RhAPP

RHEUMATOLOGY ADVANCED PRACTICE PROVIDERS

RHAPP NATIONAL CONFERENCE

SEPTEMBER 8-10, 2022

Women’s Health in Rheumatology

Brittany Sedlacek, PA-C
Kyle George, PA-C
Cassie Dolecki, PharmD

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Faculty Disclosures

- Kyle George, PA-C:
  - Advisory Board: Boehringer Ingelheim
- Brittany Sedlacek, PA-C:
  - There are no relevant financial relationships to disclose
- Cassandra Dolecki, PharmD:
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Learning Objectives

- Discuss benefits and risks of commonly used DMARDs on fertility, pregnancy and breastfeeding.
- Review considerations for contraceptive and hormone use in patients with rheumatic and musculoskeletal diseases.
- Discuss pertinent counseling points of perception, pregnancy, and post-partum periods.
- Identify appropriate health maintenance recommendations for women with rheumatic and musculoskeletal diseases.

PRECONCEPTION AND PREGNANCY PLANNING

Preconception Counseling is Often Overlooked

- Clinicians should initiate a family-planning conversation with every reproductive-age female patient at the time of diagnosis of rheumatologic disease and before initiating or changing potentially teratogenic medications.
  - According to a study by Schwarz et al. (2013) almost half of all women prescribed teratogenic medications did not receive counseling regarding the medication's teratogenic effects.
  - Women who received class A or B medications were no more likely to received counseling than women who filled class D or X medications.
- Special consideration should be taken for adolescents (ages 11-19)

The Emotional Burden

- According to two telephone surveys involving a total of approximately 1000 female patients, having RA negatively affected their decision to have children (Katz PP, Clowse et al.)
  - Reasons cited included:
    - Concerns over carrying the child
    - Caring for the child
    - Passing RA on to biologic offspring
    - Concern that disease activity would worsen.
- Fortunately, there has been a shift from health professionals against pregnancy in patients with rheumatic disease to encouraging conception during periods of low disease activity and emphasis on pregnancy-compatible medications

The Initial Encounter

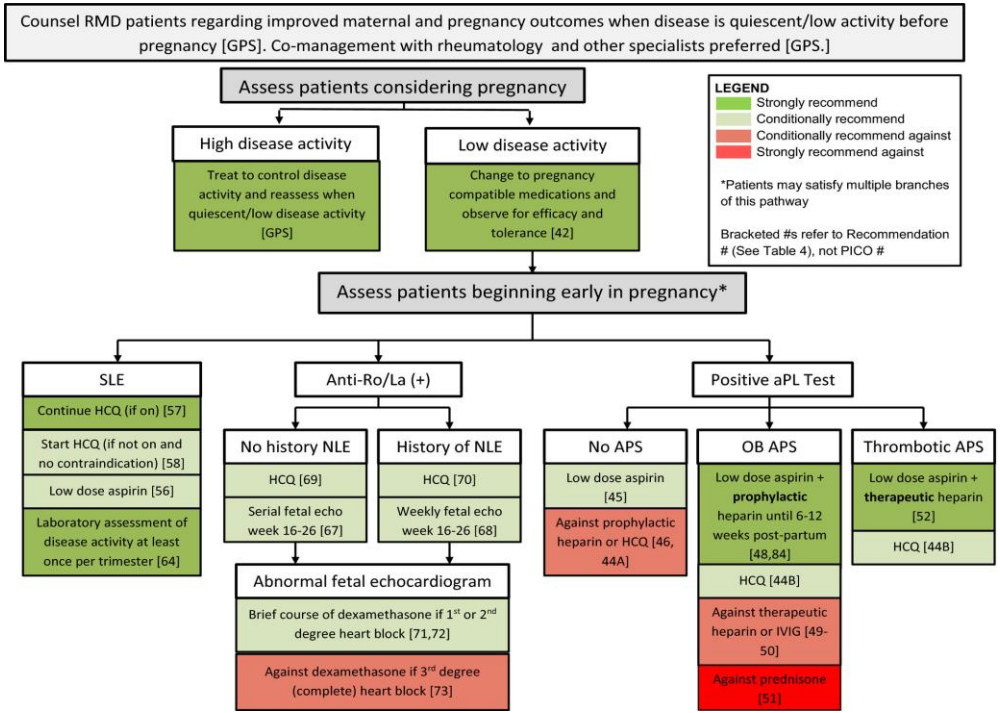
- During initial encounter, the provider should determine whether a patient has childbearing capacity (e.g. no prior sterilization procedure).
- Avoid making assumptions based on sociodemographic factors including: age, sexual orientation, sterilization of partner, or marital status.
- Outcomes of prior pregnancies and current disease activity should be evaluated.
- Extent of organ involvement and presence of anti-Ro/La and antiphospolipid antibodies.

Sample Questions:

- Do you think you might want to have (more) children in the future?
- If so, have you though about when that might be?
- What have you heard about the way your disease or medications can impact a pregnancy?
- Have you used any birth control methods in the past?
- What do you like or dislike about these methods?

Patients with immediate or future goals of pregnancy, or those who are unclear about their pregnancy goals, should start a prenatal vitamin, consider additional folic acid supplementation if risk is high, and refer to OB-Gyn for further guidance.

Guidelines for Preconception Planning



SLE = systemic lupus erythematosus; HCQ = hydroxychloroquine; NLE = neonatal lupus erythematosus; aPL = antiphospholipid antibody (persistent moderate-to-high–titer anticardiolipin or anti–β_2-glycoprotein I antibody or persistent positive lupus anticoagulant); APS = antiphospholipid syndrome (obstetric and/or thrombotic); obstetric APS (OB APS) = patients meeting laboratory criteria for APS and having prior consistent pregnancy complications (≥3 consecutive losses prior to 10 weeks' gestation, fetal loss at or after 10 weeks' gestation, or delivery at <34 weeks due to preeclampsia, intrauterine growth restriction, or fetal distress) and with no history of thrombosis; thrombotic APS = patients meeting laboratory criteria for APS and having a prior thrombotic event (arterial or venous), regardless of whether they have had obstetric complications; IVIG = intravenous immunoglobulin; PICO = population, intervention, comparator, outcomes.

Sammaritano LR, Bermas BL, Chakravarty EE, et al. 2020 American college of rheumatology guideline for the management of reproductive health in rheumatic and musculoskeletal diseases. Arthritis Rheumatol. 2020 Feb 23;72(4):529-556

Infertility Concerns

- This is a very distressing concern for most patients and can impact adherence to treatment
- Fertility in SLE patients does not appear to be altered by disease itself; however, a decrease in ovarian reserve can occur in women exposed to cyclophosphamide.
- Women with RA have had smaller families and higher rates of nulliparity than women without the disease. In a Dutch study of 245 women with RA, 42% reported a delay of more than 12 months to conception (Akitayo et al).
  - Reasons that women with RA have trouble growing their families include: higher rates of miscarriage, physical disability that limits sexual activity, maternal age, menstrual irregularity, disease activity, reduced levels of anti-Mullerian hormone, which is an indicator for ovarian reserve in women, daily dose of prednisolone higher than 7.5 mg, use of non-steroidal anti-inflammatory drugs (NSAIDs), ovulatory dysfunction, and endometriosis.
- Cyclophosphamide and sulfasalazine (SSZ) have been shown to negatively affect spermatogenesis.
  - Cyclophophamide can induce irreversible or prolonged oligozoospermia or azoospermia, compromising fertility.
  - SSZ can cause reversible azoospermia or oligospermia and adversely impact sperm quality.
    - However, we do not routinely discontinue SSZ in men who are pursuing fertility. In men taking SSZ in whom attempts at pregnancy have not been successful, we obtain a semen analysis, and if abnormal, we suggest stopping the medication for three months to allow for recovery of spermatogenesis
- Some patients may also erroneously assume their fertility is impaired, leading them to not use contraception even when they do not desire pregnancy.

Cryopreservation

- The American Society for Reproductive Medicine (2013) reported oocyte cryopreservation may be a viable alternative for women with high potential for ovarian failure when embryo freezing is not an option.
- Males have had great success with cryopreservation of sperm prior to gonadotoxic therapy.

Cyclophosphamide[1-3]

- Gonadotoxic, may induce infertility at standard dosing
  - Consider concurrent gonadotropin-releasing hormone agonist therapy for ovarian preservation (eg. Leuprolide)
- EURO-LUPUS dosing (low dose) may not impact ovarian reserves
- Consider assisted reproductive technology

1. Cytoxan. Package Insert. Baxter Healthcare Corporation; 2013.
2. Tamirou F, Husson SN, Gruson D, Debieve F, Lauwerys BR, Houssiau FA. The Euro-Lupus low-dose intravenous cyclophosphamide regimen does not impact the ovarian reserve, as measured by serum levels of anti–Mullerian hormone. Arthritis Rheumatol 2017;69:1267–71.
3. Sammaritano LR, Bermas BL, Chakravarty EE, et al. 2020 American college of rheumatology guideline for the management of reproductive health in rheumatic and musculoskeletal diseases. Arthritis Rheumatol. 2020 Feb 23;72(4):529-556

NSAIDs

- Consider discontinuing NSAIDs prior to conception if a patient is having difficulty becoming pregnant, due to NSAID-induced unruptured follicle syndrome

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PREGNANCY

Disease Activity and Pregnancy Outcomes

- Stable, well controlled disease typically equates to a good pregnancy outcome.
- Active, uncontrolled disease increases risk of:
  - Fetal growth restriction
  - Preeclampsia/hypertension
  - Preterm labor and labor complications, including higher risk of c-section

Disease Course During Pregnancy

- Approximately 50-70% of women with rheumatoid arthritis, and 50% of SLE patients see improvement in symptoms during pregnancy. Improvement typical begins in 1st trimester and lasts throughout the duration of pregnancy.
  - This is likely due to significant hormonal changes and immunologic factors (changes in cytokines, T-cell counts, etc.)

Course of maternal disease during pregnancy and fetal risks in some rheumatic diseases

Disease	Autoantibodies with risk for pregnancy	Active during pregnancy	Fetal risks
Rheumatoid arthritis	Rare*	Improves in 50–75% of pregnancies, 10–25% remain active	Rare — limited to very active RA or to therapy
Ankylosing spondylitis	No	60% of patients remain active, 20% flare during pregnancy	No
Systemic lupus erythematosus	Antiphospholipid antibodies, anti-SS-A, anti-SS-B	50% of patients have mild to moderate activity, severe flares occur in about 25% of pregnancies	Miscarriage, intrauterine growth restriction, prematurity, congenital heart block
Systemic sclerosis	Rare	No major effect of pregnancy on disease activity	Intrauterine growth restriction, prematurity
Vasculitis	Rare	No major effect of pregnancy on disease activity	Miscarriage, intrauterine growth estriction, prematurity

* Antiphospholipid antibodies and anti-SS-S/B can occur in other rheumatic diseases as well, but much less frequent than in SLE.

Østensen, M., & Förger, F. (2013). How safe are anti-rheumatic drugs during pregnancy? *Current opinion in pharmacology, 13 3*, 470-5 .

Pregnancy Physiologic Changes

- Pregnancy-related increased intravascular volume may worsen previous cardiac or renal disease
- Pregnancy-induced hypercoagulability increases thrombosis risk
- Demand on fetal development can worsen maternal osteoporosis
- Normal pregnancy symptoms (anemia, elevated ESR, malar erythema, arthralgias) may falsely mimic active rheumatologic disease
- Pregnancy-induced hypertension (preeclampsia) may be confused with scleroderma renal crisis, vasculitis flare or lupus nephritis.
- HELLP can also mimic a severe disease flare

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Principles of Drugs in Pregnancy

- Ideal to plan conception during periods of disease remission
- Try to avoid teratogenic drugs in women of child-bearing age
  - If they must be used, encourage contraception
  - LARC preferred
- Flares are common postpartum – have a plan in place

- Safety in pregnancy ≠ safety during lactation, and vice versa

Patient JM

- 28 year old female patient with dermatomyositis, psoriasis, migraines, anxiety, fatigue, depression, Raynaud's phenomenon. She is hoping to discontinue her hormonal contraceptive soon in an attempt to conceive
  - Medroxyprogesterone 150mg IM every 3 months
  - Mycophenolate 360mg 2 tabs BID
  - Ondansetron 8mg Q8H PRN N/V
  - Cyanocobalamin 10,000 units IM once weekly
  - Esomeprazole 40mg BID
  - Felodipine 10mg Qday PRN
  - Fluoxetine 20mg Qday
  - IVIG 2g/kg every 30 days
  - Linaclotide 145mcg Qday

Patient JM

Which of JM’s medications are not safe in pregnancy?

- A. Felodipine
- B. Mycophenolate
- C. IVIG
- D. Cyanocobalamin

Pregnancy Risk in Package Inserts

Risk Categories

- A – adequate, well-controlled studies have failed to demonstrate risk to fetus in 1st tri
- B – animal studies have failed to show risk, and no adequate well controlled studies in preg women; OR animal studies show adverse effects but human studies did not
- C – animal studies show adverse effects on the fetus, or no animal studies and no well-controlled human studies
- D – positive evidence of fetal risk, but benefits may outweigh
- X – Positive evidence of fetal risk, and risk clearly outweighs any possible benefit

Newer Methods

- Risk Summary
- Clinical Considerations
- Data
  - Human data
  - Animal data

Known Fetal Harm

- Methotrexate
  - Stop 1-3 months prior to conception
- Leflunomide
  - Stop prior to conception for both men and women
  - Consider cholestyramine washout
- Mycophenolate
  - Stop at least 6 weeks prior to conception
  - REMS – physician education
- Cyclophosphamide
  - Stop at least 12 weeks prior to conception and for at least 12 months after
- Rituximab
  - Use contraception during treatment and for at least 12 months after

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Leflunomide Washout

- Cholestyramine 8 grams three times a day for 11 days
- Activated charcoal 50 grams (oral suspension) every 12 hours for 11 days

- Verify plasma teriflunomide concentrations of less than 0.02 mg/L (0.02 mcg/mL) by two separate tests at least 14 days apart.
- If plasma teriflunomide concentrations are higher than 0.02 mg/L, repeat cholestyramine and/or activated charcoal treatment.

Arava. Package Insert. Sanofi Aventis; 2015.

Possible Fetal Harm?

- JAK inhibitors – small size, likely placental transfer
- Apremilast – increased risk of low birth weight in animal studies
- Voclosporin – contains anhydrous ethyl alcohol

Unknown Safety

- Anakinra (Kineret)
- Belimumab (Benlysta)
- Abatacept (Orencia)
- Tocilizumab (Actemra)
- Secukinumab (Cosentyx)
- Ustekinumab (Stelara)
- Anifrolumab-fnia (Saphnelo)

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Safe in Pregnancy

- Hydroxychloroquine
- Sulfasalazine
- Azathioprine
- Mercaptopurine
- TNF inhibitors
  - Certolizumab has least placental transfer during pregnancy
    - Only passive transport, no active transport

- Tacrolimus, cyclosporine only
  - Monitor BP
- Colchicine
- NSAIDs – only during first and second trimesters; avoid use in 3rd

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Biologic Treatment Strategies in Pregnancy

- Continue throughout the entire pregnancy
- Discontinue after 2nd trimester
- Others?

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- C. IVIG
- D. Cyanocobalamin

Patient JM

Which of the following agents are safer alternatives for JM during pregnancy?

- A. Methotrexate
- B. Leflunomide
- C. Tofacitinib
- D. Azathioprine

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- **D. Azathioprine**

POST-PARTUM

Postpartum Concerns

- Disease flares
- Breastfeeding
- Infant immunization
- Contraception

Postpartum Flares and Breastfeeding

Rheumatic condition	Risk of postpartum flare	Risk factors for flare
Rheumatoid arthritis	Up to 50%	- Positive anti-CCP antibody and RF - Stopping anti-TNF therapy too early - Poor disease control at conception
Ankylosing spondylitis	Up to 90%	- Stopping anti-TNF therapy too early - Poor disease control at conception
Psoriatic arthritis	28-55%	- Stopping anti-TNF therapy too early - Poor disease control at conception
SLE and CTD	35-70%	Active disease 6 months preconception
APS	Two to tenfold increase in thrombosis	

: Mouyis, M. Postnatal Care of Woman with Rheumatic Diseases. *Adv Ther* **37,** 3723–3731 (2020).

Resources

- LactMed
- MothertoBaby.org

Monoclonal Antibodies

- Often large molecules, so small amounts get passed into the breastmilk
- Poorly absorbed from the gut; get hydrolyzed by stomach acid
- Use caution in pre-term neonates

csDMARDs

Drug	Excreted in Breastmilk	Peak	Adverse Events Reported	Recommendations[1]
Methotrexate	Yes	1-12 hours after dose	One case, none reported	• Generally recommended to avoid however: • Some recommend that if breastfeeding during MTX use, consider avoiding during the 24 hours after dose (decreases infant exposure by ~40%) • Consider monitoring infant CBC
Leflunomide	Unknown	Unknown	Unknown	Recommended AGAINST
Hydroxychloroquine	Yes	Unknown	Multiple cases reported with no AEs	Considered safe
Sulfasalazine	Yes, mostly metabolites	Unknown	One case of bloody diarrhea; multiple cases of no AE's	• Considered safe • Observe infant for diarrhea

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Drugs and Lactation Database (LactMed) [Internet]. Bethesda (MD): National Library of Medicine (US); 2006-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK501922/

Immunosuppressants

Drug	Excreted in Breastmilk	Peak	Adverse Events Reported	Recommendations
Mycophenolate	Yes	~2 hours	None reported; 2 cases reported	ACR: Recommends AGAINST
Azathioprine	Yes, low amounts	2-8 hours	Mild neutropenia in 1 case; multiple cases reported with no AEs	Considered safe
Mercaptopurine	Yes, low amounts	2-8 hours	None reported	Considered safe
Cyclosporin/ tacrolimus	Yes; variable amounts	Unknown	One case of elevated Plts (CsA) that normalized at 16 mos; multiple cases reported with no AE's	Considered safe
Voclosporin	Likely yes	Unknown	One case reported, no AE's	Manufacturer recommends AGAINST breastfeeding during use and for at least 7 days after

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Others

Drug	Excreted in Breastmilk	Peak	Adverse Events Reported	Recommendations[1]
Prednisone	Yes, low amounts	2 hours after dose	None reported	• Considered safe after >4 hours since dose • May decrease milk supply
Tofacitinib	Unknown	Unknown	Unknown	• Manufacturer recommends AGAINST breastfeeding during use and for at least 18 hours (IR)/26 hrs (XR) last dose
Baricitinib	Unknown	Unknown	Unknown	• Manufacturer recommends AGAINST breastfeeding during use and for at least 4 days last dose
Upadacitinib	Unknown	Unknown	Unknown	• Manufacturer recommends AGAINST breastfeeding during use and for at least 6 days last dose
Apremilast	Yes	Unknown	Unknown	• Manufacturer recommends AGAINST breastfeeding during use

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Patient JM

- Patient JM, now 29, comes back to your clinic for follow up. She is now 37 weeks pregnant, and is scheduled for induction in 2 weeks. Prior to conception you changed her immunosuppressant to azathioprine 75mg orally daily, and she maintained low disease activity until about 3 weeks ago when she experienced a disease flare, so you added prednisone 10mg. She was able to successfully taper down to 5mg, but if she attempts lower doses, she has return of symptoms. She is inquiring about the safety of her medicines during breastfeeding. She is currently on prednisone 5mg daily, azathioprine 75mg daily, and a daily prenatal vitamin.
- What do you recommend?

Immunization to Infants Born to Women with Rheumatic Disease

- Non-live vaccines should be given on schedule
- Live vaccines, such as rotavirus, should be avoided in the first 6 months of life in infants who may have had *in utero* biologic exposure after 2nd trimester for TNF-I and 1st trimester for infliximab
- Live vaccines that are given at 12 months of age, such as MMR and varicella, can be given on schedule even in breastfed infants who have mothers treated with biologics.

Contraception Postpartum

- Contraception needs to be discussed soon after delivery to prevent any unplanned pregnancies.

- Although exclusive breastfeeding can cause lactational amenorrhea, it is not a reliable form of contraception, and other contraceptive options need to be explored.

Summary

- Patients should receive appropriate guidance on preconception planning including contraception, disease management, and postpartum concerns.

The Burning Question….

- What does the middle age, white guy from Idaho have to say about contraception and women's health recommendations?

Contraceptive methods

- Method selection is best guided by an individual woman's preferences, with consideration of:
  - Reversibility
  - Safety
  - Non-contraceptive benefits
  - Side effects
  - Cost
  - Convenience
- Highly effective methods:
  - Progestin-only subdermal implants are the most effective contraceptives available (1st year failure rate 0.05%).
  - IUD: hormonal and copper.
- Moderately effective methods:
  - Combined hormonal contraceptives (e.g. pills, patch, vaginal ring). Annual failure rate 7%.
  - Progestin-only methods (pills and injection – annual failure rate 7% and 4% respectively).
- Least effective methods:
  - Male and female condoms. Annual failure rate 13% and 20% respectively
  - Diaphragm. Annual failure rate 12%
  - Behavioral methods (natural family planning, withdrawal – annual failure rate 24% and 20% respectively)

Contraception

- ACR Reproductive Health Initiative
- Excellent Contraception Handouts
- Also has educational toolkits, CME, video information regarding SLE and pregnancy, and more.

Contraception

BIRTH CONTROL FOR PEOPLE WITH RHEUMATIC DISEASES*

IUD — MOST EFFECTIVE

- This t-shaped piece of plastic—available with or without hormones—is placed in the uterus by a health care professional and keeps sperm from doing their thing. (As in not fertilizing an egg.)
- Trouble remembering your birth control? The IUD just may be for you. Once it's in, you can keep it for 3-12 years.
- IUDs with hormones can lighten your period and even may make your periods stop all together. The hormones in the IUD will not affect your rheumatic disease or treatments.
- You can have the IUD removed anytime you want and can get pregnant pretty fast after you stop using it.
- Both types of IUDs are safe for everyone with a rheumatic disease.

IMPLANT — MOST EFFECTIVE

- This teeny tiny rod is placed under the skin in the upper arm by a health care professional and it prevents pregnancy for up to 5 years.
- It gives off hormones that keep ovaries from releasing eggs. Also has a cool sperm-blocking effect.
- It's so small that most people can't see it—which means it can be your little secret, if you're so inclined.
- You can have the implant removed anytime you want and can get pregnant pretty fast after you stop using it.
- Safe for everyone with a rheumatic disease. The hormone in the implant will not affect your rheumatic disease or treatments.

SHOT

- A shot that keeps you from getting pregnant for 3 months at a time.
- It contains progestin, which keeps ovaries from producing eggs. Also has an awesome sperm-blocking effect.
- Once you get the shot, no one can tell you're on it, so it gives you a lot of privacy.
- It's possible to get pregnant 13-15 weeks after the last injection, but for some it can take up to 9 months.
- Safe for most people with a rheumatic disease. If you have antiphospholipid antibodies or at high risk for osteoporosis because of medications you take, think about if this is the best method for you.

Contraception

PATCH

- A thin, beige piece of plastic—kind of like a Band-Aid—that you put on your skin and change once a week.
- Gives off hormones that keep ovaries from releasing eggs. Also has a fabulous sperm-blocking effect.
- Xulane is less effective if you weigh more than 198 pounds; Twirla is less effective the higher your BMI is, starting at 25.
- You can get pregnant pretty fast after you stop using the patch.
- Safe for most people with a rheumatic disease. It's not recommended if you have antiphospholipid antibodies or lupus.

ring

- A small, bendable ring that's inserted into the vagina. Put it in. Wait 3 weeks. Take it out. Wait 1 week. Repeat.
- It gives off hormones that prevent ovaries from releasing eggs. Also has a fabulous sperm-blocking effect.
- It allows you skip your period altogether. Consider the possibilities.
- You can get pregnant pretty fast after you stop using the ring.
- Safe for most people with a rheumatic disease. It's not recommended if you have antiphospholipid antibodies or very active lupus.

CONDOM

- Slip a condom over the penis or insert an internal condom into the vagina to prevent pregnancy and lower the risk of sexually transmitted infections.
- Latex or non-latex. With spermicide or without. With lube or no lube. There are hundreds of shapes, sizes, and types to choose from.
- They're cheap (sometimes even free!) and easy to get.
- You should use them correctly every single time if you want them to be effective.
- Safe for everyone with a rheumatic disease.

BIRTH CONTROL PILL

- Take the pill once a day and it'll keep you from getting pregnant.
- The pill keeps the ovaries from releasing eggs. Also has an excellent sperm-blocking effect.
- Some pills allow you to skip your period altogether. Consider the possibilities.
- You can get pregnant pretty fast after you stop using the pill.
- The most common kind of pills are safe for most people with a rheumatic disease, but they aren't recommended if you have antiphospholipid antibodies or very active lupus.
- Progestin-only pills are safe for everyone with a rheumatic disease.

*There are many rheumatic and musculoskeletal diseases and conditions including fibromyalgia, lupus, psoriatic arthritis, rheumatoid arthritis, and scleroderma. For a complete list go to: www.rheumatology.org/I-Am-A/Patient-Caregiver/Diseases-Conditions

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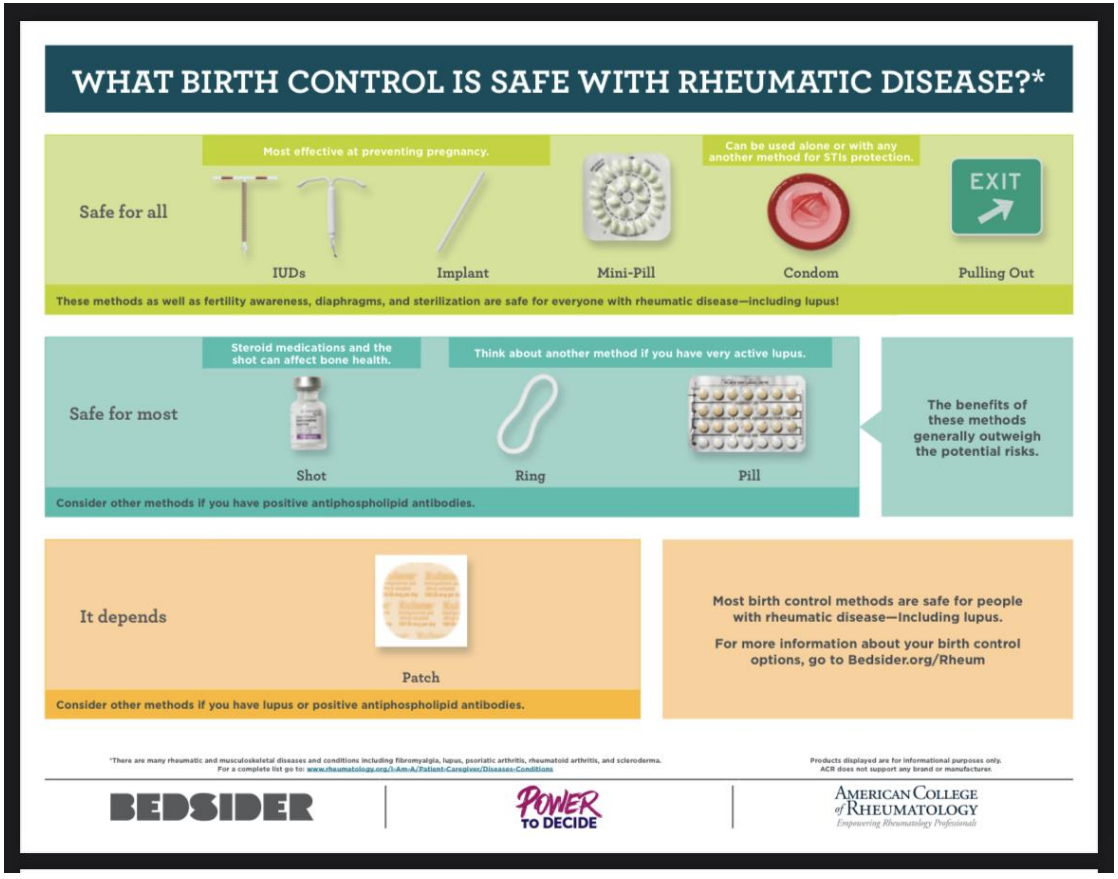
Contraception



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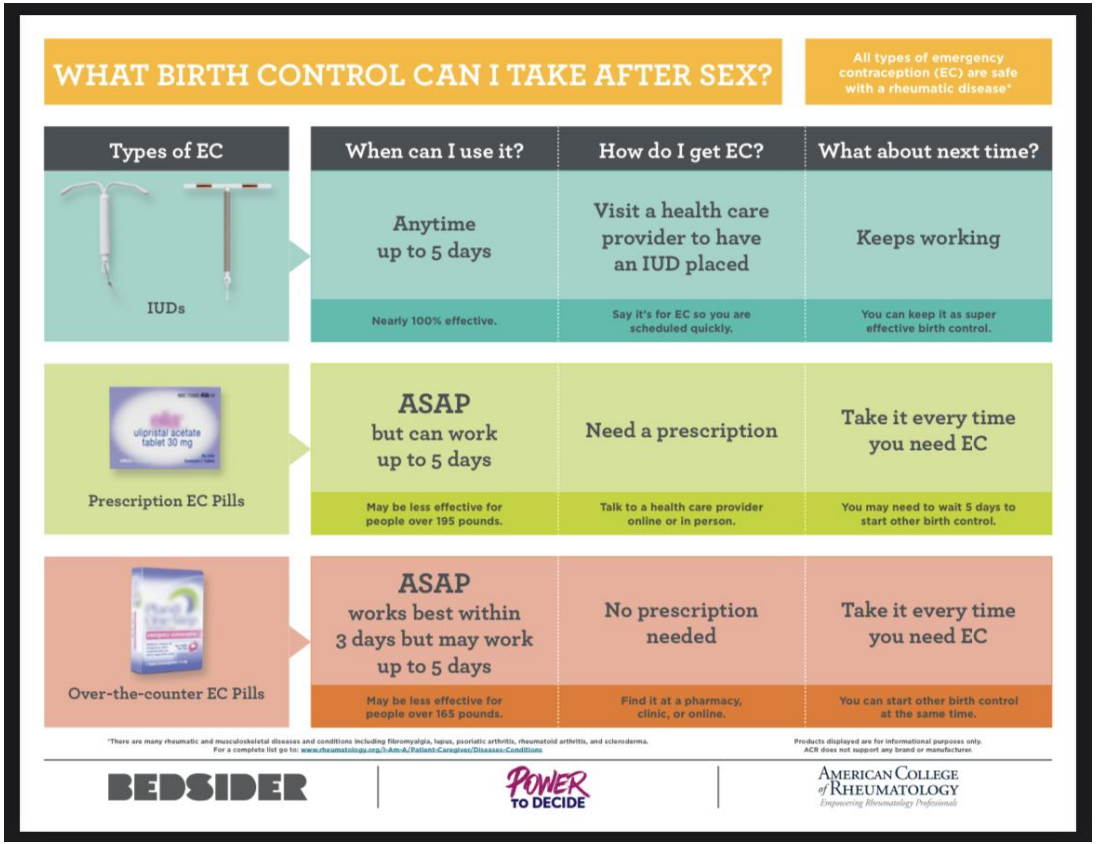
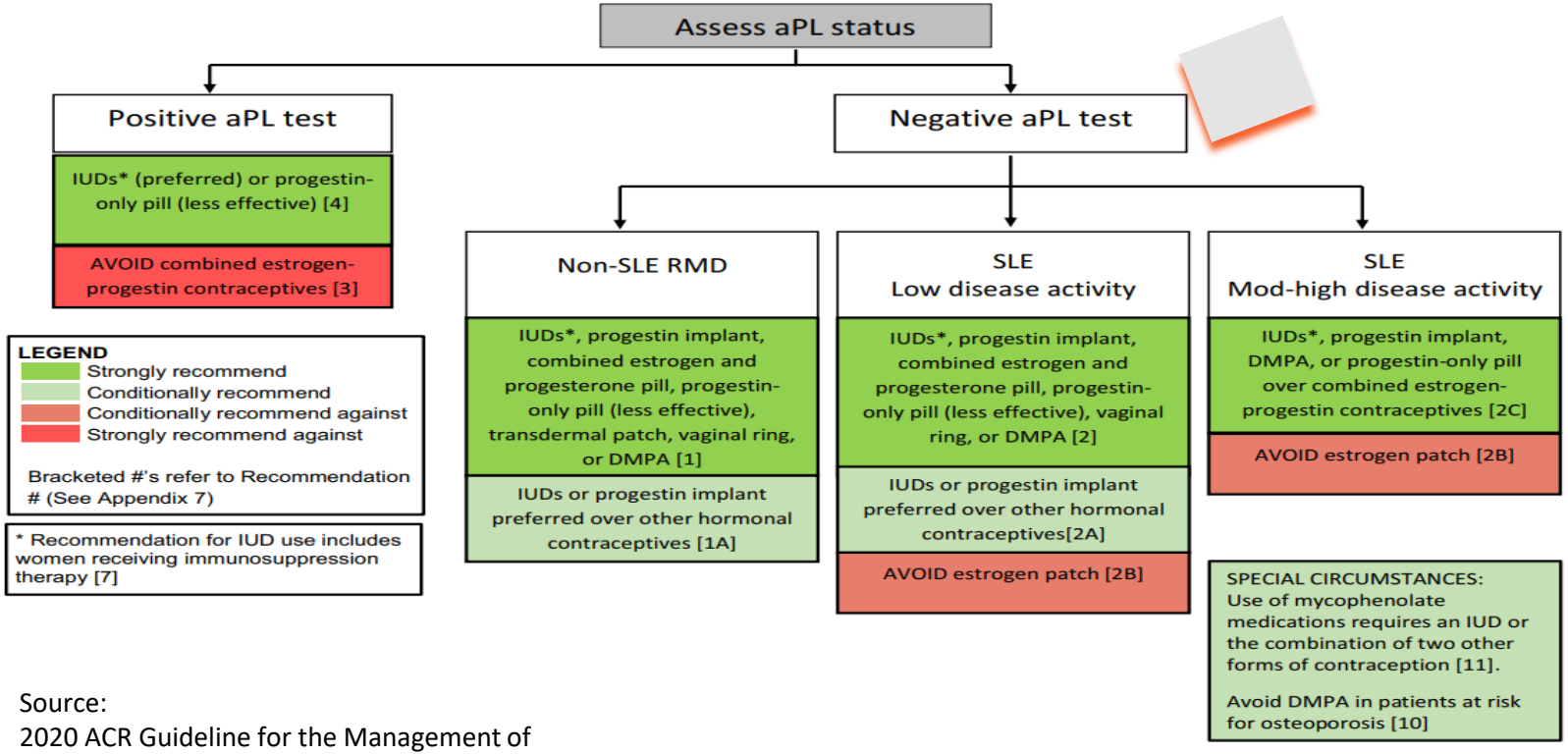


Considerations for aPL Status



Source:
2020 ACR Guideline for the Management of Reproductive Health in Rheumatic and Musculoskeletal Diseases

Health Maintenance Recommendations for Women with Rheumatic Disease

- Age Appropriate Cancer Screenings
- Bone Density Screenings
- Cardiovascular Disease
- Immunizations
- Psychosocial Health Concerns

Age Appropriate Cancer Screenings

- Pap
  - Ages 21-29
    - Cytology every 3 years
    - Also acceptable HPV testing every 5 years starting at 25
  - Ages 30-65
    - HPV or Co-test every 5 years
    - Cytology every 3 years

Age Appropriate Cancer Screenings

- Breast
  - Recommendations depend on the organization
  - Most recommend mammogram every 1-2 years beginning between ages 40-45

Age Appropriate Cancer Screenings

- Colon
  - Screening to begin at age 45 with no risk factors

Bone Density Screening Guidelines

- Women > 65 years of age and older
  - All should undergo screening
- Women < 65 years
  - Screen if one or more risk factors are present

Clinical Risk Factors for Fracture

Clinical risk factors for fracture

Advancing age
Previous fracture
Glucocorticoid therapy
Parental history of hip fracture
Low body weight
Current cigarette smoking
Excessive alcohol consumption
Rheumatoid arthritis
Secondary osteoporosis (eg, hypogonadism or premature menopause, malabsorption, chronic liver disease, inflammatory bowel disease)

Data from: Kanis JA, Borgstrom F, De Laet C, et al. Assessment of fracture risk. Osteoporos Int 2005; 16:581.

Cardiovascular Disease

- 59% increased risk in RA patients
- Also greatly increased in SLE
  - Increased thrombotic events with APS
- Increased Inflammation
- Medications that increase CV risk
  - JAK inhibitors, Actemra, NSAIDs, Steroid

Immunizations

Recommended adult immunization schedule by age group - United States, 2022

Vaccine	Age group (years): 19 through 26 years	27 through 49 years	50 through 64 years	≥65 years
Influenza inactivated (IIV4)* or Influenza recombinant (RIV4)*	1 dose annually			
or				
Influenza live, attenuated (LAIV4)*	1 dose annually			
Tetanus, diphtheria, pertussis (Tdap or Td)¶	1 dose Tdap each pregnancy; 1 dose Td/Tdap for wound management (refer to footnotes)			
	1 dose Tdap, then Td or Tdap booster every 10 years			
Measles, mumps, rubella (MMR)Δ	1 or 2 doses depending on indication (if born in 1957 or later)			
Varicella (VAR)◇	2 doses (if born in 1980 or later)		2 doses	
Zoster recombinant (RZV)§	2 doses for immunocompromising conditions (refer to footnotes)		2 doses	
Human papillomavirus (HPV)¥	2 or 3 doses depending on age at initial vaccination or condition	27 through 45 years		
Pneumococcal (PCV15, PCV20, PPSV23)‡	1 dose PCV15 followed by PPSV23 OR 1 dose PCV20 (refer to footnotes)			1 dose PCV15 followed by PPSV23 OR 1 dose PCV20
Hepatitis A (HepA)†	2 or 3 doses depending on vaccine			
Hepatitis B (HepB)**	2, 3, or 4 doses depending on vaccine or condition			
Meningococcal A, C, W, Y (MenACWY)¶¶	1 or 2 doses depending on indication, refer to footnotes for booster recommendations			
Meningococcal B (MenB)¶¶	2 or 3 doses depending on vaccine and indication, refer to footnotes for booster recommendations			
	19 through 23 years			
Haemophilus influenzae type b (Hib)ΔΔ	1 or 3 doses depending on indication			

Recommended vaccination for adults who meet age requirement, lack documentation of vaccination, or lack evidence of past infection

Recommended vaccination for adults with an additional risk factor or another indication

Recommended vaccination based on shared clinical decision-making

No recommendation/not applicable

COVID-19 vaccination

COVID-19 vaccines are recommended within the scope of the Emergency Use Authorization or Biologics License Application for the particular vaccine. ACIP recommendations for the use of COVID-19 vaccines can be found at www.cdc.gov/vaccines/hcp/acip-recs/vacc-specific/covid-19.html.

CDC's interim clinical considerations for use of COVID-19 vaccines can be found at www.cdc.gov/vaccines/covid-19/clinical-considerations/covid-19-vaccines-us.html.

Psychosocial Health Concerns

- Depression
- Anxiety
- Substance Abuse
- Intimate Partner Violence

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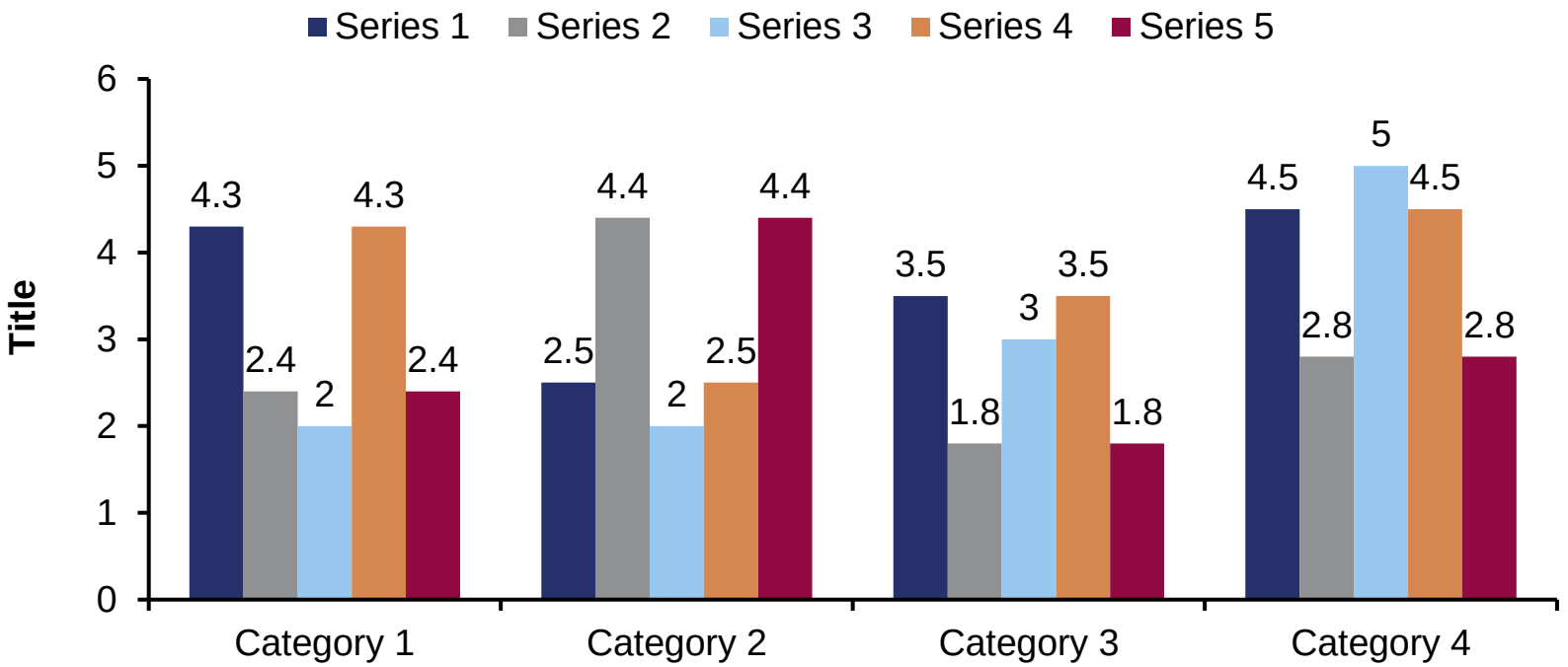
Sample Chart



Sample Table

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