OBESITY AND CONTRACEPTION
IMPLICATIONS FOR CLINICAL CARE

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Planned Parenthood Federation of America

ARHP 50th Anniversary Meeting
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Talk Objectives and Outline

- Scope of the Problem
- Obesity & Health
- Effectiveness of birth control methods (BCMs) by BMI
- Contraception and Weight Gain
- Risks of BCMs by BMI
- Conclusions & Recommendations
Obesity Epidemic

• 2/3 of reproductive-age women in the U.S. are overweight or obese¹

¹McDowell MA. National Health Statistics. 2008.

<table>
<thead>
<tr>
<th></th>
<th>Total (Canada)</th>
<th>United States</th>
<th>Men (Canada)</th>
<th>United States</th>
<th>Women (Canada)</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obesity class I (BMI 30.0–34.9)</td>
<td>24.1</td>
<td>34.4</td>
<td>24.3</td>
<td>32.6</td>
<td>23.9</td>
<td>36.2</td>
</tr>
<tr>
<td>Obesity class II (BMI 35.0–39.9)</td>
<td>5.8</td>
<td>8.8</td>
<td>4.5</td>
<td>6.6</td>
<td>7.2</td>
<td>11.0</td>
</tr>
<tr>
<td>Obesity class III (BMI 40.0 or higher)</td>
<td>3.1</td>
<td>6.0</td>
<td>2.2</td>
<td>4.3</td>
<td>4.0</td>
<td>7.6</td>
</tr>
</tbody>
</table>

1Significantly different from estimate for Canada (p < 0.05).
2Use with caution (coefficient of variation 16.6%–33.3%).

NOTES: BMI is body mass index. Estimates were age-standardized by the direct method to the 2000 United States Census population using age groups 20–39, 40–59, and 60–79. Pregnant women are excluded. Obesity class estimates do not sum to exact totals due to rounding.


Adult obesity prevalence in Canada and the US. NCHS no 56. 2011
Calculating Body Mass Index (BMI)

*Calculated* the same way for adults and teens

- **Kilograms and meters (or centimeters)**
  
  Formula: weight (kg) / [height (m)]^2

- **Pounds and inches**
  
  Formula: weight (lb) / [height (in)]^2 x 703

# Body Mass Index (BMI)

<table>
<thead>
<tr>
<th>Terminology</th>
<th>BMI (kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt; 18.5</td>
</tr>
<tr>
<td>Normal weight</td>
<td>18.5 to 24.9</td>
</tr>
<tr>
<td>Overweight</td>
<td>25 to 29.9</td>
</tr>
<tr>
<td>Obesity</td>
<td>30 or greater</td>
</tr>
<tr>
<td>Class I</td>
<td>30 to 34.9</td>
</tr>
<tr>
<td>Class II</td>
<td>35 to 39.9</td>
</tr>
<tr>
<td>Class III</td>
<td>40 or greater</td>
</tr>
</tbody>
</table>
BRFSS, 1985

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults
BRFSS, 1990

(*BMI $\geq 30$, or $\approx 30$ lbs. overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults
BRFSS, 1995

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults
BRFSS, 2000

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults
BRFSS, 2005

(*BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
Obesity Trends* Among U.S. Adults

BRFSS, 2010

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

No Data          <10%           10%–14%            15%–19%              20%–24%           25%–29%           ≥30%

Gotay CC et al.  CJPH 2013;104:e64-e68.

Figure 1

15-19%  20-24%  25-29%  30-34%  ≥35%

2000

2003

2005

2007

2008

2009

2010

2011

Gotay CC et al.  CJPH 2013;104:e64-e68.
Obesity Rates & Race Among US Adults 2006-2008

Hispanic

No sufficient sample**

25–29

< 20

20–24

30–34

35+
Obesity Rates & Race Among US Adults 2006-2008

White non-Hispanic

(*BMI ≥30)
Obesity – Non-Hispanic White only


1Significantly different from estimate for Canada (p < 0.05).
2Use with caution (coefficient of variation 15.6%–33.3%).

NOTES: BMI is body mass index. Estimates were age-standardized by the direct method to the 2000 United States Census population using age groups 20–39, 40–59, and 60–79. Pregnant women are excluded.


Adult obesity prevalence in Canada and the US. NCHS no 56. 2011
Obesity – Women by age group


Adult obesity prevalence in Canada and the US. NCHS no 56. 2011
Factors Associated with Obesity

- Increasing age
- Female gender
- Black race, Hispanic ethnicity
- Lower individual level SES (income, education, assets)
- Community SES disadvantage

Disparities in Unintended Pregnancy

- US, 2001 unintended pregnancies
  - 51/1,000 women 15-44
  - 76/1,000 women < HS education
  - 78/1,000 Hispanic women
  - 98/1,000 Black women
  - 112/1,000 women < 100% FPL

Pregnancy Complications in Obesity

- Gestational diabetes mellitus
- Preeclampsia
- Planned and emergency cesarean delivery
- Postpartum hemorrhage
- Macrosomia
- Low Apgar score
- Stillborn fetus

Health Consequences of Obesity

- Cardiovascular disease
  - HTN, DM, DVT/PE
- Musculoskeletal/joint disease
- Endometrial cancer
- Fertility impairment
- Treatment complications
Obesity Increases VTE Risk

- Consistent evidence: systematic review & cohort and case–control studies
- The risk appears to be at least double that for normal weight subjects
- Risk increases with age
- Plausible mechanisms:
  - Obesity may limit venous return
  - Changes in coagulation system.

Allman-Farinelli MA. Orenet al, 2006
Body Weight and Risk of Oral Contraceptive Failure

Victoria L. Holt, PhD, MPH, Kara L. Cushing-Haugen, MS, and Janet R. Daling, PhD

OBJECTIVE: To examine the hypothesis that higher body weight increases the risk of oral contraceptive (OC) failure.

METHODS: We conducted a retrospective cohort analysis of data from 755 randomly selected female enrollees of Group Health Cooperative of Puget Sound who completed an in-person interview and dietary questionnaire between 1990 and 1994 as control subjects for a case-control study of ovarian cysts. Among the 618 women who were OC ever-users, we used Cox proportional hazards regression models to estimate the relative risk (RR) of pregnancy while using OCs associated with body weight quartile.

RESULTS: During 2822 person-years of OC use, 106 confirmed pregnancies occurred (3.8 per 100 person-years of exposure). After controlling for parity, women in the highest body weight quartile (70.5 kg or more) had a significantly increased risk of OC failure (RR 1.6, 95% confidence interval [CI] 1.1, 2.4) compared with women of lower weight. Higher elevations of risk associated with the highest weight quartile were seen among very low-dose OC users (RR 4.5, 95% CI 1.4, 14.4) and low-dose OC users (RR 2.6, 95% CI 1.2, 5.9), controlling for parity, race, religion, and menstrual cycle regularity.

CONCLUSION: Our findings suggest that body habitus may affect metabolism sufficiently to compromise contraceptive effectiveness. Consideration of a woman’s weight may be an important element of OC prescription. (Obstet Gynecol 2002;99:826-7. © 2002 by the American College of Obstetricians and Gynecologists.)

Safe and effective birth control is important to most young women, and over 90% of sexually active US women at risk of unintended pregnancy use contraception.1 Half of the 21 million US women who use reversible contraception choose oral contraceptives (OCs), and

In a 1980 letter to the Medical Journal of Australia, Boden reported a cluster of low-dose OC failures among relatively heavy women (Boden DC. Unplanned pregnancies and the pill [letter]. Med J Aust 1980;1:391). Also in 1980, a small study by Stadel et al of ethinyl estradiol (EE) blood levels in OC users found that women in the lowest serum EE quartile had a nonsignificantly higher mean weight than those in the highest quartile (142.2 versus 133.5 lb), indicating that OC metabolism may be enhanced among heavy women.3 No more recent research on this topic is evident, although the lower-dose OCs currently marketed may have a greater impact on failure likelihood among heavy women. We conducted this analysis to investigate the relationship between a woman’s weight and her risk of pregnancy while using OCs, using a population-based cohort of health maintenance organization enrollees.

MATERIALS AND METHODS

In this retrospective cohort analysis, we used data obtained in a case-control study of functional ovarian cysts and neoplasms conducted within Group Health Cooperative of Puget Sound (GHC) in western Washington State. This study was approved by the Fred Hutchinson Cancer Research Center and GHC Institutional Review Boards. All subjects in that study were female GHC enrollees aged 18-39 years, ascertained between January 1, 1990, and June 30, 1994. A total of 919 randomly selected matched controls were approached for participation, of whom 755 (82.2%) completed an in-person interview and a dietary questionnaire after in-
OC Pharmacokinetics

Serum concentration of EE and LNG in 13 normal weight and 15 obese study participants

Mean EE levels over 24 h after ingesting OC tablet
Mean LNG levels over 24 h after ingesting OC tablet

Westhoff CL. Contraception. 2010.
OC Pharmacokinetics

Serum concentration of EE and LNG in 13 normal weight and 15 obese study participants

Mean EE levels over 24 h after ingesting OC tablet

Mean LNG levels over 24 h after ingesting OC tablet

Westhoff CL. Contraception. 2010.
# Hoogland Scores by BMI

## Hoogland Scores by Body Mass Index Group (n=150)*

<table>
<thead>
<tr>
<th>Hoogland Score</th>
<th>Normal Weight</th>
<th>Obese</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>96</td>
<td>54</td>
<td>150</td>
</tr>
<tr>
<td>1</td>
<td>54 (56.3)</td>
<td>28 (51.9)</td>
<td>82 (54.7)</td>
</tr>
<tr>
<td>2</td>
<td>11 (11.5)</td>
<td>12 (22.2)</td>
<td>23 (15.3)</td>
</tr>
<tr>
<td>3</td>
<td>6 (6.3)</td>
<td>6 (11.1)</td>
<td>12 (8.0)</td>
</tr>
<tr>
<td>4</td>
<td>21 (21.9)</td>
<td>7 (13.0)</td>
<td>28 (18.7)</td>
</tr>
<tr>
<td>5/6</td>
<td>4 (4.2)</td>
<td>1 (1.9)</td>
<td>5 (3.3)</td>
</tr>
</tbody>
</table>

Data are n (%).
Fisher exact test $P=0.22$.
* Consistent oral contraceptive pill users only.

Westhoff, Obstetrics and Gynecology, 2010
Ovulation during the study cycle by compliance (n = 181)

Values shown as n (%)

<table>
<thead>
<tr>
<th></th>
<th>Ovulation</th>
<th>No Ovulation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consistent users</strong> (n = 150)</td>
<td>4 (2.7)</td>
<td>146 (97.3)</td>
</tr>
<tr>
<td><strong>Inconsistent users</strong> (n = 13)</td>
<td>5 (38.5)</td>
<td>8 (61.5)</td>
</tr>
<tr>
<td><strong>Non-users</strong> (n = 18)</td>
<td>12 (66.7)</td>
<td>6 (33.3)</td>
</tr>
<tr>
<td><strong>All participants</strong> (n = 181)</td>
<td>21 (11.6)</td>
<td>160 (88.4)</td>
</tr>
</tbody>
</table>

Ovulation as defined by Serum Progestin > 3ng/mL

Fisher exact test p-value < 0.0001
## Studies (2001-2008): OCs and Weight

<table>
<thead>
<tr>
<th>Yr/Author</th>
<th>N</th>
<th>Study Type</th>
<th>Weight</th>
<th>Obesity risk?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vessey &amp; Painter-2001</td>
<td>6779</td>
<td>Prospective cohort</td>
<td>Measured</td>
<td>No</td>
</tr>
<tr>
<td>Holt et al-2002</td>
<td>618</td>
<td>Retro cohort</td>
<td>Self-reported</td>
<td>Yes</td>
</tr>
<tr>
<td>Holt et al-2005</td>
<td>248/533</td>
<td>Case-control</td>
<td>Self-reported</td>
<td>Yes</td>
</tr>
<tr>
<td>Brunner &amp; Hogue-2005</td>
<td>2064</td>
<td>Retro cohort</td>
<td>Self-reported</td>
<td>No</td>
</tr>
<tr>
<td>Brunner et al-2007</td>
<td>1491</td>
<td>Retro cohort</td>
<td>Self-reported</td>
<td>No</td>
</tr>
<tr>
<td>Brunner et al-2006</td>
<td>179/223</td>
<td>Case cohort</td>
<td>Self-reported</td>
<td>No</td>
</tr>
<tr>
<td>Zhang*-2006</td>
<td>1673</td>
<td>Clinical Trial</td>
<td>Measured</td>
<td>No</td>
</tr>
<tr>
<td>Westhoff*-2008</td>
<td>6465</td>
<td>Clinical Trial</td>
<td>Measured</td>
<td>No</td>
</tr>
</tbody>
</table>

*Abstract

Trussell J. *Contraception* 2009; 334-8.
OC effectiveness according to BMI, weight, age, and other factors, Europe

**FIGURE 3**
Oral contraceptive failure vs overall body mass index

- n=52,218
- pyo=73,269
- pregnant=1634

OC failure by BMI, US

- n=59,510
- pyo=112,659
- pregnant=545

Dinger, Obstet and Gynecol 2011.
Pregnancy rates in a phase 3 trial of a 91-day OC by weight and BMI

Based on 1735 women (1/2 with BMI > 25), 36 pregnancies
OC Effectiveness Summary

- OC use is effective in women with BMI < 40.
- Caveat – no data re- women with BMI > 40.
- In U.S. society, obesity associated with characteristics associated with unintended pregnancy (e.g., poverty and less education)
- Past studies of obesity and “OC failure” may not have been able to adequately adjust for these salient factors.
Birth Control Patch

- Pooled analysis of 3 multi-centered trials
  - 7/15 pregnancies in women > 80kg
  - 5/15 pregnancies occurred in >90kg group – only 3% of patients
  - Possible decreased effectiveness noted in label.
  - Even for the heaviest women effectiveness was greater than 90%

- More data needed; new patch forthcoming.

## Novel Patch (EE2/Gestodene)

Women in each cycle achieving a maximum follicle size >13 mm.

<table>
<thead>
<tr>
<th>Cycle</th>
<th>Follicle size (mm)</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>BMI ≤30</td>
<td>30 &lt; BMI ≤ 35</td>
<td>BMI &gt; 35</td>
</tr>
<tr>
<td>Pre-Rx</td>
<td>&gt;13 mm</td>
<td>N=56 %</td>
<td>N=55 %</td>
<td>N=47 %</td>
</tr>
<tr>
<td></td>
<td></td>
<td>43/56 77</td>
<td>38/55 69</td>
<td>28/47 60</td>
</tr>
<tr>
<td>Cycle 1</td>
<td>&gt;13 mm</td>
<td>4/55 7</td>
<td>4/54 7</td>
<td>6/45 13</td>
</tr>
<tr>
<td>Cycle 2</td>
<td>&gt;13 mm</td>
<td>11/51 22</td>
<td>18/52 35</td>
<td>9/43 21</td>
</tr>
<tr>
<td>Cycle 3</td>
<td>&gt;13 mm</td>
<td>7/51 14</td>
<td>11/43 26</td>
<td>11/41 27</td>
</tr>
</tbody>
</table>

Westhoff, *in preparation*
Novel Patch (EE2/Gestodene)

<table>
<thead>
<tr>
<th>Hoogland Score in Cycle 2</th>
<th>Group 1 (BMI ≤30)</th>
<th>Group 2 (30&lt; BMI ≤35 )</th>
<th>Group 3 (BMI &gt;35)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=56 (100%)</td>
<td>N=55 (100%)</td>
<td>N=47 (100%)</td>
</tr>
<tr>
<td><strong>Cycle 2 (No. [%])</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 = No activity</td>
<td>50 (100)</td>
<td>44 (100)</td>
<td>41 (100)</td>
</tr>
<tr>
<td>2 = Potential activity</td>
<td>34 (68)</td>
<td>19 (43)</td>
<td>21 (51)</td>
</tr>
<tr>
<td>3 = Non-active FLS</td>
<td>6 (12)</td>
<td>8 (18)</td>
<td>11 (27)</td>
</tr>
<tr>
<td>4 = Active FLS</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>5 = LUF</td>
<td>9 (18)</td>
<td>13 (29)</td>
<td>8 (20)</td>
</tr>
<tr>
<td>6 = Ovulation</td>
<td>1 (2)</td>
<td>2 (5)</td>
<td>1 (2)</td>
</tr>
</tbody>
</table>

Westhoff, *in preparation*
# Novel Patch (EE2/Gestodene)

## Hoogland Score in Cycle 3

<table>
<thead>
<tr>
<th>Hoogland Score</th>
<th>Group 1 (BMI ≤30)</th>
<th>Group 2 (30 &lt; BMI ≤35)</th>
<th>Group 3 (BMI &gt;35)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=56 (100.0%)</td>
<td>N=55 (100.0%)</td>
<td>N=47 (100.0%)</td>
</tr>
<tr>
<td><strong>Cycle 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(No. [%])</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 = No activity</td>
<td>49 (100)</td>
<td>40 (100)</td>
<td>40 (100)</td>
</tr>
<tr>
<td>2 = Potential activity</td>
<td>30 (61)</td>
<td>21 (53)</td>
<td>25 (63)</td>
</tr>
<tr>
<td>3 = Non-active FLS</td>
<td>12 (25)</td>
<td>9 (223)</td>
<td>4 (10)</td>
</tr>
<tr>
<td>4 = Active FLS</td>
<td>0 (0)</td>
<td>1 (3)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>5 = LUF</td>
<td>7 (14)</td>
<td>7 (18)</td>
<td>9 (23)</td>
</tr>
<tr>
<td>6 = Ovulation</td>
<td>0 (0)</td>
<td>1 (3)</td>
<td>1 (3)</td>
</tr>
</tbody>
</table>
Contraceptive Vaginal Ring

- Phase III trials found no increase in failure for women in the highest weight decile (>166 lbs) versus the rest of the study population

Nuvaring Pharmacokinetics

Serum concentration of EE and ENG in 18 normal weight and 19 obese study participants

Nuvaring Pharmacokinetics

Serum concentration of EE and ENG in 18 normal weight and 19 obese study participants

DMPA

• Equal efficacy for obese women
  • 150-mg intramuscular or 106-mg subcutaneous formulations of DMPA
• Increasing obesity correlating with decreasing serum levels of MPA\(^3\)
  • still consistently above minimum needed for ovulation inhibition

DMPA

• Large inter-subject variability in serum DMPA levels.
• Fluctuating E2 levels reflective of follicular development occurred more in obese women
• DMPA levels lower among obese vs. normal wt and lowest among extremely obese subjects
• Median MPA levels remained above the level (200 pg/mL) needed to prevent ovulation

In a 6-month study of 13 obese women had lower serum ENG than four normal weight women. HOWEVER, all serum levels were greater than therapeutic threshold. NO pregnancies reported in obese implant users.
LNG VS. UPA EC
Reduced Efficacy in Obese Women

• For obese women LNG >4X greater pregnancy risk vs. normal-weight or underweight women.
• For obese women UPA >2X greater risk of pregnancy vs. normal-weight or underweight women.
• Rapid risk of ↓↓ efficacy with LNG with increasing BMI.
LNG VS. UPA EC

Reduced Efficacy in Obese Women

• LNG treated obese women had an observed pregnancy rate of 5.8%, which is > the pregnancy rate expected in the absence of use of EC

• No different from expected pregnancy rates among women not using EC at a BMI of 26 for LNG & at a BMI of 35 for UPA

• The limit of efficacy was reached at 70 kg for LNG & 88 kg for UPA so for this group of women, LNG-EC may be ineffective

Contraceptive Effectiveness & Obesity – Summary

- COCs, extensive data, little concern
- Ring, good data, no concern
- Implant, more data coming, no concern
- Depo, little data, minimal concern

- **Patch**, little data, some concern
- **LNG EC**, good data, substantial concern
CHCs and Weight Gain – Cochrane Review

• Three placebo-controlled, randomized trials found no evidence for a causal association between COCs or patch and weight gain.

• Comparisons of different CHCs showed no substantial difference in weight.

• Available evidence was limited, but no large effect of CHCs on weight was evident.

• Less data regarding POPs, no apparent effect.

Gallo 2008; Lopez 2013. Cochrane Database of Systematic Reviews
Weight change after 3 months OC use

Normal Weight
n=141

Obese
n=77

Mayeda and Westhoff (year?)
Weight Gain and other HCs

Patch not associated with a significant increase in body weight.

No evidence regarding weight change with CVR.  .

No evidence regarding weight change with ENG implants.
DMPA and Weight Gain

- About ¼ of DMPA users had early weight gain
- Most DMPA users who gain excessive weight, gain ≥ 5% within first 6 months
- Teens who gain early are at risk for continued excessive wt gain.
- Appropriate counseling should be done at this time point.

Bonny AE Obstet Gynecol 2011;117(4):793-797
Longitudinal Study of Adolescents

- Weight changes after 4-5 years of contraceptive use:

<table>
<thead>
<tr>
<th>Method</th>
<th>N</th>
<th>Weight Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-users</td>
<td>48</td>
<td>2.8 kg (sd 7.4 kg)</td>
</tr>
<tr>
<td>COC users</td>
<td>24</td>
<td>2.3 kg (sd 5.5 kg)</td>
</tr>
<tr>
<td>Injectable users</td>
<td>73</td>
<td>6.2 kg (sd 8.4 kg)</td>
</tr>
<tr>
<td>Dis-continuers</td>
<td>50</td>
<td>2.8 kg (sd 7.6 kg)</td>
</tr>
</tbody>
</table>

Beksinska et al. CONTRACEPTION 2010;81;30-34
## Obesity & VTE during OC use

<table>
<thead>
<tr>
<th>BMI level (kg/m²)</th>
<th>OC use</th>
<th>OR</th>
<th>CI95</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;25</td>
<td>No</td>
<td>1.0</td>
<td>Reference Group</td>
</tr>
<tr>
<td>≥25 &amp; &lt;30</td>
<td>No</td>
<td>0.9</td>
<td>0.4-2.0</td>
</tr>
<tr>
<td>≥30</td>
<td>No</td>
<td>1.5</td>
<td>0.6-3.7</td>
</tr>
<tr>
<td>&lt;25</td>
<td>Yes</td>
<td>4.6</td>
<td>2.2-9.6</td>
</tr>
<tr>
<td>≥25 &amp; &lt;30</td>
<td>Yes</td>
<td>10.2</td>
<td>3.8-27.3</td>
</tr>
<tr>
<td>≥30</td>
<td>Yes</td>
<td>9.8</td>
<td>3.0-31.8</td>
</tr>
</tbody>
</table>

Combined effects of Body Mass Index and oral contraceptive use on the risk of deep vein thrombosis in women aged 15-45 years (n = 382)

Abdollahi, Cushman, Rosendaal, 2003
## Obesity & VTE during OC use

<table>
<thead>
<tr>
<th>BMI level (kg/m²)</th>
<th>OC use</th>
<th>OR</th>
<th>CI95</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;25</td>
<td>No</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>≥25 &amp; &lt;30</td>
<td>No</td>
<td>2.52</td>
<td>1.38-4.57</td>
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<tr>
<td>≥30</td>
<td>No</td>
<td>3.04</td>
<td>1.66-5.57</td>
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<tr>
<td>&lt;25</td>
<td>Yes</td>
<td>4.15</td>
<td>2.85-6.03</td>
</tr>
<tr>
<td>≥25 &amp; &lt;30</td>
<td>Yes</td>
<td>11.63</td>
<td>7.46-18.14</td>
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<tr>
<td>≥30</td>
<td>Yes</td>
<td>23.78</td>
<td>13.35-42.34</td>
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</table>

Combined effect of body mass index (BMI) and oral contraceptive (OC) use on the risk of venous thrombosis in women aged 18–39 years. (n = 742)

Pomp, le Cessie, Rosendaal, Doggen, 2007
Obesity & VTE during OC use

- 196 VTE cases, 746 controls

| Non Users | RR = 1.0 |
| OC users BMI < 30 | RR = 3.34 |
| OC users BMI > 30 | RR = 6.04 |

Obesity + COC
VTE Risk

Obesity & VTE during OC use

EURAS results: Impact of age and BMI on VTE risk during OC use

Obesity & VTE during OC use

EURAS results: Impact of age and BMI on VTE incidence in OC users without other known risk factors

VTE risk, obesity and the Patch

- Obesity associated with ↑risk of VTE in patch users
- VTE risk is not materially different than that of users of LNG COCs in women <40 years.
- Can’t rule out some ↑risk in women aged ≥40
VTE risk, Obesity and the Ring

- Risk of VTE in new ring users probably similar to COCs.
- No data yet to evaluate risk in obese subgroup.
Current Guidelines & Recommendations

- CDC Medical Eligibility Criteria for Contraceptive Use, 2010
  - BMI $\geq 30 \text{ kg/m}^2 = \text{ Category 2}$

Rationale:
- VTE more common, but absolute risk small
- Equal rates of MI, weight gain
- Decreased efficacy for patch $>90\text{ kg}$ (by weight not BMI)
### Obesity & VTE

#### WHO MEC - 2009

<table>
<thead>
<tr>
<th>OBESITY</th>
<th>1</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>a) $\geq 30 \text{ kg/m}^2$ BMI</td>
<td>2</td>
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</tr>
<tr>
<td>b) Menarche to $&lt; 18$ years and $\geq 30 \text{ kg/m}^2$ BMI</td>
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</table>

**Evidence:** Obese women who use COCs are more likely to experience venous thromboembolism than obese women who do not use COCs. The absolute risk of venous thromboembolism in healthy women of reproductive age is small. Limited

#### US MEC - 2010

<table>
<thead>
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<th>Obesity</th>
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<tr>
<td>a. $\geq 30 \text{ kg/m}^2$ BMI</td>
<td>2</td>
</tr>
<tr>
<td>b. Menarche to $&lt; 18$ yrs and $\geq 30 \text{ kg/m}^2$ BMI</td>
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</table>

**Evidence:** Obese women who use COCs are more likely than obese women who do not use COCs to experience VTE. The absolute risk for VTE in healthy women of reproductive age is small. Limited evidence suggests that obese women who use COCs do not have a higher risk for acute myocardial infarction or stroke than do obese nonusers (147, 153–159). Limited evidence is inconsistent about whether COC effectiveness varies by body weight or BMI (160–165). Limited evidence suggests obese women are no more likely to gain weight after 3 cycles of the vaginal ring or COC than overweight or normal weight women. A similar weight gain during the 3 months was noted between the COC group and the vaginal ring group across all BMI categories (166). The effectiveness of the patch decreased among women who weighed $> 90$ kg; however, no association was found between pregnancy risk and BMI (18).
## Obesity & VTE

**UK MEC - 2009**

<table>
<thead>
<tr>
<th>OBESITY</th>
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</thead>
<tbody>
<tr>
<td>a) ≥30 - 34 kg/m(^2) body mass index</td>
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<td>The absolute risk of venous thromboembolism (VTE) in the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>women of reproductive age is low. The relative risk of VTE</td>
</tr>
<tr>
<td></td>
<td></td>
<td>increases with combined hormonal contraceptive use.</td>
</tr>
<tr>
<td>b) ≥35 kg/m(^2) body mass index</td>
<td>3</td>
<td>Nevertheless, the absolute risk of VTE in combined hormonal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>contraceptive users is still low. The risk of VTE rises as BMI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>increases over 30 and rises further with BMI over 35. Use of</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CHC raises this inherent increased risk further.(^{15-20})</td>
</tr>
</tbody>
</table>
HC & Obesity - SUMMARY

• No change in HC effectiveness up to BMI = 40

• LNG-EC effectiveness merits further study

• Weight gain limited to subset of DMPA users.

• VTE risks important (& age matters)
Obesity & Contraception

Additional Points

- Remember Hysteroscopic BTL
- Remember Mirena to control bleeding & prevent endometrial cancer
- IUD insertions more challenging
- Mifepristone – no need to increase dose
- CHCs OK after bariatric surgery
Current Guidelines & Recommendations

• “(T)he Society of Family Planning strongly encourages the use of both hormonal and nonhormonal methods of contraception in obese women desiring pregnancy prevention with very few restrictions.”
