Birth Control in the 21st Century

What the Primary Care Provider Needs to Know!

Cynthia de Steuben, APRN, CNM, FNP
None of the planners or presenters of this session have disclosed any conflict or commercial interest
Objectives

1. Increase knowledge about the available methods of contraception, including efficacy, safety and non-contraceptive benefits.
2. Assess women who are having side effects or potential complications related to contraceptive use.
3. Utilize the US Medical Eligibility Criteria for Contraceptive Use to counsel women about their contraceptive choices.
Why is it important to have primary care providers (adult and pediatric alike) knowledgeable about the various methods of contraception?
Why is it important?

50% of pregnancies in the US are unintended
That is 3.1 million pregnancies

4 in 10 end in induced abortion

1/2 of unintended pregnancies result from contraceptive failure
Effective, properly used, safe, cost effective contraceptive will:

- Reduce unintended pregnancy
- Reduce abortion
- Reduce teen pregnancy
- Reduce maternal morbidity and mortality
Why is it important?

Do you know if what she reports is a side effect or a complication of her birth control method?

Is she using the most effective method of birth control for her?

When should you refer?
Women with chronic disease have:

- Increased risk of morbidity and mortality
- Exacerbation of disease status
- Poor fetal outcomes – IUFD, PTD, LBW, congenital anomalies & teratogen exposure
Why is it important?

Women with chronic medical conditions should be evaluated for risk of unintended pregnancy, intention to become pregnant, and for use of appropriate and effective birth control.
It is important to optimize disease status before pregnancy.
Do you have any of these women in your panel?

- Teen
- Perimenopausal
- Tobacco use
- Obese
- Bariatric surgery
- Hypertension
- Seizure disorder
- Mental health disorder
Acne
Migraines
History of thromboembolic event
Diabetes
Asthma
Chronic heart disease
HIV/AIDS
MRSA
RA
Do any of the women in your panel take:

- St John’s Wort
- Rifampin
- Topiramate (Topamax)
- Lamotrigine (Lamictal)
- Cyclosporine
Do any of the women in your panel take:

Valproic Acid (Depakote)
Lithium
Spironolactone
Isotretinon (Accutane)
Orlistat
Doxycycline
Methotrexate
Think of birth control as a vital sign!
Questions to ask every woman between the age of 15 and 45

1. Do you intend to become pregnant in the next year?
2. Are you using birth control?
3. What are you using for birth control?
US Medical Eligibility Criteria for Contraceptive Use

Available at:
www.cdc.gov
Provides evidenced-based recommendations for safe use of contraceptive methods with various conditions.
1 = A condition for which there is no restriction for the use of the contraceptive method.
2 = A condition for which the advantages of using the method generally outweigh the theoretical or proven risks.
3 = A condition for which the theoretical or proven risks usually outweigh the advantages of using the method.
4 = A condition that represents an unacceptable health risk if the contraceptive method is used.
Antiepileptic Drugs and Hormonal Contraceptives

Potential adverse effects:
- Contraceptive Failure
- Recurrence of seizure activity
In the liver, certain AEDs and COCs induce and are metabolized by the CYP450 enzyme system. These enzyme-inducing (EI) AEDs increase metabolism of the exogenous hormones resulting in as much as a 50% decrease in serum hormonal concentration.
### Us Medical Eligibility Criteria for Contraceptive Use Category for EI-AED

<table>
<thead>
<tr>
<th>Drug</th>
<th>COCs, Patch, Ring</th>
<th>POP</th>
<th>Progestin Implant</th>
<th>DMPA Injection</th>
<th>LNG-IUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbamazepine (Tegretol)</td>
<td>3</td>
<td>3</td>
<td>2</td>
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<td>1</td>
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<tr>
<td>Felbamate (Felbatol)</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Oxcarbazepine (Trileptal)</td>
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<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Phenobarbital</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Phenytoin (Dilantin)</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Primidone (Mysoline)</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Topiramate (Topamax)</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
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</tr>
<tr>
<td>Rufinamide (Benael)</td>
<td>NA</td>
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<td>NA</td>
</tr>
<tr>
<td>Lamotrigine (Lamictal)</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>NA</td>
<td>1</td>
</tr>
</tbody>
</table>

Adapted from: US Medical Eligibility Criteria for Contraceptive Use, 2010, CDC
NEI-AEDs that do not affect hormonal contraceptives

Lacosamide (Vimpat)
Valproate sodium (Depakote)
Zonisamide (Zonegran)
Gabapentin (Neurontin)
Vigabatrin (Sabril)
Levetiracetam (Keppra)

Pregabalin (Lyrica)
Tiagabine (Gabilitril)
Benzodiazepines
Ethosuximide (Zarontin)
Actazolamide (Diamox)
Lamotrigine (Lamictal) has a different effect on and a different interaction with sex hormones.

COCs reduce the serum lamotrigine level due to an increase in AED metabolism which affects the stability and predictability of seizure control.

Lamotrigine levels can be significantly reduced (40-60%) with COC use, but can also significantly increase during hormone free interval.
It is the estrogen in the combination methods that decrease the serum concentrations.

No drug interactions have been found in women taking lamotrigine and POPs, DMPA, etonogestrel implant (although company literature notes possible interaction) or levonorgestrel-releasing IUD.
Topiramate

Decreases estrogen in doses higher than 200 mg/day
No effect on progesterone
May reduce the contraceptive effectiveness
Broad-spectrum antibiotics do not affect the contraceptive effectiveness of COCs

Rifampin is likely to reduce the effectiveness of CHCs, POPs and ETG implants.

Rifampin does not decrease effectiveness of DMPA, Cu-IUD or LNG-IUD
1. Theoretical risk of decreased efficacy due to larger mass distribution
2. Women who are obese have a higher risk of venous thrombosis, hormonal contraceptives increase risk of VTE
3. How does bariatric surgery affect efficacy since these procedures affect absorption in the gut.
Trials that have led to FDA approvals of contraceptive methods generally use 130% of ideal body weight as their upper limit for study inclusion.

That roughly translates to a BMI under 30!
Migraines and CHC

Migraines with aura increases risk of stroke

Women with a history of migraines who use CHC are 2-4 times as likely to have an ischemic stroke as nonusers with a history of migraine.
A pelvic exam is not needed before initiating contraception in teens. Screen for sexual activity and STIs at every encounter. Talk about condoms every chance you have.
Long-active Reversible Contraception for Teens

IUDs and Implants
Require no effort for adherence
Highly effective without further action
3-10 year duration of contraception
When to initiate a method

Any time if you can be reasonably certain she is not pregnant
No symptoms or signs of pregnancy and meets one or more of the following criteria:

* is <7 days after the start of a normal period
* has not had sexual intercourse since the start of last normal period
* has been correctly and consistently using a reliable method of contraception
* is < 7 days after a spontaneous or induced abortion
* is within 4 weeks postpartum
* is fully or nearly fully breastfeeding, amenorrheic and < 6 months postpartum

### When to start a contraceptive method

<table>
<thead>
<tr>
<th>Contraceptive Method</th>
<th>When to start, if provider is reasonably certain woman is not pregnant</th>
<th>Back-up needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNG IUD</td>
<td>Any time</td>
<td>If &gt; 7 days of cycle, use back-up method or abstain for 7 days</td>
</tr>
<tr>
<td>Copper IUD</td>
<td>Any time</td>
<td>Not needed</td>
</tr>
<tr>
<td>Implant (etongestrel)</td>
<td>Any time</td>
<td>If &gt; 5 days of cycle, use back-up method or abstain for 7 days</td>
</tr>
<tr>
<td>Injectable</td>
<td>Any time</td>
<td>If &gt; 7 days of cycle, use back-up method or abstain for 7 days</td>
</tr>
<tr>
<td>CHC</td>
<td>Any time</td>
<td>If &gt; 5 days of cycle, use back-up method or abstain for 7 days</td>
</tr>
<tr>
<td>Progestin-Only Pills (POPs)</td>
<td>Any time</td>
<td>If &gt; 5 days of cycle, use back-up method or abstain for 2 days</td>
</tr>
</tbody>
</table>
Long-active Reversible Contraception

Intrauterine Devices

Implant
History

IUDs were used by 10% of US contraceptive users in the 1970s. Several available, most were inert devices (no copper, no progestin). One device, Delkon Shield, linked to PID. Multi-filmented threads acted as a wick that allowed bacteria to ascend to upper genital track. Another contributing factor: in the 1970s it was not possible to test for asymptomatic chlamydia.
Early IUDs

- Lippies Loop
- Self T Coil
- Dalkon Shield
Available Intrauterine Contraception

- Paragard – Copper T – labeled for 10 years of use
- Mirena – Levonorgestrel – labeled for 5 years of use
- Skyla – Levonorgestrel – labeled for 3 years of use
- Lilitta – Levonorgestrel – currently labeled for 3 years of use
Intrauterine Contraception

Mechanism of action

Alters the uterine environment by promoting a foreign-body reaction in the uterine cavity that prevents fertilization.

Cu-IUD causes an increase in copper ions, enzymes, prostaglandins and macrophages in uterine and tubal fluids that impair sperm function.

LNG-IUD also thickens the cervical mucous, suppresses the endometrium and impairs sperm function.
Intrauterine Contraception

Advantages
Highly effective: failure rate 0.2 % (LNG) to 0.8% (CU)
No estrogen
Long term protection
Rapid reversibility
Cost effective
Convenient and private
Can be used during breastfeeding
Intrauterine Contraception

Non-contraceptive benefits of LNG-IUC

- Reduces menstrual blood loss
- Reduced dysmenorrhea
- Reduced risk of endometrial cancer
- Effective alternative to hysterectomy and ablation
- May decrease risk of PID (thickened cervical mucous provides barrier to ascending infection)
Intrauterine Contraception

Side effects

Menstrual disturbances

Expulsion

Cramping
Intrauterine Contraception

Disadvantages

Availability may be limited, requires trained provider

Risk of perforation of the uterus

No protection against STIs
Intrauterine Contraception

Pearls

Cu-IUD is the most effective emergency contraception.

IUD does not have to be immediately removed if diagnosed with PID.

Effective longer than labeled.
Etonogestrel Implant

Nexplanon (Merck)

4 cm long non-biodegradable rod

68 mg etonogestrel

Labeled for 3 years of use
Subdermal implant

Implant is placed underneath skin of arm
Etonogestrel Implant

Mechanism of action
Suppresses ovulation
Alters endometrial structure
Changes cervical mucous that may impede sperm penetration
Etonogestrel Implant

Advantages

Highly effective: 0.5 to 1 pregnancy/1000 users
Easy: nothing to forget
Discreet: no supplies, resupply or follow-up clinical care until removal
No estrogen
Reversible
Cost effective
Can be used during breast feeding
Etonogestrel Implant

Non-contraceptive benefits

- No adverse effect on acne
- Relief of dysmenorrhea
- Relief for pelvic pain due to endometriosis
Changes in menstrual bleeding patterns:

- Frequency – absent, less, more frequent or continuous
- Intensity – reduced or increased
- Duration
In clinical studies (and clinical practice) bleeding irregularities was (is) the most common side effect sited for removal of the implant.
Etonogestrel Implant

Disadvantages

Implants must be inserted and removed by a trained clinician

No protection against STIs
Pearls

Bleeding pattern in first 3 months is predictive of future pattern

Have patient chart bleeding over 90 days, seeing it on paper may reduce concern

Does not work to reduce PMS/PMDD

Consider replacing < 3 yrs in obese women
Depot medroxyprogesterone acetate

Depo-Provera: 150 mg/1 ml – given IM every 12 weeks

Depo-subQ Provera 104: 104 mg/0.65 ml – given sc every 12 weeks
DMPA

Mechanism of Action

Primarily inhibits ovulation

Thickens and decreases cervical mucous
preventing sperm penetration
DMPA

Advantages

Highly effective: 6% failure rate with typical use (0.2% with perfect use)

Efficacy not compromised by greater body weight

DMPA avoids first-pass metabolism, it effectiveness is unaffected by medications that may increase hepatic enzyme activation
DMPA

Advantages

No estrogen
Reversible
Infrequent dosing
Can be used during lactation
Non-contraceptive Benefits

Amenorrhea: 50% by 1 year
Fewer menstrual symptoms
Fewer seizures
Fewer sickle cell crises
Reduced pain from endometriosis
Decreased risk of endometrial cancer
DMPA

Side effects

Menstrual cycle disturbances
Weight gain
DMPA

Disadvantages

Cannot discontinue immediately: DMPA is cleared from body in 6-8 months after last injection

Delay in return of fertility: median delay to conception is 9-10 months after last injection

Requires office visits every 3 months

No protection against STIs
In November 2004, the FDA added a black box warning to the label of DMPA:

* “Women who use Depo-Provera Contraceptive Injection may lose significant bone mineral density”.

*”It is unknown if use of Depo-Provera Contraceptive Injection during adolescence or early adulthood . . . . . will reduce peak bone mass and increase the risk of osteoporotic fracture in later life.”
In June 2005, the World Health Organization reviewed the evidence.

*They concluded “there should be no restriction on the use of DMPA, including no restriction on duration of use, among women age 18-45 “

* “Among adolescents (menarche to < 18) and women over 45, the advantages . . . . Usually outweigh the theoretical safety concerns regarding fracture risk.”
Women with conditions that already place them at high risk of osteoporosis, such as chronic corticosteroid use, disorders of bone metabolism, strong family history of osteoporosis (?genetic mutation) or anorexia, may not be appropriate for long-term use of DMPA.
Progestin Only Pill

Sometimes called “minipills”

Norethindrone

Pill is taken daily, no hormone free interval
POP

Mechanism of Action

Ovulation is inhibited (about 50% of the time)
Cervical mucous is thickened and decreased, preventing sperm penetration
  Activity of the cilia in fallopian tubes reduced, slowing egg movement
Endometrium is altered, inhibits implantation of fertilized egg
Failure rate with typical use is 9% (perfect use < 1%)
They are often thought to be less effective that combination pills, but are very effective when taken properly in motivated users
For maximum efficacy the pill must be taken at the same time every day, they are not as forgiving as combination pills
Advantages

No estrogen
Low hormone dose
Few contraindications
Immediate reversibility
Can be used with breastfeeding
Side Effects
Menstrual cycle disturbances
Headaches
Nausea
POPO
Disadvantages
Vulnerable efficacy
Potential increase in ovarian cysts
Lack of protection against STIs
Limited availability ($)
POP

Pearls

Tea time dosing
Combined Hormonal Contraceptives

Combined Oral Contraception
Contraceptive Patch
Vaginal Contraceptive Ring
Birth control pills

Vaginal ring

Birth control patch
Combined Oral Contraceptive (COCs)

Are synonymous with contraception in the US
Have been available over 50 years – first pill approved May 1960
Enovid-10 contained 9.85 mg norethynodrel and 150 mcg Mestranol
COCs

Progestin provide the majority of the contraceptive actions
Thicken the cervical mucous preventing sperm penetration
Blocks LH surge and prevents ovulation (dependent on dose and potency of the progestin)
10 different progestins have been used in COCs in the US
Progestins vary in bioavailability, dose needed to inhibit ovulation and half-life.

Each new “generation” of progestins were developed to address side effects and non-contraceptive benefits of the pill.
First-generation progestins

Norethynodrel, Norethindrone, Norethindrone acetate and Ethynodiol diacetate

Well tolerated and some are still used today

These compounds have lower potency and relatively short half-lives

As doses have decreased, more unscheduled spotting and bleeding became more common
Second-generation progestins
Norgestrel and Levonorgestrel
To solve the problem of BTB, these are more potent and have a longer half-life
Associated with more androgen-related side effects: acne, facial hair, adverse effect on lipids
Third-generation progestins
Desogestrel and Norgestimate
Introduced to maintain the high potency of the second generation progestins and to reduce the androgenic side effects
Reduction of androgen increases estrogen impacts resulting in some clinical benefits
Ortho Tri-cyclen was the first pill to be approved for the treatment of mild to moderate cystic acne
Fourth-generation progestins

Drospirenone

Analogue of spironolactone, anti-androgenic properties

New non-contraceptive applications: PMDD and acne
COCs

Estrogen was added to the pill for better cycle control

Does contribute to ovulation suppression
COC Formulations

Monophasic
Multiphasic
Extended cycle
Mechanism of action

Progestins inhibit ovulation and thicken cervical mucous to prevent sperm penetration

Estrogen decreases folliculogenesis by suppressing FSH
COCs

Advantages

Effective: failure rate with typical use is 9%  
(perfect use < 1%)  
Options throughout reproductive years  
Rapid return of fertility
COCs

Non-contraceptive Benefits

Decreased dysmenorrhea
Decreased menstrual blood flow
Menstrual regulation
Reduce PMS/PMDD
Reduction in ovarian cysts
COCs

- Improve menstrual migraines
- Reduce risk of ovarian and endometrial cancer
- Improve acne
- Reduce hirsutism
- Reduce iron deficiency anemia
- Reduce symptoms of endometriosis
COCs

Side effects
- Headaches
- Nausea
- Irregular bleeding
- Mood swings and depression
- Decreased libido
- Skin changes
COCs

Disadvantages

Daily administration
Expense
Access challenges
Need for storage and ready access
No protection against STIs
COCs

Pearls

Shorter hormone free intervals

Quick Start
Ortho Evra – transdermal contraceptive patch approved in 2002 (now Zulane, 2014)

- 6 mg of norelgestromin and 0.75 mg ethinyl estradiol
- Applied to buttocks, upper arm, lower abdomen or upper torso
- Mimics the 28 day dosing schedule of the pill
- Three 7-day patches for 1 week each, then have a 7-day patch-free interval
Contraceptive Patch

Effectiveness
Failure rate with typical use is 9% (0.3% with perfect use)

Advantages
No need for oral administration: malabsorption
No daily dosing may increase compliance

Side effects
Skin reactions
Contraceptive Patch

Potential increased risk of VTE due to higher serum ethinyl estradiol levels
May be less effective in obese women
NuvaRing: a soft, transparent, flexible ring
120 mcg of etonogestrel and 15 mcg of ethinyl estradiol

Each ring is placed vaginally once every 28 days, it is removed after 21 days for a 7-day ring-free period.
Vaginal Contraceptive
Ring

Effectiveness
Failure rate with typical use is 9% (0.3% with perfect use)

Advantages
No daily dosing

Side effects
Increased vaginal discharge
References/Tools


Questions
References


Burkman, RT (2016) Obesity and Contraceptive Efficacy and Risk. OBG Management. 28 (1):30-31


The American College of Obstetricians and Gynecologist. Committee Opinion:
Depot Metroxyprogesterone Acetate and Bone Effects. Number 602, June 2014.