

Contraception for Obese Women

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Summary

- Obese women have lower fertility than do other women, but it is not zero
- Unplanned pregnancies occur and are more dangerous than for other women
- Contraception has added importance for obese women
- Obesity is increasing rapidly
- Hence, obese women are an increasing concern for you

Lake JK. *Int J Obes Relat Metab Disord* 1997;21:432-8

Objectives

- Summarize the scope of the obesity problem in the United States
- Summarize the added health risks associated with obesity
- Suggest good contraceptive options for obese women

Obesity Is an Epidemic: Obesity Trends Among Adults in the United States

Behavioral Risk Factor Surveillance System (BRFSS)
Telephone surveys, self-reports



Definitions

- **Obesity:** having a very high amount of body fat in relation to lean body mass, or Body Mass Index (BMI) of 30 or higher.
- **Body Mass Index (BMI):** a measure of an adult's weight in relation to his or her height, specifically the adult's weight in kilograms divided by the square of his or her height in meters.
- $BMI = 703 \times Wt \text{ (pounds)} / Ht \text{ (inches)}^2$

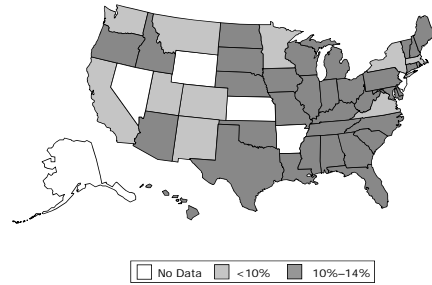
Degrees of Obesity

- Underweight: BMI < 18.5
- Healthy weight: BMI between 18.5 and 24.9
- Overweight: BMI between 25 and 29.9
- Obese: BMI \geq 30
 - Morbidly or extremely obese: BMI \geq 40

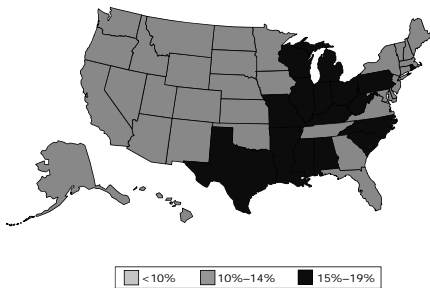
Examples of BMI = 30 (Obese)

Height	5'0"	5'2"	5'4"	5'6"	5'8"
Weight	153	164	174	186	197

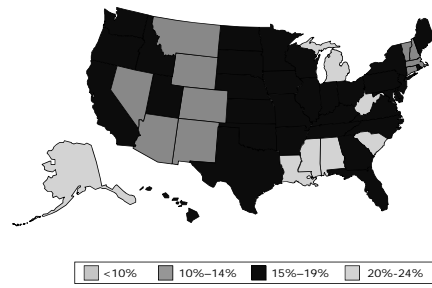
Percent Obese by State: 1990



Percent Obese by State: 1994

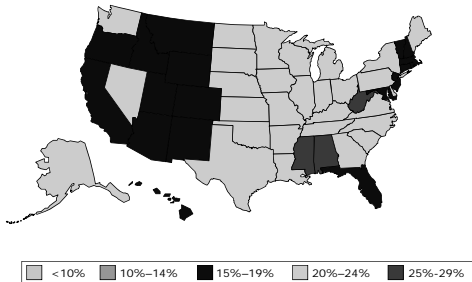


Percent Obese by State: 1998

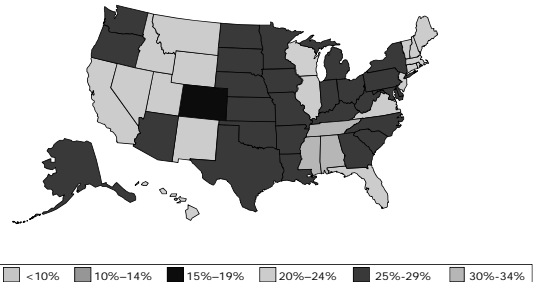


Percent Obese by State: 2002

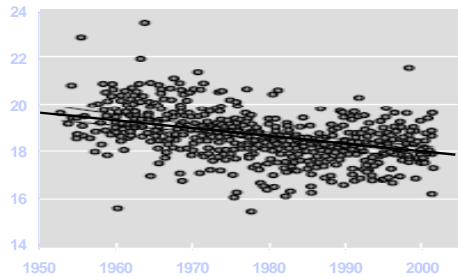
(*BMI ≥30, or ~30 lbs overweight for 5'4" person)



Percent Obese by State: 2007



BMI of *Playboy* Centerfold Models



Voracek M. *Br Med J* 2002;**325**:1447-8

Obesity Among Women Ages 20-60 Data from 2003-2004 NHANES

	Ages 20-39	Ages 40-59
White, non-Hispanic	24%	38%
Black, non-Hispanic	50%	58%
Mexican-American	36%	48%

Ogden CL. *JAMA* 2006;**295**:1549-55

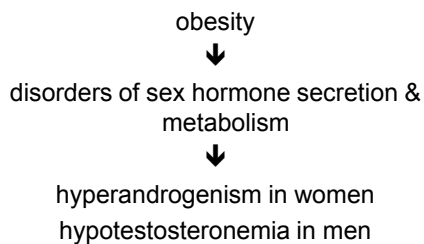
Consequences of Obesity

Obesity and Fecundity

- Increasing BMI increases infertility among women and men
- Results similar for older and younger men, suggesting that erectile dysfunction in older men does not explain the association
- Significant negative relationship between BMI and the total number of normal-motile sperm

Lake JK. *Int J Obes Relat Metab Disord* 1997;**21**:432-8
Sallmén M. *Epidemiology* 2006;**17**:520-3
Kort JJ. *J Androl* 2006;**27**:450-2

Why Does Obesity Cause Infertility?



Pasquali R. *Maturitas* 2006;**54**:363-71

Health Consequences of Obesity

- Increases risk of major causes of death, including cardiovascular disease, numerous cancers, and diabetes
- Markedly reduces life expectancy
- Increases osteoarthritis, gall bladder disease, sleep apnea, respiratory impairment, social stigmatization; decreases mobility

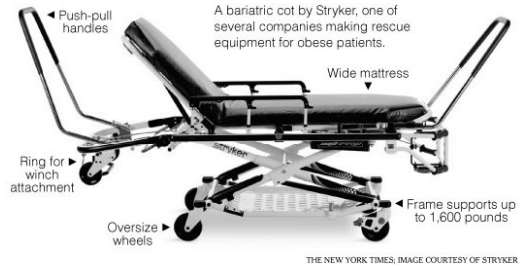
McTigue KM. *Ann Intern Med* 2003;**139**:933-49

Health Consequences of Obesity

- Study of 100 consecutive adults receiving injections in the UK
- 12 had a ventrogluteal site depth of more than 35 mm, the maximum depth of a green needle
- 26 had a ventrogluteal depth of more than 25 mm, the maximum depth of a blue needle
- Standard green and blue needles do not reach the gluteal muscles in a considerable number of patients

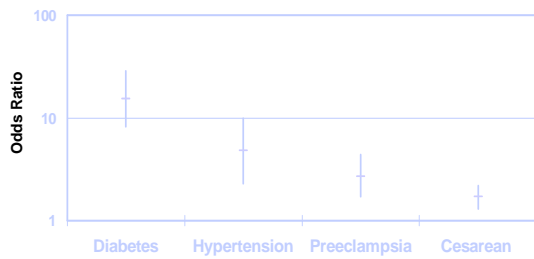
Nisbit AC. *BMJ*;332:637-8

Bariatric Cot



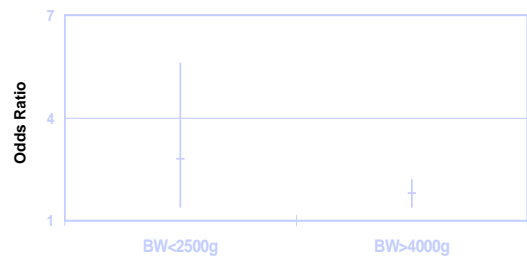
Cost = \$4,000, versus \$1,000 for a regular cot

Obstetrical Complications of Obesity



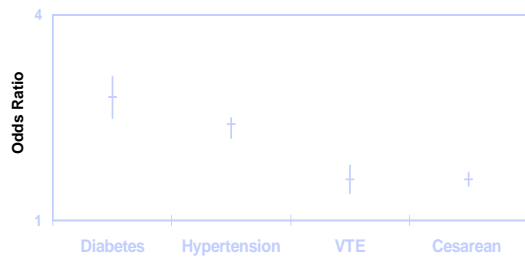
Rode L. *Obstet Gynecol* 2005;105:537-42

Obstetrical Complications of Obesity



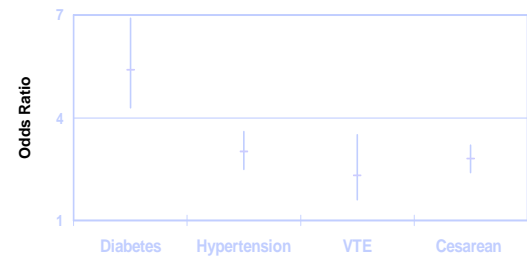
Rode L. *Obstet Gynecol* 2005;105:537-42

Obstetrical Complications of Obesity (Moderate Obesity: 90-120 kg)



Robinson HE. *Obstet Gynecol* 2005;106:1357-64

Obstetrical Complications of Obesity (Severe Obesity: >120 kg)



Robinson HE. *Obstet Gynecol* 2005;106:1357-64

Obstetrical Complications of Obesity

- Meta-analysis to summarize the available epidemiologic evidence on the relationship between maternal overweight and obesity and the risk of stillbirth
- OR of a stillbirth were 1.47 (1.08-1.94) and 2.07 (1.59-2.74) among overweight and obese pregnant women, respectively, compared with normal-weight pregnant women

Chu SY. *Am J Obstet Gynecol* 2007;**197**:223-8

Abortion Complications of Obesity

- 2nd-trimester surgical abortion
 - Increased procedure difficulty among obese women
 - Obesity may necessitate special instruments and techniques
- Medication abortion may be preferable to surgical abortion among obese women

Dark AC. *J Reprod Med* 2002;**47**:226-30

Contraception and Obesity

Weight and OC Failure-Oxford FPA

- 17,032 married women using OCs, diaphragms or IUDs recruited 1968-1974 and followed until 1994
- No effect of weight on either progestin-only or combined OC failure
- But weight was measured at recruitment and there were very few failures

Vessey M. *J Fam Plann Reprod Health Care* 2001;**27**:90-1

Weight and OC Failure: Holt 1

- Retrospective cohort analysis
- RR = 1.6 (1.1, 2.4) for women in the highest weight quartile (≥ 70.5 kg); higher risk among women on low and very low dose OCs
- No lab confirmation of self-reported pregnancies
- No knowledge of subject's weight just before becoming pregnant
- No information on OC use patterns
- Duration of use ignored

Holt VL. *Obstet Gynecol* 2002;**99**:820-7

Weight and OC Failure: Holt 2

- Case-control study
- OR = 1.4 (0.9, 2.0) among women in the highest weight quartile (>74.8 kg)
- OR = 1.7 (1.1, 2.7) among consistent OC users in the highest weight quartile (>74.8 kg)

Holt VL. *Obstet Gynecol* 2005;**105**:46-52

BMI and OC Failure: Holt 2

- Case control study
- OR = 1.6 (1.1, 2.2) among women in the highest BMI quartile (>27.3)
- OR = 2.2 (1.4, 3.4) among consistent OC users in the highest BMI quartile (>27.3)

Holt VL. *Obstet Gynecol* 2005;105:46-52

Problems with the Holt-2 Study

- Retrospective reports of pill-taking at interview on average 7 months after reference month
- Women who missed more than 5 pills in the reference month excluded
- More cases than controls previously pregnant and pregnant while on OCs
- Weight in reference month self-reported
- Duration of use ignored

Creinin MD. *Obstet Gynecol* 2005;105:1492

Weight/BMI and OC Failure: Brunner 1

- Retrospective cohort study based on the 1995 National Survey of Family Growth
- Self reports of height, weight, pregnancies and OC use
- No unadjusted or adjusted increased risk among women in the highest weight category (>190 lb)
- Unadjusted RR = 1.8 (1.01-3.20) among women in the highest BMI group (≥ 30), but adjusted RR not significant

Brunner LR. *Ann Epidemiol* 2005;15:492-9

Problems in Brunner-1 Study

- Height and weight self reported at interview in the 1993 NHIS
- Sample is 2,064 women in the 1993 NHIS using OCs in January 1993; followed up in the 1995 NSFG
- Abortions underreported in the 1995 NSFG
- Duration of use ignored

BMI and Contraceptive Failure: Brunner 2

- Case-control study using data from the 1999 Pregnancy Risk Assessment Monitoring System
- Self reports of height, weight, contraceptive use at the time of pregnancy
- Unintended pregnancy among contraceptors
 - Overweight: OR=1.73 (1.20-2.36)
 - Obese: OR=1.75 (1.21-2.52)
- No association among noncontraceptors

Brunner Huber LR. *Matern Child Health J* 2005;9:413-20

Problems in Brunner-2 Study

- Height, weight and contraceptive use self reported
- Cases were unintended pregnancies leading only to live births
- Controls were intended pregnancies leading to live births
- Type of contraceptive used not reported
- Duration of contraceptive use ignored

Brunner Huber LR. *Matern Child Health J* 2005;9:413-20

BMI and OC Failure: Huber-1

- Case cohort study in South Carolina
- Self reports of height, weight, pregnancies and OC use
- Cases are 179 women delivering infants who reported using OCs at conception; controls are 223 OC users in BRFSS.
- Unadjusted OR = 2.5 (1.2-5.5) for BMI 25-29.9 and OR = 2.8 (1.1-7.6) for BMI \geq 30; adjusted ORs not significant

Huber LRB. *Ann Epidemiol* 2006;16:637-43

Problems in Huber-1 Study

- Height, weight and OC use self reported
- Cases were pregnancies leading only to live births
- Duration of use ignored

BMI and OC Failure: Huber-2

- Retrospective population study based on the 2002 National Survey of Family Growth
- Sample is women using OCs in January 1999
- Self reports of height, weight, pregnancies and OC use
- No unadjusted or adjusted increased risk among women in the highest BMI category (\geq 30)

Huber LRB. *Am J Epidemiol* 2007;166:1306-11

Problems in Huber-2 Study

- Height, weight and OC use self reported
- Underreporting of abortion
- Duration of use incorrectly controlled

Weight/BMI and Tri-Cyclen Lo

- Ortho Tri-Cyclen Lo not associated with elevated pregnancy risk among higher weight women
- N=1,673; weight range 90-240 lb; not many obese women

Zhang HF. *Obstet Gynecol* 2006;107:50S

OC Failure in Recent Clinical Trials

- Since 1999, 5 multicenter trials evaluated the efficacy of 4 different OCs
- 15.5% of 6465 women weighed $>$ 90kg
- 4.4% had a BMI $>$ 40
- Crude perfect-use pregnancy rate
 - 0.7% among women weighing $>$ 90kg
 - 1.0% among women weighing $<$ 90kg

Westhoff C. *Contraception* 2008;78:167

Summary: Weight/BMI and OC Failure

- No convincing evidence that very heavy or obese women have a higher risk of OC failure during perfect use, even on the lowest dose formulations
- Possible that OCs are less forgiving of imperfect use among very heavy or obese women
- Even if real the absolute risk of failure is still likely to be modest: a 60% increase in risk implies an increase from 7% to 11% in the first year of typical use of OCs in the United States

Summary: OCs and Weight/BMI

- Obesity is a risk factor for venous thromboembolism; among those <40
 - RR = 5.2 (5.1, 5.3) for pulmonary embolism
 - RR = 5.2 (5.1, 5.3) for deep venous thrombosis
- OCs further increase the effect of obesity on deep venous thrombosis; synergistic effect of OC use and BMI≥25

Stein PD. *Am J Med* 2005;118:978-80
Pomp ER. *Br J Haematol* 2007;139:289-96
Sidney S. *Contraception* 2004;70:3-10.
Abdollahi M. *Thromb Haemost* 2003;89:493-8

Obesity and Combined Hormonal Contraceptive Safety

MEC	BMI			
	<30	30-34	35-39	≥40
WHO	1	2	2	2
UK	1	2	3	4

WHO. *Medical Eligibility Criteria for Contraceptive Use*, 2004
FPRHC. *UK Medical Eligibility Criteria for Contraceptive Use (2005-2006)*

Obesity and Combined Hormonal Contraceptive Safety

- The UK MEC recommendations with respect to CHC use and obesity are inconsistent with those for age and smoking.
- Use of CHCs among women with a BMI of 35-39 is generally safe and should be changed from a UK MEC 3 to a UK MEC 2.
- There are no data on the safety of use of CHCs among women with a BMI ≥40.

Trussell J. *Contraception* 2008;77:143-6

Weight and Patch Failure

Weight (kg)	pregnancies	Weight (kg)	pregnancies
<52	1	63-65	0
52-54	2	66-68	1
55-57	0	69-73	0
58-59	0	74-79	2
60-62	2	≥80	7

Zieman M. *Fertil Steril* 2002;77:13S-8S

Weight and Patch Failure

Weight (kg)	pregnancies
<80	8
≥80	7

Approximate RR = 7.8

Zieman M. *Fertil Steril* 2002;77:13S-8S

BMI and Failure of Implanon and DMPA

- No pregnancies in clinical trials of Implanon or DMPA-SC, even among obese users
- In DMPA-SQ trial, 11% of women were obese
- In Implanon trials, women could be no heavier than 130% of ideal body weight

Croxatto HB. *Contraception*. 1998;**58**:91S-7S
Croxatto HB. *Hum Reprod* 1999;**14**:976-81
Funk S. *Contraception* 2005;**71**:319-26
Jain J. *Contraception* 2004;**70**:269-75

BMI and Failure of NuvaRing

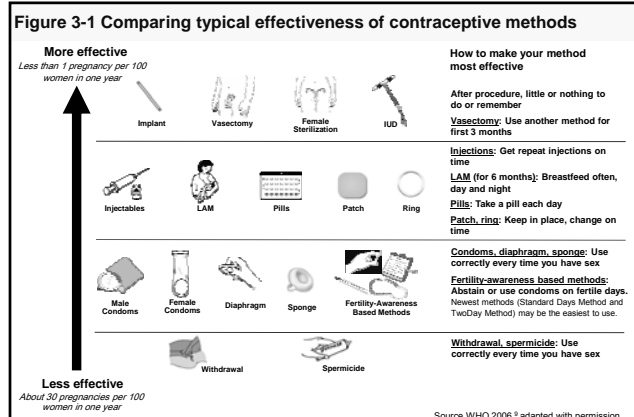
- Only mean BMI reported in published papers
- BMIs of women experiencing failures not reported
- Secondary analysis of phase III efficacy trials showed higher weight does not reduce efficacy; no pregnancies in 74 women weighing 189-272 lbs

Roumen FJME. *Hum Reprod* 2001;**16**:469-75
Dieben TOM. *Obstet Gynecol* 2002;**100**:585-93
Oddsson K. *Contraception* 2005;**71**:176-82
Ahrendt H-J. *Contraception* 2006;**74**:451-7
Westhoff C. *Obstet Gynecol* 2005;**105**:56S

Interlude: Hormonal Contraceptives and Weight Gain

- Excellent *Cochrane Review* summarizing three placebo-controlled randomized trials of combined hormonal contraceptives
- No evidence of a causal association between combined OC or patch use and weight gain
- One randomized trial demonstrated that DMPA does not cause short-term weight gain

Gallo MF. *Cochrane Database Syst Rev* 2006
Pelkman CL. *Am J Clin Nutr* 2001;**73**:19-26



Tubal Sterilization

- Collaborative Review of Sterilization
- 9,475 women underwent interval laparoscopic tubal sterilization.
- Complication rate 16 per 1,000 procedures
- Higher complication rate among obese women
- Obesity OR = 1.7 (1.2, 2.6)

Jamieson DJ. *Obstet Gynecol* 2000;**96**:997-1002

IUD: Terrific Choice for Obese Women

- Copper (and plastic) IUDs decrease risk of endometrial cancer
- LNG-IUS reduces menstrual blood loss (decreases anemia), reduces menorrhagia, reduces dysfunctional uterine bleeding

Hubacher D. *Obstet Gynecol Survey* 2002;**57**:120-8
Jensen JT. *Obstet Gynecol Survey* 2005;**60**:604-12
Blumenthal P. *Contraception* 2006;**74**:249-58

Vasectomy: Best Choice for Obese Women



Contraception after Bariatric Surgery

- Pregnancy should be avoided for at least 12 months after surgery because of fetal and maternal complications
- The decreased gastrointestinal absorption resulting from bariatric surgery is believed to reduce absorption of orally ingested hormones required for contraceptive efficacy
- Ideal contraceptives are the same as those for obese women: IUD, vasectomy

Westhoff CL. *Dialogues Contraception* 2007;11:8-9
Merhi ZO. *Gynecol Obstet Invest* 2007;64:100-2

Treatment of Obesity & Causes of Increasing Obesity

Treating Obesity

- Counseling: modest (3-5kg) sustained (1-2 years) weight loss
- Weight Watchers: modest (1.9kg) sustained (2 years) weight loss: better than counseling alone
- Pharmacotherapy: modest (3-5.5kg) potentially prolonged weight loss
- Surgical options: substantial (10-159kg) weight loss over 1-5 years

McTigue KM. *Ann Intern Med* 2003;139:933-49
Heshka S. *JAMA* 2003;289:1792-8

Why Have We Become More Obese?

- People get heavier if they consume more or expend fewer calories
- On average 3,500 calories = 1 pound
- The 10-12 pound increase in median weight over the past two decades requires a net caloric increase of only 150 calories per day
- 150 calories = 3 Oreo cookies or one can of Pepsi = 1.5 miles of walking

Cutler DM. *J Econ Perspect* 2003;17:93-118

Calories In *versus* Calories Out

- No decrease in caloric expenditure since 1975
- No increase in caloric intake during meals
- All caloric increase is from snacks!

Cutler DM. *J Econ Perspect* 2003;17:93-118

Food for Thought

- Before WW II, Americans ate massive amounts of potatoes, largely baked, boiled, or mashed
- French fries were rare, both at home and in restaurants because preparation required significant peeling, cutting, and cooking time
- Today the French fry is America's favorite vegetable
- From 1977 to 1995, total potato consumption increased 30% due to FF and potato chips

Cutler DM. *J Econ Perspect* 2003;17:93-118

More Food for Thought

- Does weight gain in one person affect weight gain in his or her friends, siblings, spouse, or neighbours?
- Answer obtained from an interconnected social network of 12,067 people who were assessed repeatedly from 1971 to 2003 in the Framingham Heart Study

Christakis NA. *NEJM* 2007;357:370-9

Social Spread of Obesity

- A person's chance of becoming obese increased by
 - 171% if a *mutual* friend became obese
 - 57% if a friend became obese
 - 40% if a sibling became obese
 - 37% if a spouse became obese
 - 0% if a neighbour became obese

Christakis NA. *NEJM* 2007;357:370-9