34.9 (31.5–38.3)	34.6 (32.8–36.5)	31.1 (27.7–34.5)	29.0 (22.2–35.7)	NS
Pregnancy rate % (CI 95%)	60.3 (55.9–64.7)	60.1 (57.7–62.5)	56.6 (52.0–61.2)	49.2 (40.2–58.2)	NS
Biochemical pregnancy rate % (CI 95%)	7.4 (4.3–10.5)	8.0 (6.3–9.8)	9.4 (5.8–13.1)	5.0 (0–10.7)	NS
Ectopic pregnancy rate % (CI 95%)	0.4 (0–1.0)	0.9 (0.3–1.5)	2.0 (0.2–3.7)	3.3 (0–8.0)	NS
Miscarriage rate % (CI 95%)	14.8 (10.6–18.9)	15.9 (13.6–18.2)	19.7 (14.8–24.6)	18.3 (8.3–28.4)	NS
Ongoing pregnancy rate per cycle (%)	46.7 (41.2–51.2)[a]	45.2 (42.8–47.6)[b]	38.9 (34.4–43.4)[c]	36.1 (27.4–44.7)[c]	.017 .016[a,c] .032[a,d] .016[b,c] .046[b,d]

Weight and fertility

OB and implantation: miscarriages

Human Reproduction Vol.23, No.4 pp. 878–884, 2008
Advance Access publication on February 15, 2008
doi:10.1093/humrep/den017

High and low BMI increase the risk of miscarriage after IVF/ICSI and FET

Zdravka Veleva[1], Aila Tiitinen[2], Sirpa Vilska[3], Christel Hydén-Granskog[2], Candido Tomás[4], Hannu Martikainen[1] and Juha S. Tapanainen[1,5]

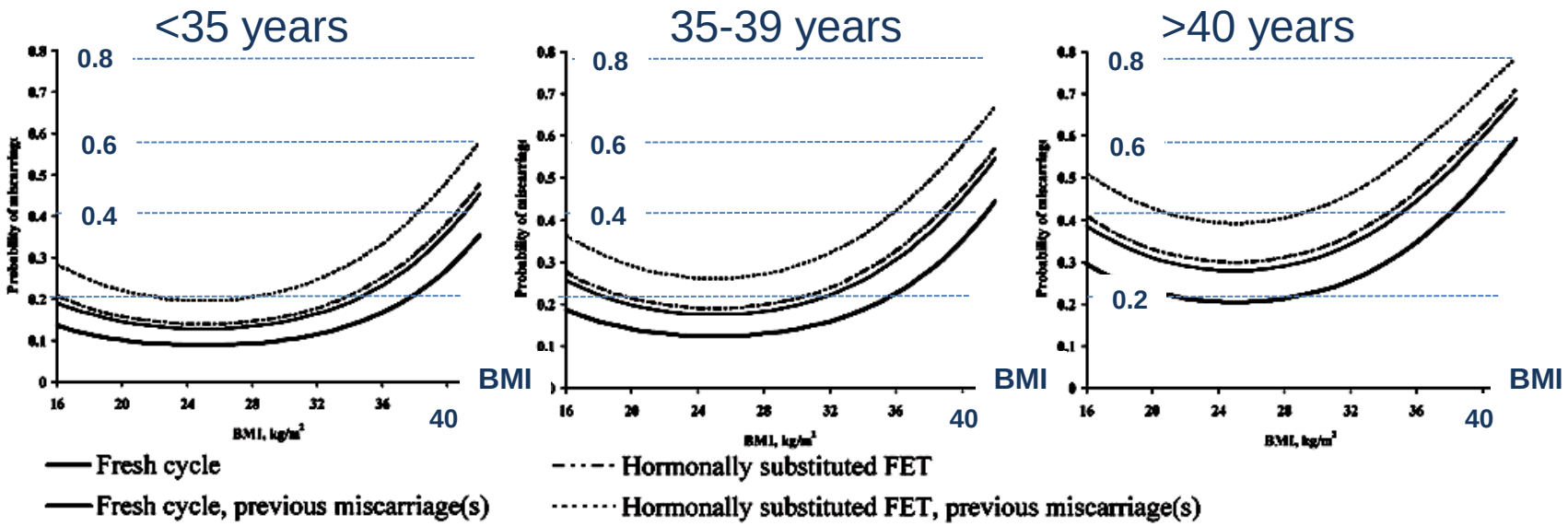
[1]Department of Obstetrics and Gynecology, University of Oulu, PO Box 5000, Oulu FIN-90014, Finland; [2]Department of Obstetrics and Gynecology, Helsinki University Central Hospital, Helsinki, Finland; [3]Infertility Clinic, Family Federation of Finland, Helsinki, Finland; [4]AVA Clinic, Tampere, Finland

Analysis of **3,330** 1st-pregnancy cycles (1999–2004). Of these, 65.4% (2,198 cycles) were fresh transfers and 34.6% (1,132 cycles) FETs (666 spontaneous and 466 hormonally substituted).

Veleva Z. et al. HR 2008;23;878-84.

Weight and fertility

OB and implantation: miscarriages



Veleva Z. et al. HR 2008;23;878-84.

Weight and fertility

OB and implantation: LH pulsatility

0021-972X/07/$15.00/0
Printed in U.S.A.

The Journal of Clinical Endocrinology & Metabolism 92(7):2468–2473

doi: 10.1210/jc.2006-2274

Pulsatile Luteinizing Hormone Amplitude and Progesterone Metabolite Excretion Are Reduced in Obese Women

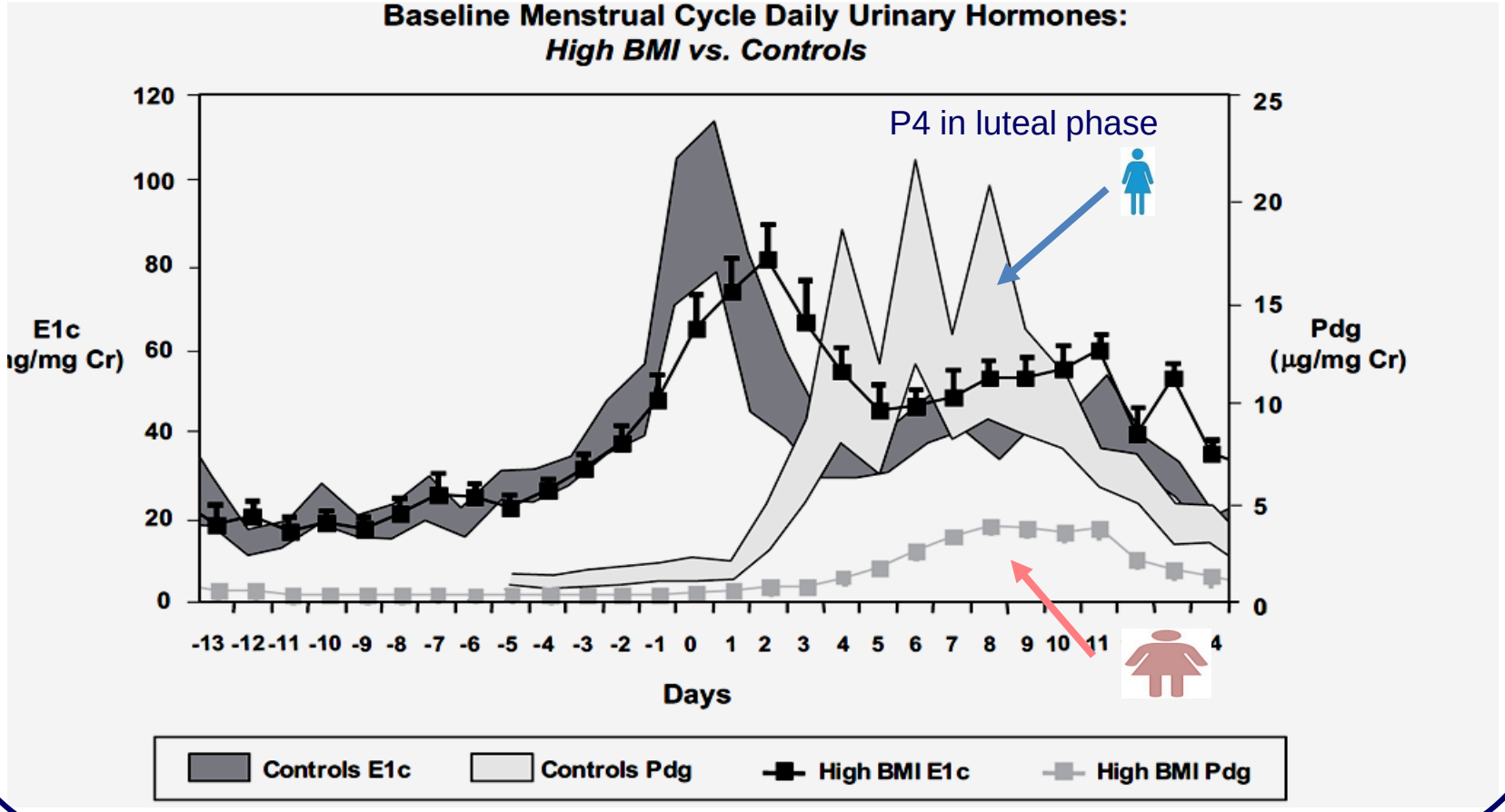
Akas Jain, Alex J. Polotsky, Dana Rochester, Sarah L. Berga, Tammy Loucks, Gohar Zeitlian, Karen Gibbs, Hanah N. Polotsky, Sophia Feng, Barbara Isaac, and Nanette Santoro

Departments of Obstetrics, Gynecology, and Women's Health (A.J., A.J.P., G.Z., S.F., B.I., N.S.) and Medicine (D.R., H.N.P.), Albert Einstein College of Medicine, Bronx, New York 10461; Department of Obstetrics and Gynecology (S.L.B., T.L.), Emory University, Atlanta, Georgia 30322; and Department of Surgery (K.G.), Montefiore Medical Center, Bronx, New York 10467

Jain A. et al. JCEM 2007.

Weight and fertility

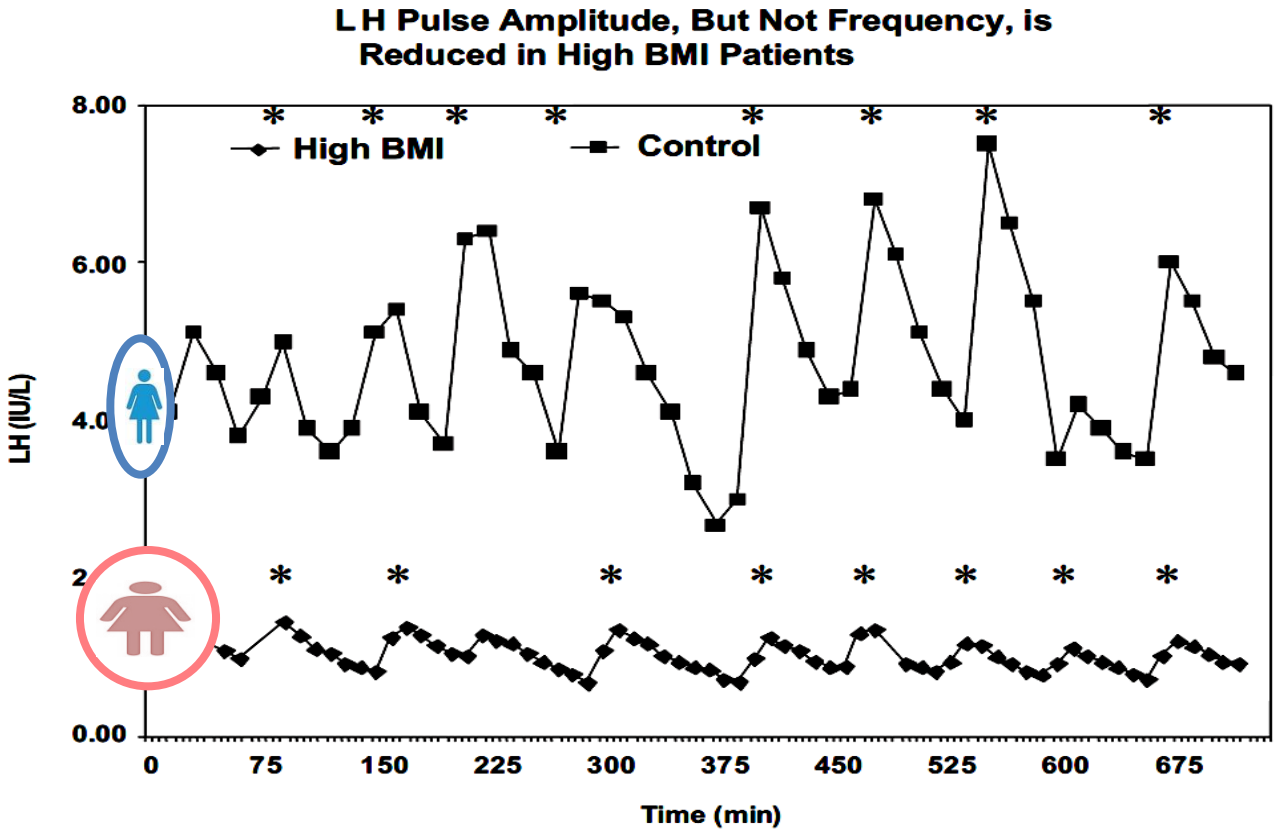
OB and implantation: LH pulsatility



Jain A. et al. JCEM 2007.

Weight and fertility

OB and implantation: LH pulsatility



Jain A. et al. JCEM 2007.

Weight and fertility

OB and implantation: polyps

Body mass index is an independent risk factor for the development of endometrial polyps in patients undergoing in vitro fertilization

Reside Onalan, M.D.,[a] *Gogsen Onalan, M.D.,*[b] *Esra Tonguc, M.D.,*[a] *Tulin Ozdener, M.D.,*[a] *Muammer Dogan, M.D.,*[a] *and Leyla Mollamahmutoglu, M.D.*[a]

[a] Obstetrics and Gynecology, Zekai Tahir Burak Women's Education and Research Hospital, [b] Obstetrics and Gynecology, Baskent University School of Medicine, Ankara, Turkey

Onalan R. et al. FS 2009.

Weight and fertility

OB and implantation: polyps

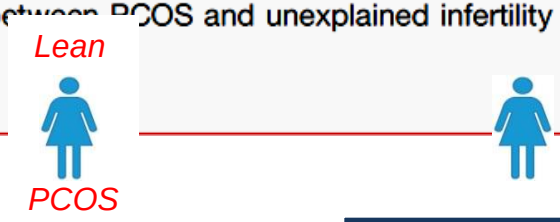
TABLE 1

Anthropometric, anamnestic data, hormone levels, and polyp findings in polycystic ovary syndrome and unexplained infertility groups.

	PCOS (n = 114)	Unexplained infertility (n = 109)	*P* value
Age (year)	28.8 ± 4.1	28.5 ± 4.0	NS
Duration of infertility (year)	4.9 ± 3.5	4.9 ± 3.0	NS
Basal FSH (mIU/mL)	5.5 ± 1.3	5.4 ± 1.2	NS
Basal E_2 (pg/mL)	51 ±11.7	50.8 ± 13.1	NS
Body mass index(kg/m^2)	27.8 ± 3.9	26.3 ± 3.8	.043
Patients with polyp (%)	28.9% (33/114)	18.3% (20/109)	.08
Polyp size (cm)	1.2 ± 0.4	1.1 ± 0.4	NS
Patients with multiple polyps (%)	7% (8/114)	5.5% (6/109)	NS

Note: $P<.05$, statistically significant differences between PCOS and unexplained infertility groups. NS: not statistically significant.

Onalan. Routine hysteroscopy prior to IVF cycles. Fertil Steril 2009.



Onalan R. et al. FS 2009.

Weight and fertility

OB and implantation: polyps

TABLE 2

Anthropometric, anamnestic data, hormone level, and polyp findings according to body mass index (BMI >30 or BMI ≤30).

	BMI >30 (n = 50)	BMI ≤30 (n = 173)	*P* value
Age (year)	28.8 ± 3.8	29.1 ± 4.0	NS
Duration of infertility (year)	4.6 ± 2.9	4.9 ± 3.3	NS
Basal FSH (mIU/mL)	5.1 ± 1.0	5.6 ± 1.3	NS
Basal E_2 (pg/mL)	51 ± 8.9	50.8 ± 13.3	NS
Patients with polyp (%)	52% (26/50)	15 (26/173)	.04
Polyp size (cm)	1.2 ± 0.5	1 ± 0.3	NS
Patients with multiple polyps (%)	→ 16% (8/50)	→ 3.4% (6/173)	.001

Note: $P < .05$, statistically significant differences between BMI >30 and BMI ≤30 groups. NS: not statistically significant.

Onalan. Routine hysteroscopy prior to IVF cycles. Fertil Steril 2009.

Onalan R. et al. FS 2009.

Weight and fertility

Wt and implantation

Weight and fertility

Wt and implantation

Obesity is associated with decreased endometrial receptivity and increased early pregnancy losses.

May result from inflammatory processes.

May benefit from vitamin 'M' (?)

Wt and fertility

Wt, FSH and ovulation

Wt and implantation

Wt loss and fertility

Weight and fertility

Human Reproduction Update, Vol.15, No.2 pp. 189–201, 2009
Advanced Access publication on January 8, 2009 doi:10.1093/humupd/dmn057

human reproduction update

Reproductive outcome after bariatric surgery: a critical review

Isabelle Guelinckx[1,3], Roland Devlieger[2], and Greet Vansant[1]

Few case-controls and cohort studies:

Weight loss through bariatric surgery resulted in:

- Improved fertility
- **Reduced risk obstet. complications (gest DM)**
- But, higher incidence IUGR

Weight loss and reprod. outcome

Guelinckx I et al. HRU 2009;15:189-201

Weight and fertility

Human Reproduction Vol.23, No.3 pp. 642–650, 2008
Advance Access publication on December 24, 2007
doi:10.1093/humrep/dem391

Structured exercise training programme versus hypocaloric hyperproteic diet in obese polycystic ovary syndrome patients with anovulatory infertility: a 24-week pilot study

S. Palomba[1,6], F. Giallauria[2], A. Falbo[1], T. Russo[1], R. Oppedisano[1], A. Tolino[3], A. Colao[4], C. Vigorito[2], F. Zullo[1] and F. Orio[2,5]

The benefits of a 3-month structured exercise training (SET) programme on cardio-pulmonary functional capacity in young overweight women equals weight loss.

Weight loss and reprod. outcome

Palomba S et al. Human Reprod 2008;23:642-50.

Weight and fertility

Table III. Reproductive outcomes of obese anovulatory infertile PCOS patients after 24-weeks in the SET or diet programmes.

Reproductive outcomes	SET group	Diet group	*P*
Menses frequency (no. observed menses/no. expected cycles, %)	28/107 (26.2)	18/118 (15.3)	0.043
Ovulation rate (no. ovulatory cycles/no. observed cycles, %)	28/113 (24.8)	18/119 (15.1)	0.032
Ovulation frequency [no. ovulatory patients with no. ovulation(s)/no. patients, %]			0.456
1 Ovulation	1/20 (5.0)	4/20 (20.0)	
2 Ovulations	6/20 (30.0)	5/20 (25.0)	
3 Ovulations	6/20 (30.0)	6/20 (30.0)	
4 Ovulations	5/20 (25.0)	3/20 (15.0)	
5 Ovulations	2/20 (10.0)	2/20 (10.0)	
Pregnancy rate (no. pregnancies/no. observed cycles, %)	7/113 (6.2)	2/119 (1.7)	0.075
Abortion rate (no. abortions/no. pregnancies, %)*	1/7 (14.2)	0/2 (0.0)	1.0
Cumulative ovulation rate (ovulatory patients/no. patients, %)	13/20 (65.0)	5/20 (25.0)	0.011
Cumulative pregnancy rate (no. pregnant patients/no. patients, %)	7/20 (35.0)	2/20 (10.0)	0.058

Data analysed using chi-square test or *Fisher's exact test.
P-values refer to SET versus diet group.

SET equals weight loss.

Palomba S et al. Human Reprod 2008;23:642-50.

Management

The New York Times

November 20, 2008

Weight Loss Surgery Helps Obese Women Have Healthier Babies

By RONI CARYN RABIN

Women who become pregnant after weight-los…ed to improve after surgery as hormone have easier pregnancies and healthier babi…urned to normal following weight women who become pregnant, resea…ier studies, polycystic Wednesday.

…mproved after weight loss as

The review of 75 studies found tha…

OB-*fert*
Dr Isabelle Streuli
streulisa@hotmail.com

Management

	if anovul: COS ± IUI if failed, or male or tubal fact: IVF/ICSI	if anovul: COS ± IUI if failed, or male or tubal fact: IVF/ICSI	if no co-morbidity provide full array of infert treatments	In principle no infertility treatments. Consider exceptions
			Look for co-morbidity. If co-morbidity consider bariatric Sx. Consider diet and/or systematic exercise. Consider age.	Pregnancy likely carries unreasonable risks. In principle candidate for bariatric Sx. Wait one year after Sx. Alternate options may be commanded by age.

18 25 30 35 40 BMI

Conclusion

L’obésité est une pandémie moderne qui hypothèque les chances de grossesse.

L’obésité réduit les taux circulants de FSH. En cas de PCOS associé à l’obésité, des taux élevés d’AMH réduisent l’efficacité de la FSH.

L’obésité est associée à une diminution des altérations endométriales, une baisse des TG en AMP et des risques accrus de fausse couche.

Conclusion

En cas d’obésité, la perte de poids et l’exercice améliorent les chances de grossesse et réduisent les risques en cours de grossesse.

Weight and fertility

Université Paris Descartes - Hôpital Cochin

Paris FIVE

Chirurgie

Charles Chapron
Hervé Foulot
Bruno Borghese
Marie Christine Lafay
Fouzia Decuypere
Pietro Santulli
Guillaume Pierre

Infertilité

Dominique de Ziegler
Vanessa Gayet
Ann Marszalek
Isabelle Streuli
Blandine Boquet
Alessandra Fubini
Caterina Ferretti

Biologie

Jean Philippe Wolf
Virginie Lange
Khaled Pocate
Jean Marie Kuntzman
Céline Chalas