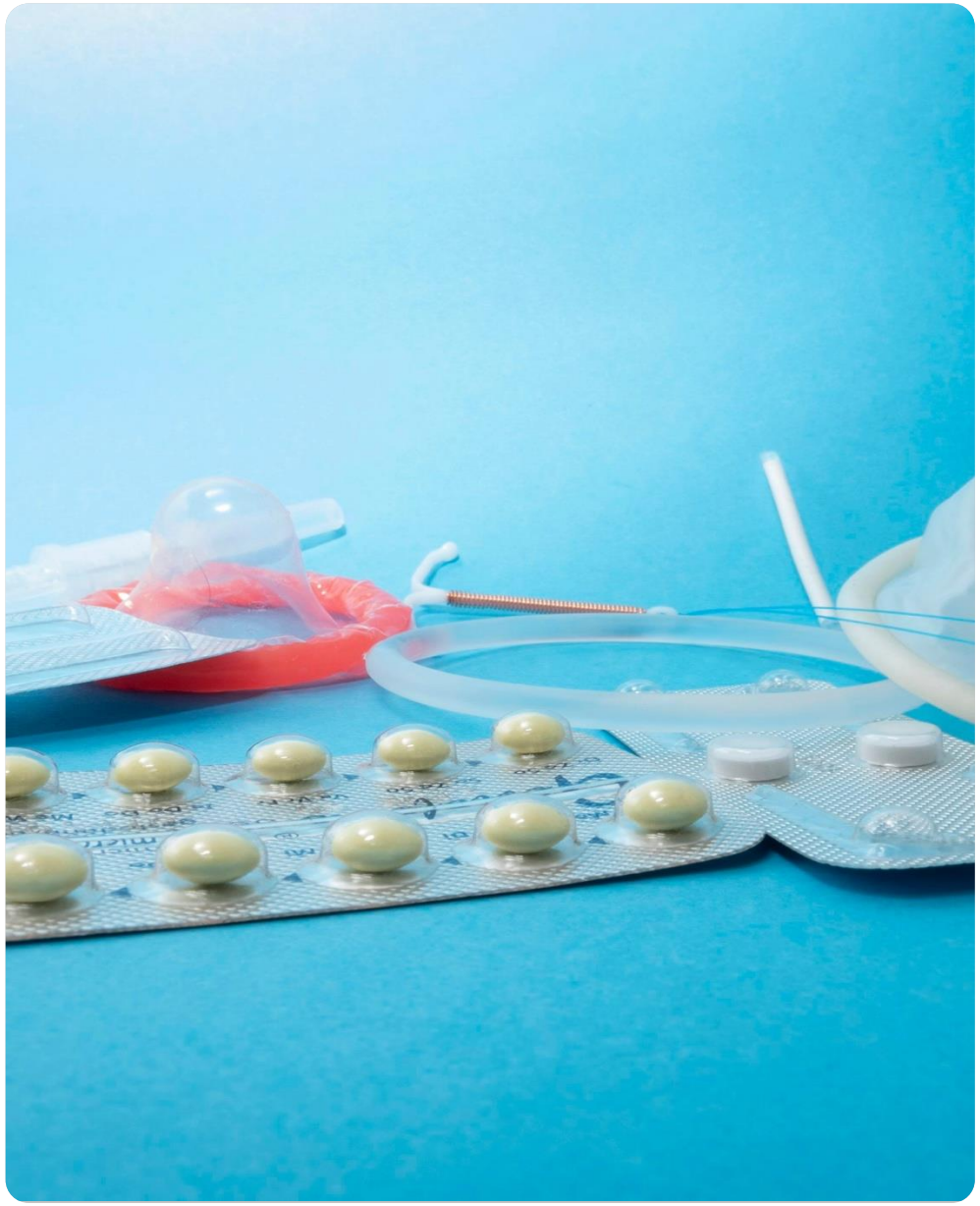
Mass General Brigham

Contraception for Patients with Neurologic and Psychiatric Disorders



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May 2026

Disclosures

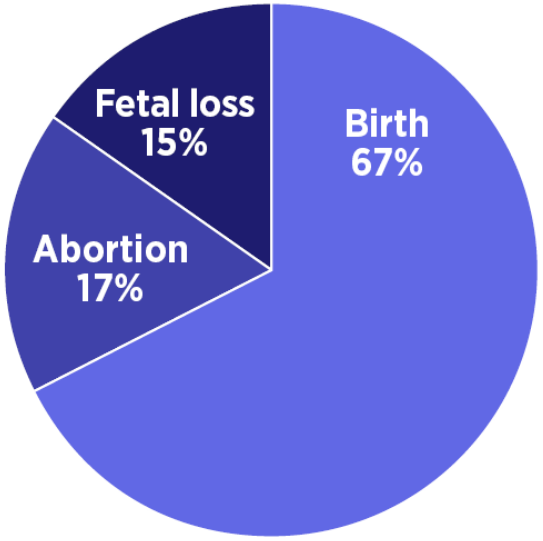
No financial disclosures.

Over 40% of all pregnancies in the U.S. are unintended.

In 2020, there were 5.35 million pregnancies.

Guttmacher Institute, 2025

Pregnancies in the United States, by outcome, in 2020



Source: Chiu DW, Maddow-Zimet I and Kost K, *Pregnancies, Births and Abortions in the United States, 1973–2020: National and State Trends by Age,* New York: Guttmacher Institute, 2024.

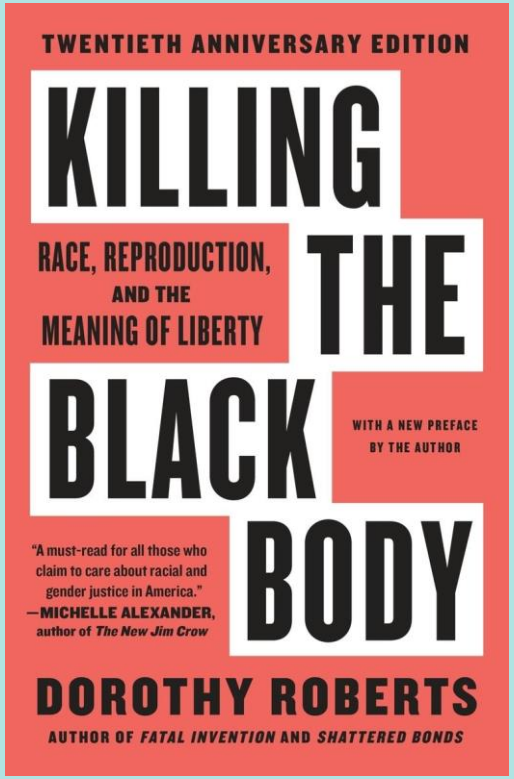
guttmacher.org

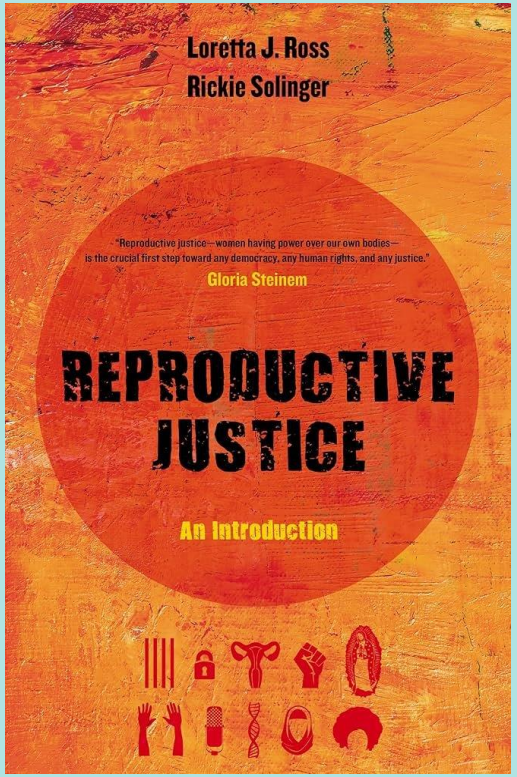
Reproductive Justice

The right to maintain personal bodily autonomy, have children, not have children, and parent children in a safe, healthy, and sustainable community.

Sister Song

Women of Color Reproductive Justice Collective





What is the goal?

Contraceptive Methods

Intrauterine devices (IUDs)

Copper T380A IUD

Paragard®

- 12 years of use
- Foreign body effect with inflammatory response
- 50% increase in blood loss, more cramping

Levonorgestrel 52 mg

Mirena, Liletta

- 8 years of use
- 20 mcg LNG/day
- 20% amenorrhea, 15-35% ovulatory
- Foreign body effect
- Endometrial thinning and cervical mucus thickening

Levonorgestrel 19.5/13.5 mg

Kyleena (19.5)

- 5 years of use
- 17.5 mcg LNG/day
- 12% amenorrhea, 98%+ ovulatory
- 28 mm x 30 mm (compared to 32mm x 32 mm)

Skyla (13.5)

- 3 years of use
- 6 mcg LNG/day
- Same as Kyleena

Newest IUD

Copper 175 mm^2 IUD

Miudella®

- Approved in February 2025
- 3 years of use
- Foreign body effect with inflammatory response
- 32 mm x 30 mm (compared to Paragard® 32 mm x 36 mm)

Implant

Etonogestrel 68 mg Implant

Nexplanon®

- 5 years of use
- Office insertion/removal
- Provides ovulatory inhibition

Progestogen-only methods

Depot medroxyprogesterone 150 mg (DMPA)

Depo-Provera

- Q3month injection
- Office-administered or self-administered
- Provides ovulatory suppression

Progestogen-only pills (POP)

Micronor, Slynd, Opill

- Norethindrone 0.35 mg (Micronor): local effects, some ovulatory suppression (~50%)
- Drospirenone 4 mg (Slynd): local effects, more consistent ovulatory suppression (~88-96%)
- Norgestrel 0.075 mg (Opill): local effects, some ovulatory suppression (~50%), over-the-counter
- Can be taken continuously

Combined hormonal methods (pills, patch, ring)

Combined Oral Contraceptives

Junel, Yaz/Yasmin, Sprintec, Aviane, Apri, Nexstellis

- Contains estrogen (often ethinyl estradiol; estetrol) and progestogen (norgestimate, norethindrone, drospirenone, desogestrel)
- Range of EE dose is 20-35 mcg
- Progestins have varying side effect profiles
- Provides ovulatory suppression
- Can be taken continuously

Combined Hormonal Patch

Xulane, Twirla

- Contains estrogen (often ethinyl estradiol) and progestogen (norelgestromin, levonorgestrel
- Provides ovulatory suppression
- Applied weekly, but can be taken continuously

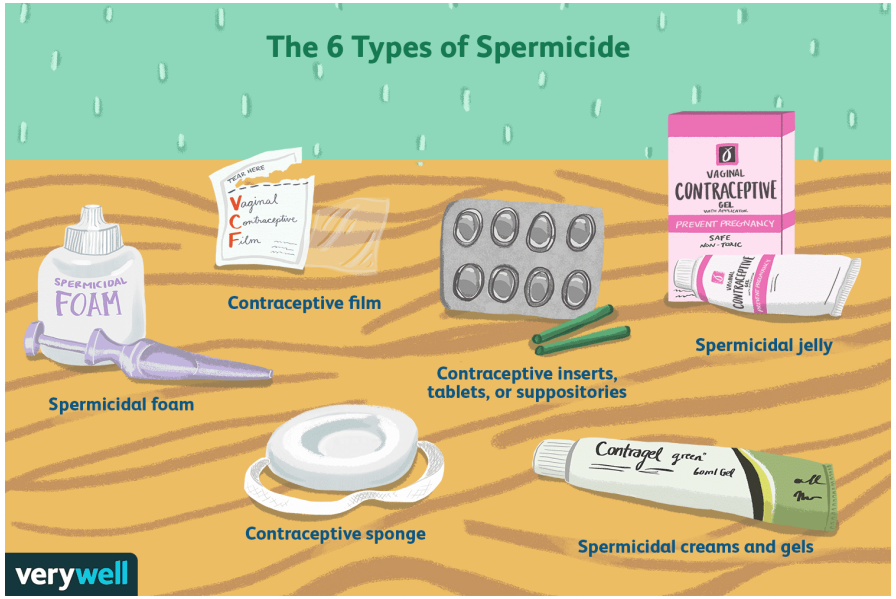
Combined Hormonal Ring

NuvaRing, Annovera

- Contains estrogen (ethinyl estradiol) and progestogen (etonogestrel, segesterone)
- Provides ovulatory suppression
- NR placed by user weekly, but can be taken continuously
- Annovera placed by user and kept for three weeks (or continuously)

Other methods

- **Barrier Methods**
  - Condoms, diaphragms
- **Spermicides & Vaginal Suppositories**
  - Phexxi (lactic acid)
- **Lactational Amenorrhea**
- **Fertility-Awareness Based Methods**
  - Calendar methods
  - Cervical mucus, basal body temperature
  - App-based (Natural Cycles, Clue)
- **Sterilization**
  - Vasectomy
  - Salpingectomy, salpingostomy



Emergency Contraception

IUDs

Paragard® + Mirena/Liletta

- Most effective
- No interactions with other medications
- Great option for those who also want LARC
- Need clinic visit

Levonorgestrel 150 mg

Plan B

- Up to 72 hours
- Decreased efficacy for BMI >25, no efficacy >30
- Available OTC
- Start hormonal contraception immediately

Ulipristal 30 mg

Ella

- Up to 5 days
- Decreased efficacy for BMI >30
- Prescription only and less readily available
- Need to wait 5 days to start hormonal contraception

Contraception and Neurologic Disease

Contraception and Neurologic Disease

Areas of interest

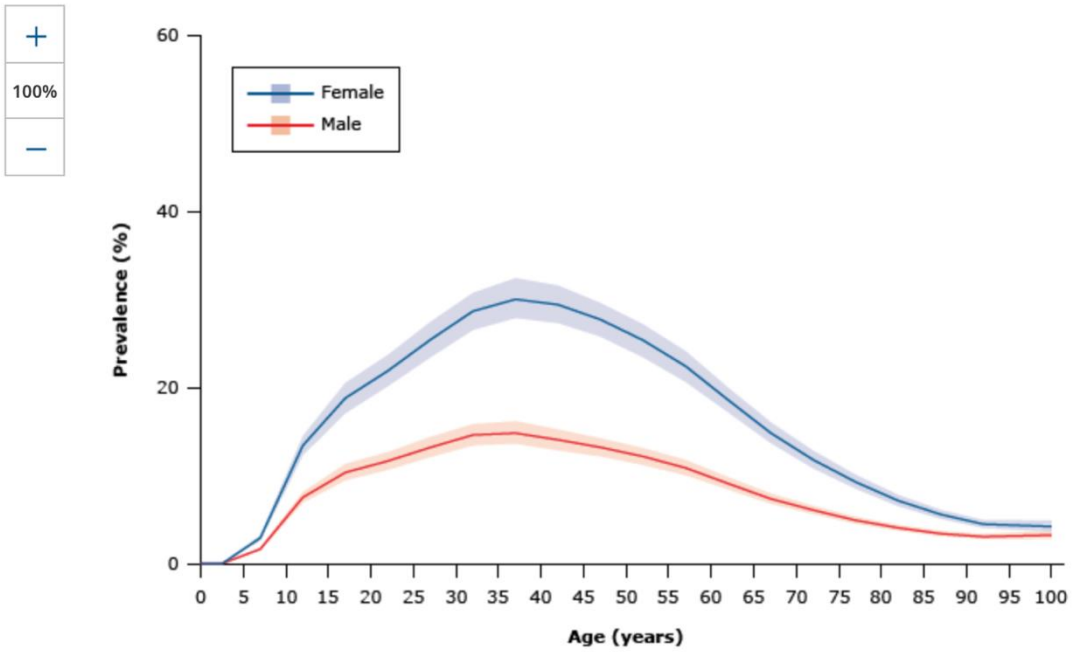
- Headache disorders
  - Migraines
- Multiple sclerosis
- Seizure disorders
  - Epilepsy

Considerations

- Disease processes mediated by hormonal changes
- Interactions between contraceptive methods and neurologic disease treatments
- Contraceptive methods for improving neurologic disease/condition states
- Safety of contraceptive methods in setting of neurologic disease

Headache Disorders – Migraines

Migraine prevalence by age

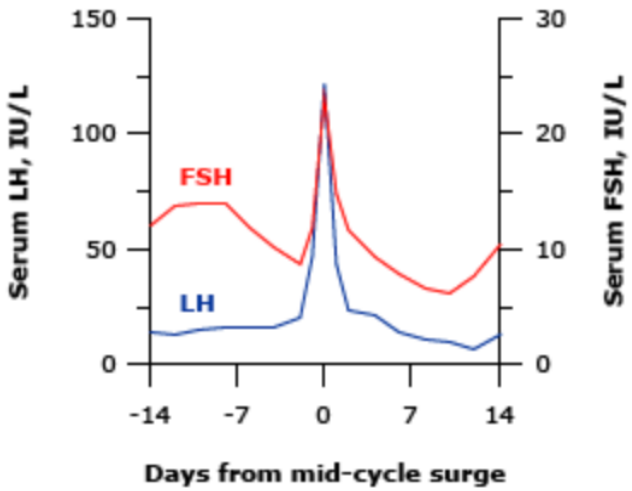


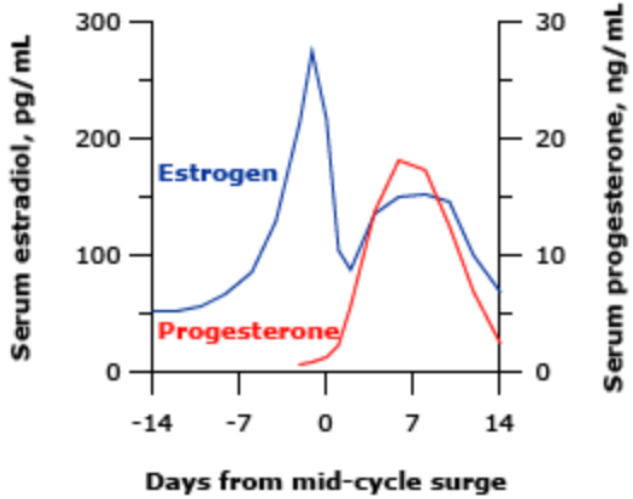
The 1-year (or active) prevalence in relation to age in people who fulfilled the lifetime prevalence criteria for migraine with aura (at least 2 attacks) or without aura (at least 5 attacks) and who had had at least 1 attack of migraine in the previous year. The 1-year prevalence steeply rises around puberty, continues to rise up to 2 or 3 times higher in females in the reproductive age range, and declines again after 45 to 50 years of age, notably in females. Peak prevalence of active migraine is ~40 years of age with 35% of females and 15% of males affected. Active migraine occurs in ~5% of young children and ~5% of the older people.

Role of estrogen

Alterations in estrogen levels

- Menstrual cycle
- Pregnancy
- Menopause
- Exogenous





Pathway modulation

- Alteration of vascular inflammatory substances
- Lowering threshold for cortical spreading depression
- Increasing sensitivity to nociceptive response

CDC Medical Eligibility Criteria

No restriction

Advantages generally outweigh theoretical or proven risks

Theoretical or proven risks usually outweigh the advantages

Unacceptable health risk

Condition	Sub-Condition	Cu-IUD		LNG-IUD		Implant		DMPA		POP		CHC	
		I	C	I	C	I	C	I	C	I	C	I	C
Headaches	a. Nonmigraine (*mild or severe*)	1		1		1		1		1		1*	
	b. Migraine												
	i. Without aura (*includes menstrual migraine*)	1		1		1		1		1		2*	
	ii. With aura	1		1		1		1		1		4*	

KEY: **1 = No restriction (method can be used)** **2 = Advantages generally outweigh theoretical or proven risks**

3 = Theoretical or proven risks usually outweigh the advantages **4 = Unacceptable health risk (method not to be used)**

Use of combined hormonal contraceptives among women with migraines and risk of ischemic stroke

Steven W. Champaloux, PhD, MPH; Naomi K. Tepper, MD, MPH; Michael Monsour, PhD; Kathryn M. Curtis, PhD; Maura K. Whiteman, PhD; Polly A. Marchbanks, PhD; Denise J. Jamieson, MD, MPH

Objective

Estimate the incidence of stroke in women of reproductive age and examine the association among combined hormonal contraceptive use, migraine type (with and without aura), and ischemic stroke

Study design

- Nationwide health care claims, nested case-case control
- Females age 15-49 with first every stroke 2006-2012
- Diagnosis codes, pharmacy database

Results

- 25,887 ischemic strokes (11/100,000) in 33,218,977 women; 1884 cases, 7536 controls

N = 25,887	Odds ratio (95% CI)
Migraine + aura + CHC	6.1 (3.1-12.1)
Migraine + aura	2.7 (1.9-3.7)
Migraine + CHC	2.2 (1.9-2.7)
Migraine	1.8 (1.1-2.9)
CHC	1.4 (1.2-1.7)
None	Reference

Migraines with combined hormonal contraceptives

Effect of CHCs on migraines

- Retrospective studies reported new or worsening of headaches but typically were low quality
  - Older CHC regimens with higher estrogen doses
  - Did not distinguish between headache type
  - Did not have control groups with baseline prevalence

Migraines with CHC initiation

- Initial treatment cycle
  - 1/3rd chance that they recur in the next cycle
  - Stop if aura develops
- Persisting migraines
  - Try continuous or extended dose regimens

Estrogen withdrawal headaches

Menstrual migraine (-2 days to +3 days)
Menstrually-related migraine (menses, other times during month)

- Terwindt et al (2025): patients with MM report more severe migraines, less satisfaction with acute treatment

Treatment

- Headache diary
- NSAIDs, triptans
- Adjunctive ovulatory suppression
- Continuous rather than cycling

Migraines medications with combined hormonal contraceptives

Calcitonin gene-related peptides (CGRP)

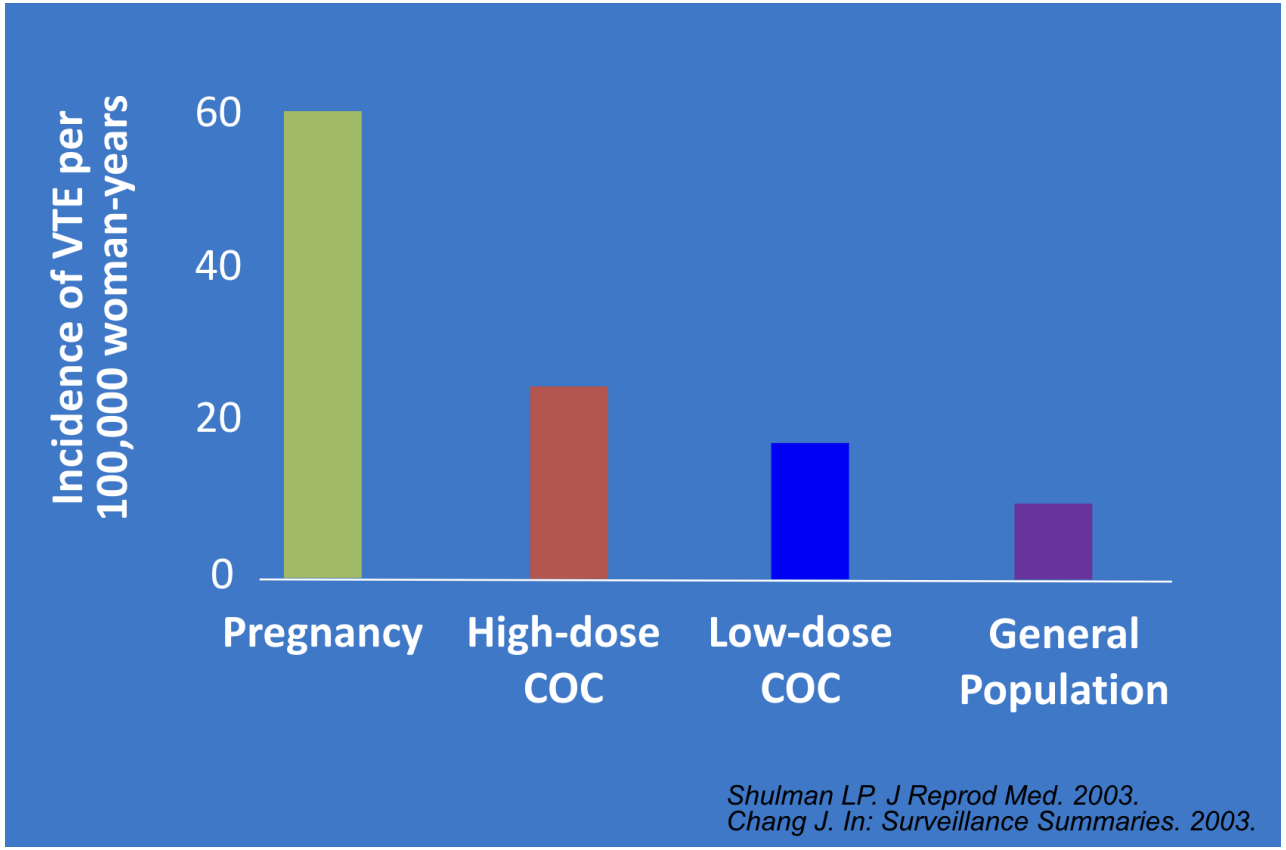
- No clinically meaningful drug-drug interactions between ubrogepant and EE+norgestimate (Chung Li et al, 2020)
- Increase in overall EE+norgestimate with rimegepant, but unlikely clinically relevant (Bhardwaj et al, 2023)

Migraines with CHC initiation

- Initial treatment cycle
  - 1/3rd chance that they recur in the next cycle
  - Stop if aura develops
- Persisting migraines
  - Try continuous or extended dose regimens

VTE Risk with Combined Hormonal Contraception

- Risk increases with increasing dose of estrogen (20-50 mcg ethinyl estradiol), age, smoking status
- VTE risk related to patch or ring- higher overall estrogen exposure; for low-risk users no contraindication to initiation



Seizure Disorders – Epilepsy

Condition	Sub-Condition	Cu-IUD		LNG-IUD		Implant		DMPA		POP		CHC	
		I	C	I	C	I	C	I	C	I	C	I	C
Epilepsy‡	(see *also Drug Interactions*)	1		1		1*		1*		1*		1*	
Anticonvulsant therapy	a. Certain anticonvulsants (phenytoin, carbamazepine, barbiturates, primidone, topiramate, oxcarbazepine)	1		1		2*		1*		3*		3*	
	b. Lamotrigine	1		1		1		1		1		3*	

KEY: **1 = No restriction (method can be used)** **2 = Advantages generally outweigh theoretical or proven risks**

3 = Theoretical or proven risks usually outweigh the advantages **4 = Unacceptable health risk (method not to be used)**

Unintended pregnancy and epilepsy

Herzog et al (2017): 78.9% of WWE reported having at least one unintended pregnancy

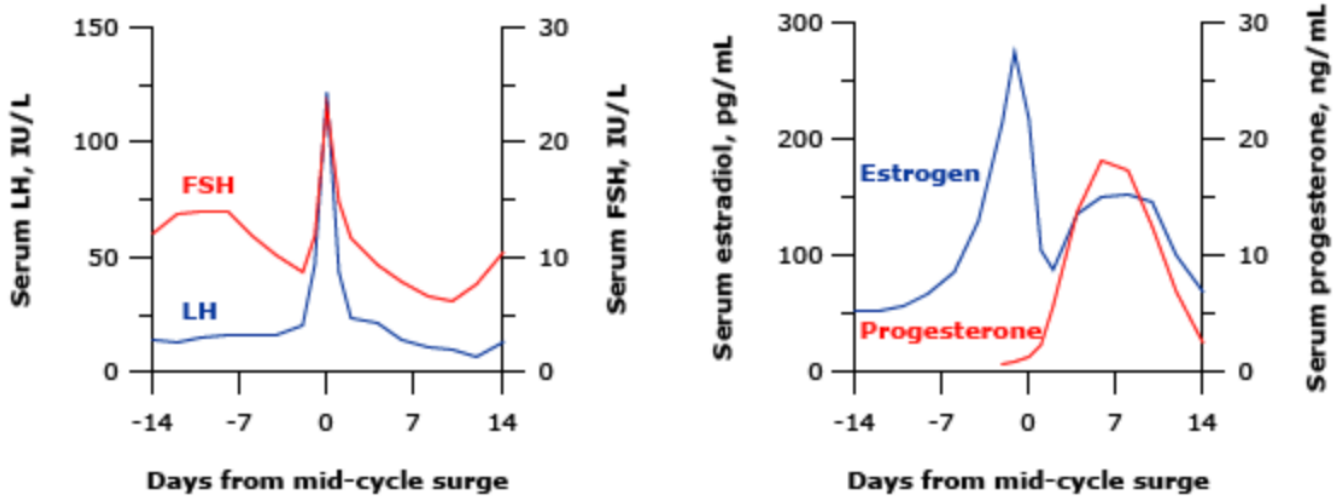
Herzog et al (2019): Unplanned pregnancy in WWE may double the risk for spontaneous fetal loss as compared to planned pregnancies (n = 137/391; 35.0% vs n = 43/262 (16.4%)

Zhang et al (2020): Planned pregnancy in WWE contributed to more optimized AED pattern, better seizure control, less adverse fetal outcomes

Role of estrogen and progesterone

Alterations in estrogen levels

- Menstrual cycle
- Pregnancy
- Menopause
- Exogenous



Pathway modulation

- Traditionally, estrogen = proconvulsant, progesterone= anticonvulsant
- Sex hormones accelerate hepatic enzymes in phase I metabolism through CYP450 system and in phase II through UGT system

Al-Faraj et al. "Contraceptive management in people with epilepsy: A narrative review of drug interactions, special populations, and clinical guidance." *Epileptic Disord.* 2026.

Combined oral contraceptives & antiepileptics – CYP Inducers

Inducers accelerate sex hormone metabolism and increase SHBG production.

Generic Name	Brand Name	Estrogen Reduction	Progestin Reduction	Other Uses of Drug
Carbamazepine	Tegretol, Equetro	42%	58%	Trigeminal neuralgia, schizophrenia, bipolar disease
Felbamate (weak)	Felbatol	13%	42%	Neuropathic pain, migraines, bipolar disease
Lamotrigine	Lamictal	No change, lamotrigine levels drop	No change, lamotrigine levels drop	PTSD, bipolar disease
Oxcarbazine (weak)	Trileptal	48%	32%	Bipolar disease, neuropathic pain
Phenobarbital	Generic	64-72%	0%	None
Phenytoin	Dilantin	49%	42%	None
Topiramate	Topamax	15-33%	0%	Migraines, bipolar disease, obesity

Table 11-8: Anticonvulsants that affect COC's metabolism and clearance, *Contraceptive Technology*, pg. 306.

Combined oral contraceptives & antiepileptics: Moderate to weak CYP inducers

Cenobamate (moderate)

- Moderate CYP3A4 with dose-dependent induction with no data on hormonal contraception

Eslicarbazepine (moderate)

- Falcão et al (2013): clinically significant reduction in both EE and LNG levels

Perampanel (weak)

- Doses of 12 mg reduced [levonorgestrel] by 40%; doses of 4 mg and 8 mg did not appear to have significant effect

Clobazam (weak)

Patsalos PN, "The clinical pharmacology profile of the new antiepileptic drug perampanel: A novel noncompetitive AMPA antagonist." *Epilepsia,* 2015. 56(1):12-27.

Combined oral contraceptives & antiepileptics: Non-CYP Inducers

Clonazepam (Klonopin)
Ethosuximide (Zarontin)
Gabapentin (Neurontin)
Lacosamide (Vimpat)

Levetiracetam (Keppra)
Pregabalin (Lyrica)
Tiagabine (Gabitril)
Valproic acid (Depakene, Depakot)
Vigabatrin (Sabril)
Zonisamide (Zonegran)

Lamotrigine

Estrogen-containing methods have been shown to reduce [LTG] by 50%

- Metabolized by hepatic uridine-diphosphate glucuronosyltransferase (UGT) enzymes inducible by ethinyl estradiol
- Observed in patients with increased endogenous estrogen during pregnancy
- Some evidence showing patch and vaginal ring may lower [LTG] similarly
- Consider LTG dose adjustments and/or continuous use of hormonal method

Some data suggest that dose increases are rare following exogenous estrogen

- Kirkpatrick et al. (2023): claims-data looking at LTG dose increases following prescription
  - N=643; incidence of dose increase 28%, median # of days 118 after estrogen filled

King A et al. "Contraceptive vaginal ring reduces lamotrigine levels." *Epilepsy Behav.* 2020. 111:107162..

Etonogestrel

Carbamazepine

- Lazorwitz et al. (2017): N=10, looked at median [etonogestrel] pre- and post-carbamazepine 600 mg and found median concentration post to be 50.9 pg/mL

Topiramate

- Lazorwitz et al. (2022): 30% of participants (8/26) had a serum etonogestrel concentration less than 90 pg/mL at 6 weeks (topiramate 100-400 mg/day, dose dependent)

Condition	Sub-Condition	Cu-IUD	LNG-IUD	Implant	DMPA	POP	CHC
Anticonvulsant therapy	a. Certain anticonvulsants (phenytoin, carbamazepine, barbiturates, primidone, topiramate, oxcarbazepine)	1	1	2*	1*	3*	3*
	b. Lamotrigine	1	1	1	1	1	3*

Depo-Provera

Dutton et al. (2024)

- N=18 with epilepsy compared to n=20 without epilepsy
- Medroxyprogesterone group
- Observed patients with epilepsy receiving injections earlier than recommended interval suggesting some perceive a benefit to this practice

Mattson (1984)

- N = 14; DMPA showed 39% reduction in seizures

Herzog (2016)

- N = 1144 WWE, reported fewer seizures using DMPA compared to cOCPs or POPs

Condition	Sub-Condition	Cu-IUD	LNG-IUD	Implant	DMPA	POP	CHC
Anticonvulsant therapy	a. Certain anticonvulsants (phenytoin, carbamazepine, barbiturates, primidone, topiramate, oxcarbazepine)	1	1	2*	1*	3*	3*
	b. Lamotrigine	1	1	1	1	1	3*

Catamenial seizures

Most common seizure pattern

Perimenstrual

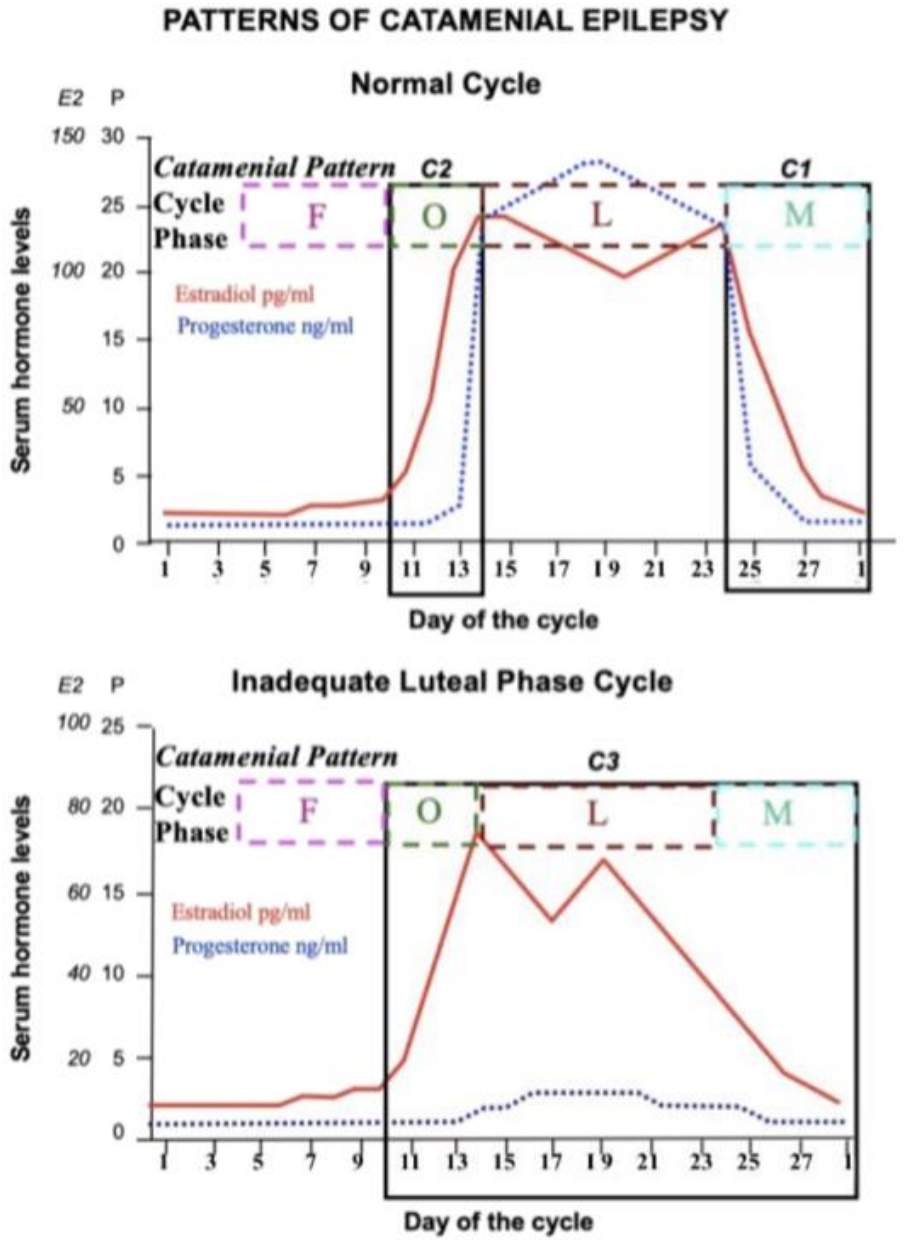
- 3 days before menses + first three days of menses

Other patterns

Periovulatory

- Midcycle surge of estrogen without progesterone opposition

Inadequate luteal phase



Herzog, Andrew G. "Catamenial epilepsy: definition, prevalence pathophysiology and treatment." *Seizure* 17.2 (2008): 151-159.

High-dose progestin?

Dorotan and Dutton (2023): Efficacy of Norethindrone Acetate on Seizure Reduction: A Retrospective Chart Review

Abstract in American Epilepsy Society

- N=78, of which 29 had diagnoses of epilepsy and prescribed norethindrone acetate; 14 included in final analysis
  - 6 with definite improvement in seizure frequency after initiation
  - 2 with possible improvement, 6 with no improvement
- 11/14 received hormonal treatment due to clinical diagnosis of catamenial epilepsy

Special populations

Adolescents, Intellectual and neurodevelopmental disabilities

- Patient-centered care; speaking to the patient privately as possible
- Obtaining collateral when unable
- Anesthesia is an option for implants and exams

Multiple Sclerosis

Hormonal contraception and multiple sclerosis

Oxford FPA Study (1968-1974)

- Women using CHC had a lower incidence of MS onset
- No associations between MS onset, duration of CHC use, or elapsed time since CHC use ended

BJOG 1998

- Prospective study of 46,000 CHC users
- Found no effect on MS incidence or survival

CDC Systematic review 2016

- 111 articles, 4 studies all suggested OCs do not affect disease course

Ghajarzadeh et al 2022

- OCP use has no effect on development of MS

Villard-Mackintosh and Vessey. Contraception 1993
Thorogood and Hannaford. BrJ Obstet Gyn 1998, Hernan, et al. Neurology 2000

Condition	Sub-Condition	Cu-IUD		LNG-IUD		Implant		DMPA		POP		CHC	
		I	C	I	C	I	C	I	C	I	C	I	C
Multiple sclerosis	a. Without prolonged immobility	1		1		1		2		1		1	
	b. With prolonged immobility	1		1		1		2		1		3	

KEY: 1 = No restriction (method can be used) | 2 = Advantages generally outweigh theoretical or proven risks | 3 = Theoretical or proven risks usually outweigh the advantages | 4 = Unacceptable health risk (method not to be used)

Hormonal contraception and MS treatment

Treatment of MS with IFN-1a combined with COC is safe and may be enhanced.

Fingolimod has no bearing on PK of EE, but may increase Cmax and AUC of LNG slightly.

Teriflunomide may increase concentrations of EE and LNG by 30-50%.

Dimetyl fumarate did not impact PK of EE or norgestimate.

Lashch et al. "Hormonal contraception methods and multiple sclerosis." Neuroscience and Behavioral Physiology.. 2025. 55(5):862-867.

Contraceptive methods are safe while using antiepileptics.

All emergency contraceptive options are safe to use.

Contraception and Psychiatric Disease

Contraception and Psychiatric Disease

Areas of interest

- Mood disorders
- PMDD
- Adolescence and young adulthood
- Perinatal depression
- Maternal mortality

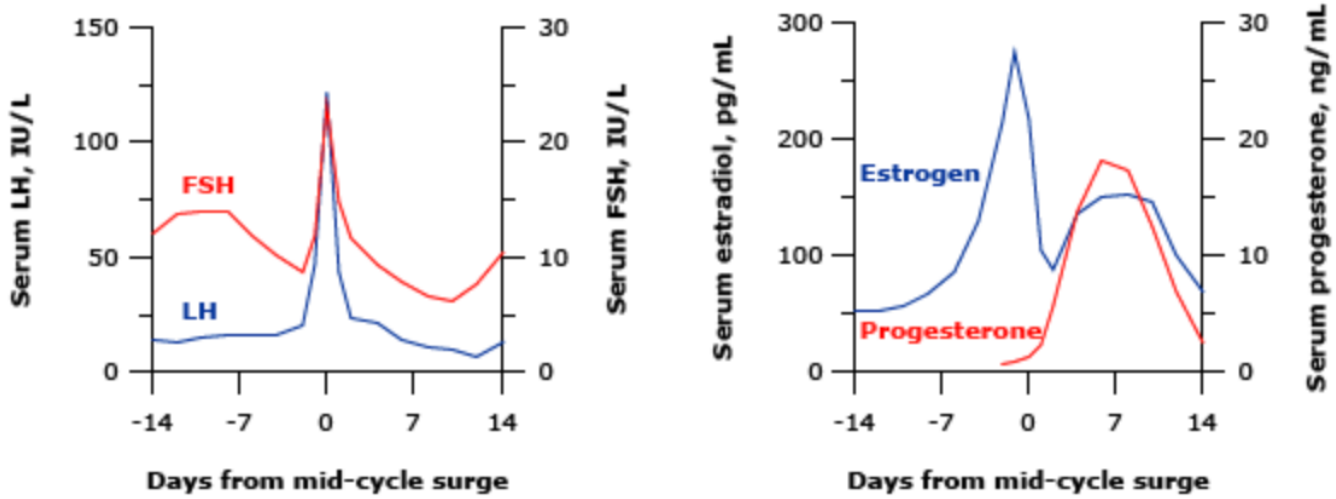
Considerations

- Impact of hormonal contraception on existing mood disorder
- Drug-drug interactions (including use of antiepileptic medications with psychotropic effect)

Role of estrogen and progesterone

Alterations in progesterone levels

- Menstrual cycle
- Pregnancy
- Menopause
- Exogenous



Pathway modulation

- Progesterone metabolizes in allopregnanolone which boosts GABA receptors in the brain

Hormonal contraception and mood

Negative

- Skovlund et al (2016): reported increased RR of starting antidepressant treatment in those using hormonal contraception, (2018) with RR 2x higher for SA, 3x higher for completion peaking after 2 months
- Aleknaviciuet et al (2025): Swedish national population-based study of 2 million+ found no increased risk for those using oral methods or non-oral CHC methods overall, but increased in non-oral progestogen-only methods
    - Age-stratified: increased in late adolescents (15-18) for all methods; non-oral progestogen-only methods across lifespan
- Jahanfar et al (2024): SR looking at 43 studies found slight increase in risk of developing depression in those without; slight protective effects for those with
- Mengelkoch (2025):

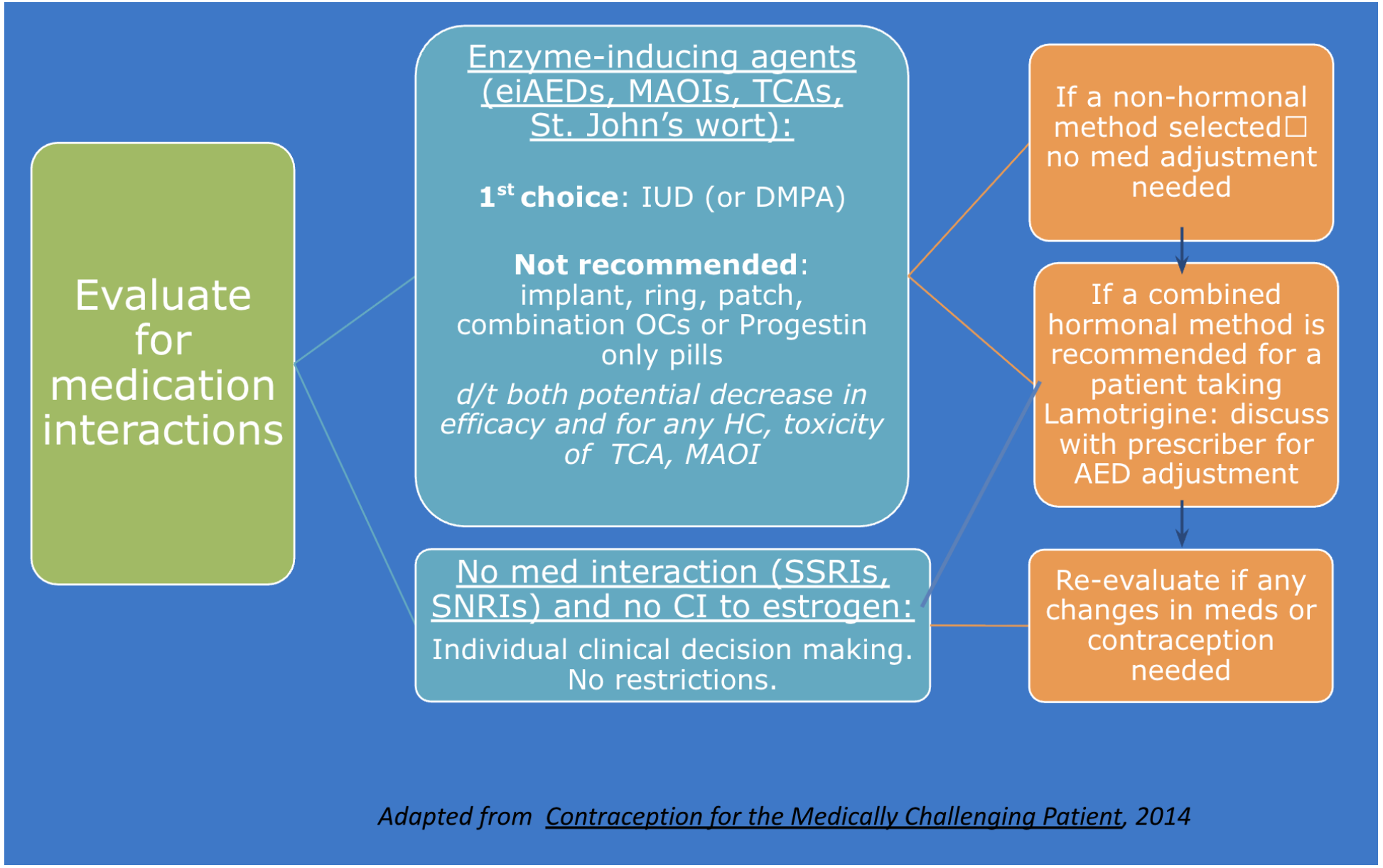
Hormonal contraception and mood

Positive

- Cheslack-Postava et al (2015): n=1105 survey data found women using oral contracpetives had lower past-year prevalence of depression, generalized anxiety, and panic
- Toffol et al (2012): n=8586 national survey data suggested current hormonal contraception use did not have clinically significant detrimental effect and may have beneficial effect on mental health and psychological well-being
- Newman (2022): n=998: 15.2% of those taking hormonal birth control had depressive symptoms, 12.1% of those in birth control group had depressive symptoms

Condition	Sub-Condition	Cu-IUD		LNG-IUD		Implant		DMPA		POP		CHC	
		I	C	I	C	I	C	I	C	I	C	I	C
Depressive disorders		1*		1*		1*		1*		1*		1*	

KEY: 1 = No restriction (method can be used) | 2 = Advantages generally outweigh theoretical or proven risks | 3 = Theoretical or proven risks usually outweigh the advantages | 4 = Unacceptable health risk (method not to be used)



From Neill (2025) presentation

How to interpret?

Methodological issues

- Often, studies are not powered to assess different compounds, administration, dosages
- Limited ability to control for co-morbid conditions
- What do we compare to? Unintended pregnancy?
- Survivorship bias and healthy user effect
- Researcher bias

Center the patient, follow closely.

Future directions

Neurology

- Updating CDC MEC
- More research in drug interactions; newer AEDs, estetrol-based contraception; interactions with etonogestrel implant
- Collaborative care models between neurology, OB/GYN, pharmacy, psychiatry

Psychiatry

- Improving research and understanding qualitative experience of mood disorders and hormonal contraception
- Integrating of reproductive psychiatry into contraceptive counseling
- Understanding mechanisms of progestogen link to mood, mental illness, and suicidality

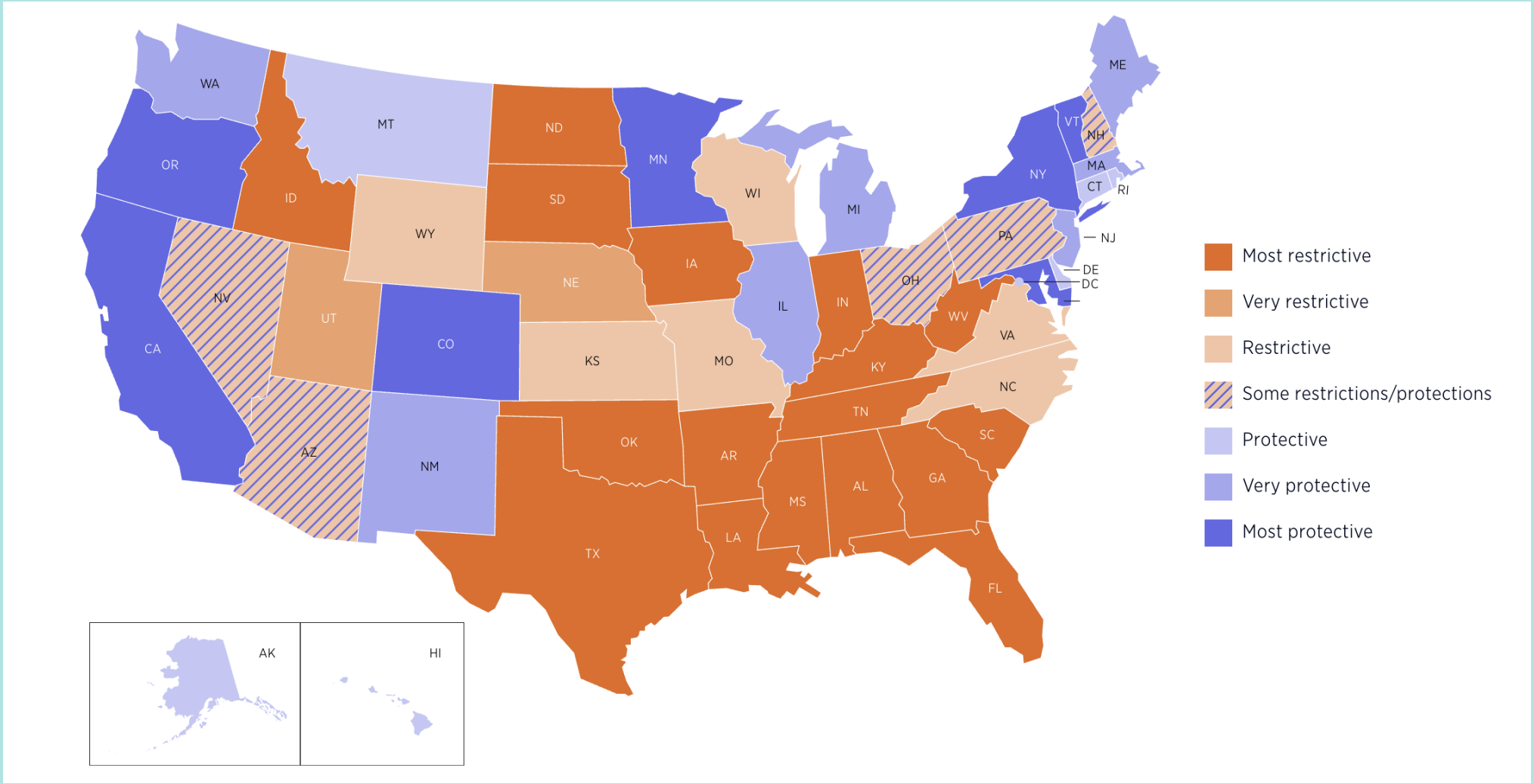
Undesired pregnancy

- **1,126,000 clinician-provided abortions in the U.S. in 2025**
- **91,000 abortions provided via telehealth in the U.S. in 2025**
- **91-93% are in first trimester (40-60% before 9 weeks)**
- **65% of all were medication abortions in 2023**

Note: Mifepristone is metabolized by the CYP system, but decreased or increased levels unlikely to be clinically meaningful as doses from 100 – 600 mg.

Guttmacher Institute, 2026

Abortion bans in the U.S.



Guttmacher Institute, 2026

How can complex family planning help?

- Consultants in high-risk contraception counseling
- Abortion provision – medication and surgical
- Bridge to general obstetrics and gynecology
- Research collaboration

Summary

We continue to have an uphill battle in combatting the misconception that patients with neurologic disease cannot use contraception, or that contraception unilaterally improves or worsens psychiatric conditions.

Contraception is often used for more than just pregnancy prevention, just as antiepileptics are often used for more than just seizure disorders.

There is no one-size-fits-all model.

OB/GYNs, neurologists, psychiatrists, and pharmacists must work to collaborate to help our patients achieve their goals in family planning within a reproductive justice minded framework.

Thank you!

Questions?

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