

## **Contraception: Public Health Perspectives and Clinical Applications**

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### **INSTRUCTOR:**

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### **OUTLINE**

1. Reasons for contraception use
2. Epidemiology and public health benefits of contraceptive care in the United States
  - a. Population in need of contraceptive services
  - b. Frequency and distribution of contraception method use in the US
  - c. National public health goals related to contraception
  - d. Public health benefits of contraception
3. Characteristics, mechanism of action, efficacy, and safety of contraception methods applicable in clinical settings
  - a. Overview of available contraception methods
  - b. Mechanism of action of all methods
    - i. hormonal methods
    - ii. IUDs
  - c. Distinguishing characteristics of the various contraception methods to guide patient counseling and method selection
  - d. Efficacy by method
    - i. Perfect use vs typical use framing
  - e. Important safety considerations when prescribing contraception
  - f. 3 Case examples
4. Summary points

**OBJECTIVES:** After studying this unit you should be able to:

1. Outline reasons for contraception use
2. Describe the epidemiology and public health benefits of contraceptive care in the United States
3. Apply knowledge about the characteristics, efficacy, and safety of various contraceptive methods to the care of a patient

### **READING REFERENCES:**

References for content included in the slides should students want to explore these resources further.

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7. Jones RK, People of all religions use birth control and have abortions, Guttmacher Institute, 2020, <https://www.guttmacher.org/article/2020/10/people-all-religions-use-bir...>.
8. Kavanaugh ML and Pliskin E, Use of contraception among reproductive-aged women in the United States, 2014 and 2016, *F&S Reports*, 2020, 1(2):83–93, [https://www.fertstertreports.org/article/S2666-3341\(20\)30038-6/fulltext](https://www.fertstertreports.org/article/S2666-3341(20)30038-6/fulltext).
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12. Peragallo Urrutia R et al., Effectiveness of fertility awareness–based methods for pregnancy prevention: a systematic review, *Obstetrics & Gynecology*, 2018, 132(3):591–604, doi:10.1097/AOG.0000000000002784.
13. Urrutia RP and Polis CB, Fertility awareness based methods for pregnancy prevention, *BMJ*, 2019, 366:l4245, doi:10.1136/bmj.l4245.
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# Contraception: Public Health Perspective and Clinical Applications

Angela Dempsey, MD, MPH

# Learning Objectives

- Outline reasons for contraception use
- Describe the epidemiology and public health benefits of contraceptive care in the United States
- Apply knowledge about the characteristics, efficacy, and safety of various contraceptive methods in patient counseling

# Learning Objective #1:

## Outline reasons for contraception use.

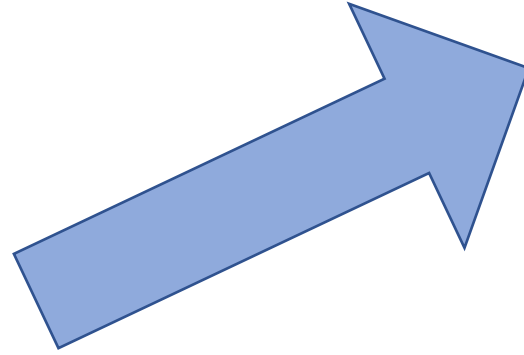
- Avoid pregnancy/plan the timing of their pregnancy and space births
- Therapy for a range of medical conditions
  - Abnormal uterine bleeding
  - Endometriosis
  - Anovulatory disorders such as Polycystic Ovarian Syndrome (PCOS)
  - Anemia due to heavy menstrual bleeding
  - Reduce hormone-sensitive conditions like menstrual headaches, premenstrual dysphoric disorder, etc.

## Learning Objective #2:

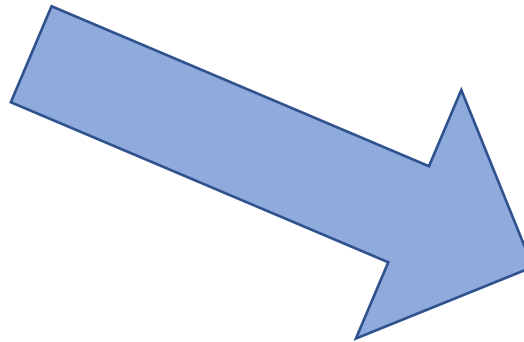
Describe the 1) epidemiology and 2) public health benefits of contraceptive care in the United States



On average, US  
adults think  
2.7 children is  
ideal.



3 years pregnant,  
postpartum, or  
trying to become  
pregnant.



3 decades trying  
to avoid  
pregnancy.



# Contraception Epidemiology

- 73 million women in the US age 15-49 (reproductive age)
  - 46 million are sexually active & not seeking pregnancy
- A couple using no contraception has 85% chance of becoming pregnant over one year.
- 99% of women age 15-44 who have ever had sexual intercourse have used at least one form of contraception during their lifetime. (Includes women who identify as Catholic or Protestant Evangelical)
- 65% of all women 15-49 in the US are currently using a contraceptive method.





Method Type	% of contraceptive users reporting this method
Permanent female cont.	27.7%
Pill	21.4%
External condom	12.9%
IUD	12.9%
Partner vasectomy	8.6%
Withdrawal	5.6%
Implant	3.1%
Injection	3.0%
Natural Family Planning	2.6%
Vaginal Ring	1.3%
Patch	0.5%
Emergency contraception	0.2%
Other methods (ex. Diaphragm, sponge, spermicide)	0.3%

- Oral contraception and permanent female contraception are the most commonly-used methods
- Reliance on permanent methods varies from 10% under age 30 to 61% of those ages 45-49
- 20% use more than one method (58% condoms plus another method)

# Healthy People 2030 Goals

**FP-1** Reduce the proportion of pregnancies that are unintended

**FP-2** Reduce the proportion of pregnancies conceived within 18 months of a previous birth

**FP-3** Reduce pregnancies in adolescents.

**FP-9** Increase the proportion of women in need of publicly funded contraceptive services and supplies who receive them

**FP-10** Increase the proportion of females at risk of unintended pregnancy who use effective birth control



# Public Health Benefits of Contraception

- Named as one of the 10 greatest public health achievements of the 20th century by the CDC
- Reduces unintended pregnancy and abortion rates
- Contributes to reduced maternal mortality worldwide
- Improves maternal and child health by facilitating birth spacing
- Supports ability of people to complete education, engage in workforce, and reach economic self-sufficiency
- Reduces risk of ovarian and endometrial cancers

### Learning Objective #3:

Apply knowledge about the characteristics, efficacy, and safety of various contraceptive methods to patient counseling.

# Available Contraceptive Methods

Image courtesy of bedsider.org



IUD



Subdermal  
Implant



Injection



Transdermal patch



Oral Contraception



Internal Condom



Fertility Awareness



Abstinence



Condom



Vaginal  
ring



Diaphragm



Sponge



Cervical  
Cap



Emergency  
Contraception



Withdrawal



Spermicide

Permanent

# How clinicians can categorize the available contraception methods

- Mechanism of action
- Hormonal vs non-hormonal
  - Combined (with estrogen & progesterone) versus progesterone only
- Duration of use
- Provider involvement in initiation and discontinuation
- Potential side effects and impact on bleeding pattern
- Levels of effectiveness



# Mechanisms of Action

All prevent fertilization of egg by sperm

## Prevents fertilization

- Abstinence
- Natural family planning (avoiding intercourse during ovulation)

## Incapacitates Sperm

- Copper IUD

## Blocks fallopian tube

- Permanent female contraception

## Prevents ovulation

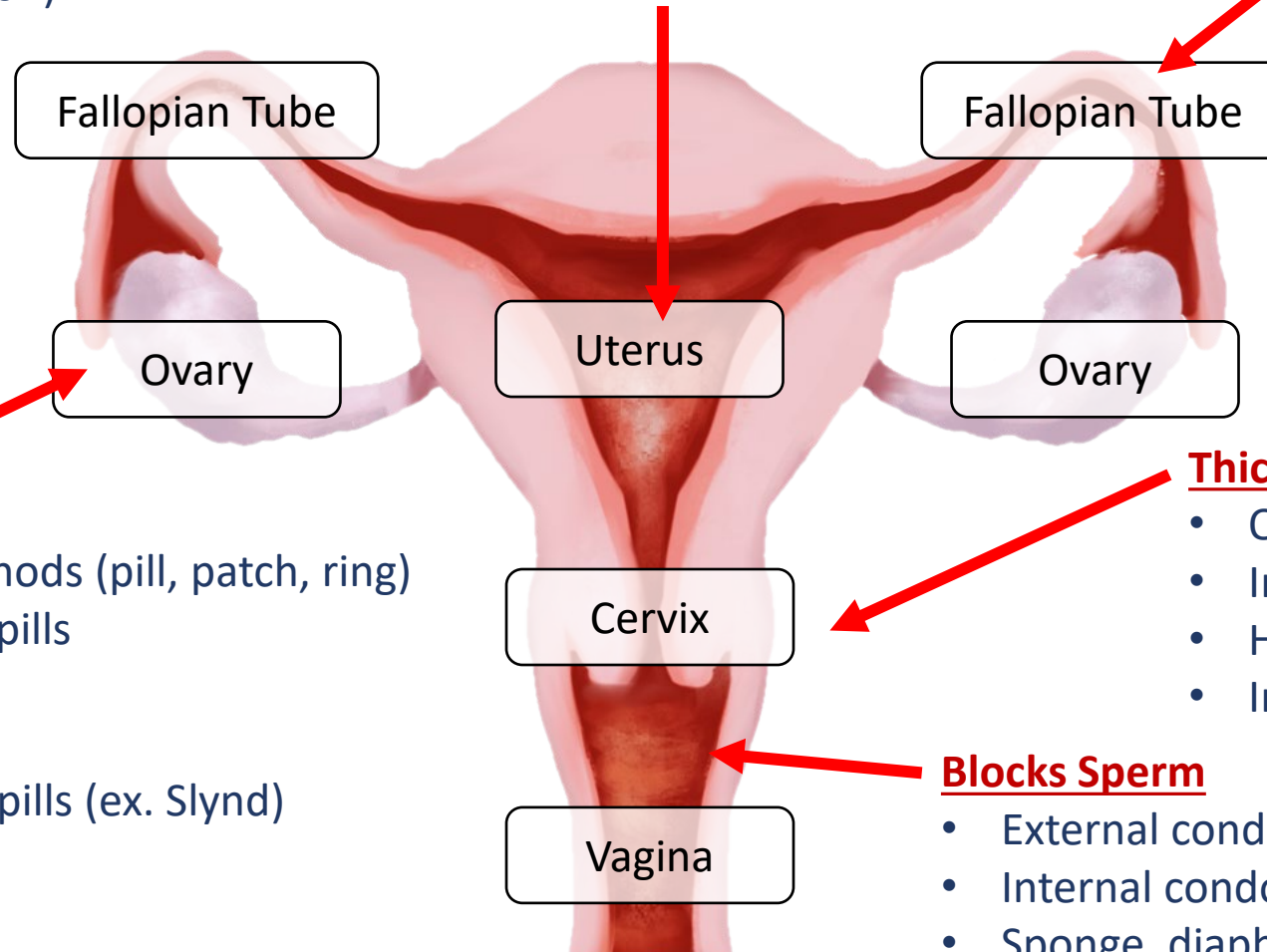
- Combined Hormonal Methods (pill, patch, ring)
- Emergency contraceptive pills
- Progestin Only Methods
  - Implant
  - Some progestin only pills (ex. Slynd)
  - Injection
- Lactational Amenorrhea

## Thickens Cervical Mucus (progestin)

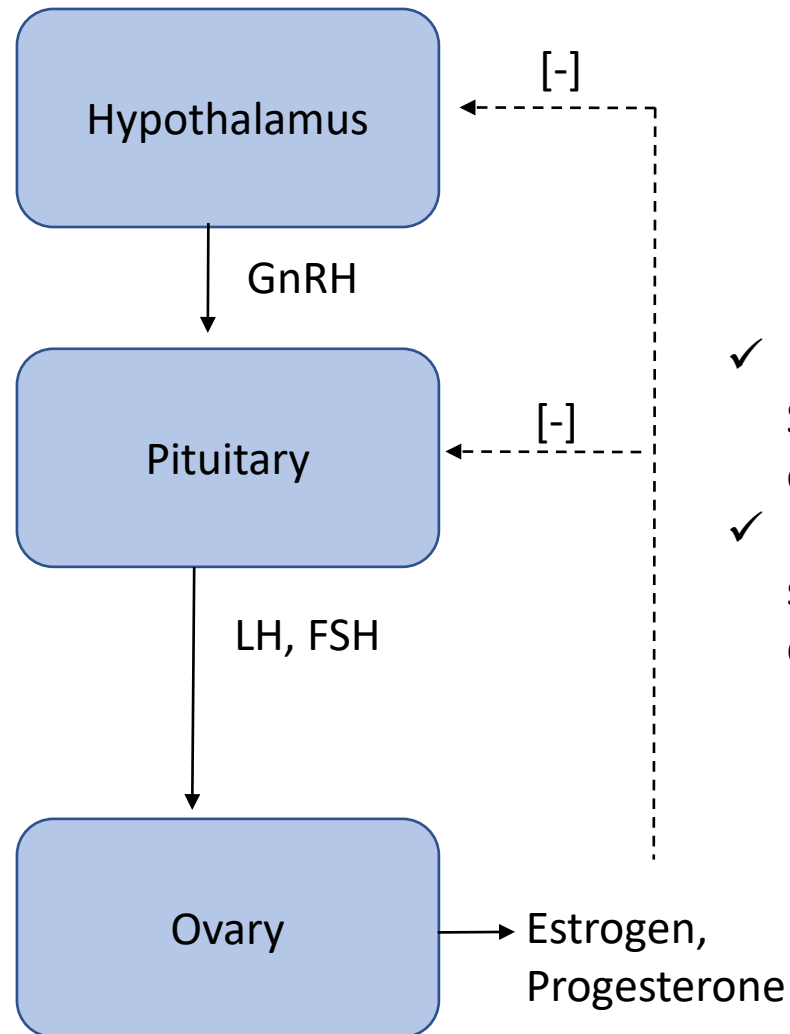
- Oral contraception
- Implant
- Hormonal IUDs
- Injection

## Blocks Sperm

- External condom
- Internal condoms
- Sponge, diaphragm, cap



# Mechanism of Action – Hormonal Contraception



- ✓ Progesterone Inhibits the LH Surge in turn inhibiting ovulation
- ✓ Estrogen inhibits FSH in turn suppressing follicle development

## **Additional progestin-mediated effects**

- ✓ Thickens cervical mucus
- ✓ Decreases motility of cilia in the fallopian tube
- ✓ Endometrial atrophy



# Mechanism of Action – IUD

## Copper IUD

Increases copper ion in uterine and tubal environment

Copper has spermicidal action

## Levonorgestrel IUD

Thickens cervical mucus

Endometrial activity

About 50% of users do not ovulate

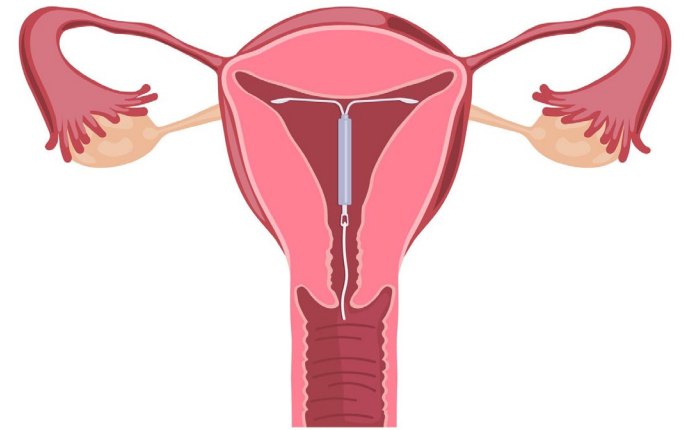


Image of IUD in uterus  
from <https://www.netdoctor.co.uk/conditions/sexual-health/a2212/contraceptive-coils-iuds/>

# Hormonal *versus* non-hormonal

## Hormonal

- Oral contraception
- Transdermal patches
- Vaginal rings
- Hormonal IUDs
- Etonogestrel Implant (Nexplanon)
- Injection (Depo Provera)

## Reasons to avoid hormones

- Contraindications to estrogen
- Breast cancer
- Patient preference
- Drug interactions

## Non-Hormonal

- Permanent Female
- Vasectomy
- Non-hormonal IUD
- Condoms
- Withdrawal
- Diaphragm
- Natural family planning

# Combined hormonal *versus* Progesterone-only

## Estrogen/ Progesterone

- Combined oral contraception
- Transdermal patches
- Vaginal rings

## Progesterone-only

- Progestin-only oral contraception
- Levonorgestrel IUDs
- Etonogestrel Implant (Nexplanon)
- Injection (Depo Provera)

# Long-acting *versus* Short-acting

## Permanent

- Female permanent
- Vasectomy

## Long-acting

- Copper IUD (10+ years)
- LNG IUD (8 years)
- Implant (3+ years)

## Short-acting

- Oral contraception (daily)
- Transdermal patches (weekly)
- Vaginal rings (monthly)
- Injection (q3 months)

# Provider-required *versus* Self-initiated

## Provider-required

- Permanent female
- Vasectomy
- IUDs
- Implant

## Prescription

- Oral contraception
- Patch
- Vaginal ring
- Injection

## Self-initiated

- Condoms
- Withdrawal
- Natural family planning
- Opill over the counter



# Anticipated Bleeding Patterns

Contraception Method	Typical Bleeding Effects
Combined hormonal pills, patches, rings	Regular, predictable, monthly
Progestosterone only (implant, pills, inject.)	Irregularly timed or amenorrhea
Hormonal IUDs	Very light or amenorrhea
Copper IUD	No effect on timing of bleeding, may be slightly heavier when it occurs
Permanent methods	No effect
Barrier methods (ex. Condom, diaphragm)	No effect

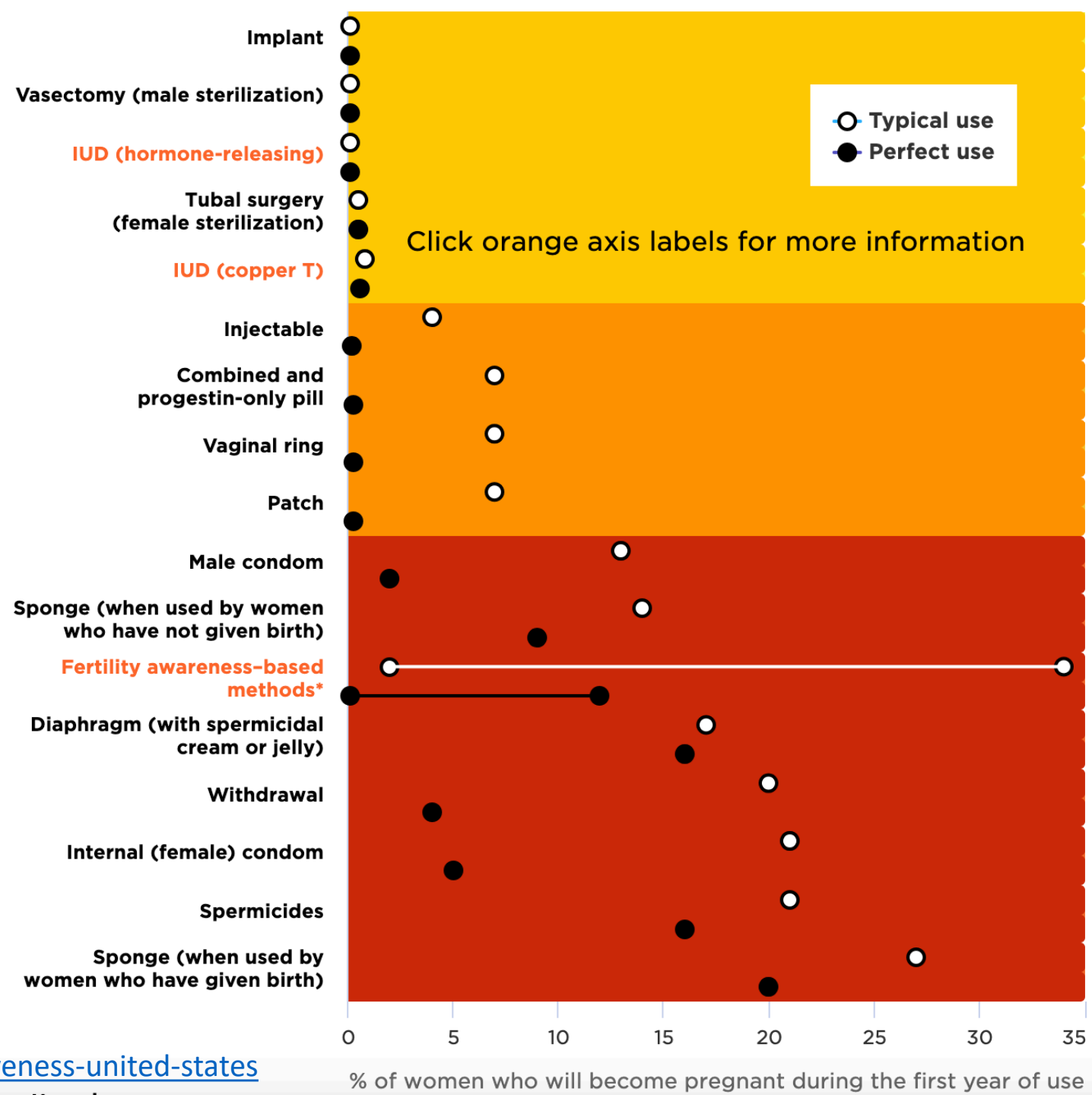
# Methods vary significantly in efficacy.

- Contraceptive failure defined as **percentage of users who will become pregnant within the first 12 months of initiating use**
  - Perfect use = failure rate in setting of consistent and correct use
  - Typical use = failure rate taking into account inconsistent and incorrect use by some users
- Implant and IUD = most effective reversible methods
- Implant and IUD perform as well as permanent methods

Contraceptive Method	Perfect use	Typical use
Pill	0.3%	7%
Permanent Female	0.5%	0.5%
External condom	2%	13%
IUD	0.2-0.6%	0.2-0.8%
Vasectomy	0.10%	0.15%
Withdrawal	4%	20%
Injectable	0.2%	4%
Implant	0.05%	0.05%
Vaginal ring	0.3%	9%
Fertility Awareness	0.4-5%	24%
Patch	0.3%	9%
Diaphragm	6%	12%

Failure rates defined as % of women who will become pregnant over one year of use.

# Perfect vs Typical Use Failure Rates by Method







# Contraceptive safety is impacted by patient medical history.

- Contraindications to **estrogen** therapy → think about conditions that increase the risk of venous or arterial thromboembolism
  - History of DVT or PE or thrombophilia
  - SLE with positive antiphospholipid antibodies
  - Immobilization/surgery
  - Postpartum hypercoagulability (42 days postpartum)
  - Smokers age 35 and over
  - Breast cancer
  - Migraine with aura
  - Severe hypertension
- Breastfeeding women may safely initiate progesterone methods immediately and estrogen containing methods after 42 days



# Contraceptive safety is impacted by patient medical history.

- For women with medical conditions, ask yourself two questions:
  1. Will contraception worsen the condition or decrease the effectiveness of concurrent therapies?
  2. Will the condition or concurrent medications decrease the efficacy of the contraception method?
- Example: Seizure Disorder
- Example: History of Bariatric Surgery
- Resource: [US Medical Eligibility Criteria for Contraceptive Use](#)

# Case #1

17 year-old individual with preferred pronouns she/her wants to start contraception.

- in a long-term relationship, they have talked about having sex
- wants to delay pregnancy at least until she finishes college
- does not feel comfortable with the idea of having something in the vagina or uterus

PMH: negative

- denies headaches, history of hypertension or DVT/PE

Social History: Will be graduating in a couple of months and starting college. She has a positive relationship with her parents but does not feel comfortable talking to them about this.

# Case #1

17 year-old individual

- in a long-term relationship
- wants to delay pregnancy at least until she finishes college
- does not feel comfortable with the idea of having something

PMH: none

- denies contraindications to estrogen-containing methods.
- denies history of VTE, thrombophilia, or DVT/PE

Social History: Will be graduating in a couple of years, has a positive relationship with her parents but does not live with them. This is about this.

Duration of use is going to be at least several years most likely.

IUD and vaginal ring are not well aligned with her preferences.

“visible” methods may not serve her needs; she may be going to a new place without a clear place for refills, etc.

# HOW WELL DOES BIRTH CONTROL WORK?

What is your chance of getting pregnant?



Really, really well



The Implant



IUDs



Copper IUD



Sterilization

Works, hassle-free...

Up to 5 years

Up to 7 years

Up to 12 years

Forever



Less than 1 in 100



Pretty well



The Pill



The Patch



The Ring



The Shot

For it to work best, use it... Every. Single. Day.

Every week

Every month

Every 3 months



6-9 in 100, depending on method



Not as well



Pulling Out



Fertility Awareness



Internal Condom



Condom

Use a condom with any other method for protection from STDs.

For each of these methods to work, you or your partner have to use it every single time you have sex.



12-24 in 100, depending on method

FYI, without birth control, over 90 in 100 young people get pregnant in a year.

## Case #2

42 year-old individual with preferred pronouns they/them presents to your office complaining of heavy and irregular menstrual bleeding that has worsened over the last six months. The results of their evaluation suggests the underlying cause is normal changes associated with perimenopausal anovulation. They would like therapy for this.

PMH: SLE with positive antiphospholipid antibodies which place them at increased risk for venous thromboembolism

Social History: Married x 19 years. Wants no children. Non-smoker.

## Case #2

Ideally would receive a method of contraception that also leads to regular, lighter bleeding or no bleeding.

42 year-old individual with perimenopausal symptoms they/they presents to your office complaining of **heavy and irregular menstruation** that has worsened over the last six months. The result suggests the underlying cause is normal change perimenopausal anovulation. They would like the

Increased risk for VTE makes estrogen-containing methods unsafe.

PMH: **SLE with positive antiphospholipid antibodies** at increased risk for venous thromboembolism

Social History: 10 years. **Wants no children.** Non-smoker.

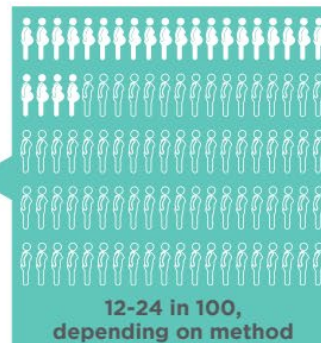
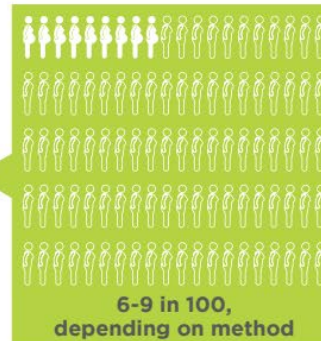
Permanent methods would be appropriate depending on patient choice but do not treat heavy bleeding.



# HOW WELL DOES BIRTH CONTROL WORK?



What is your chance of getting pregnant?



FYI, without birth control, over 90 in 100 young people get pregnant in a year.



# Case #3

33 year-old individual with preferred pronouns she/her broke her leg last week and required surgery. She is going to be on crutches with limited mobility for approximately 8 weeks. She was using oral contraception with estrogen but they told her to stop while she was in the hospital.

PMH: healthy with no medical problems or medications, 1 normal vaginal delivery last year

Social history: parents a healthy 1 year old, married, wants more children in several years. Non-smoker.

# Case #3

33 year-old in ...uns she/her broke her leg last week and requires to be on crutches with **limited mobility for approx** ...one was using oral contraception with estrogen but they told her to stop while she was in the

Contraindication to estrogen since immobilization places one at risk for VTE.

PMH: healthy with **no medical problems or medication** delivery last year

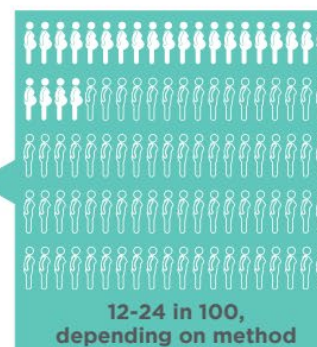
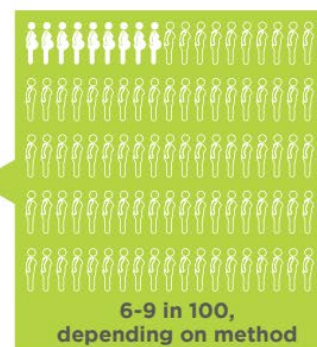
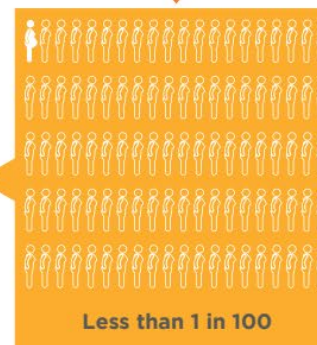
Negative medical history → doesn't rule out any methods as being safe.

Social history: parent, **wants more children in several years**. Non-

Permanent methods such as sterilization are not aligned with this preference.

# HOW WELL DOES BIRTH CONTROL WORK?

What is your chance of getting pregnant?



FYI, without birth control, over 90 in 100 young people get pregnant in a year.

# Summary Points

- Contraception helps people avoid or time pregnancy, space births, and treat a range of medical conditions.
- Contraception use during one's lifetime is nearly universal among women in the United States.
- Contraception has numerous public health benefits.
- Contraception methods vary in effectiveness, side effects, features, and safety profiles that can guide patient-centered counseling.