

Antibiotics in OBS/GYN

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Antibiotics
Antivirals
Antifungals
Antiparasitics



World Health
Organization

Human microbiome

Archaea, bacteria, fungi and viruses



Mouth



Skin



Digestive



Urogenital



-
- The microbiome is the collection of all microbes, such as bacteria, fungi, viruses, and their genes, that naturally live on our bodies and inside us.
 - Contribute to human health and wellness. They protect us against pathogens, help our immune system develop, and enable us to digest food to produce energy.

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- Antibiotics can significantly disrupt the gut microbiome by killing both harmful and beneficial bacteria, leading to potential long-term health consequences.

Effect of antibiotics on microbiome

- **Disruption of Balance**
- **Long-Term Effects** beneficial bacteria never fully recovering
- **Specific Antibiotics and Their Effects:** Broad-spectrum antibiotics, such as clindamycin and ciprofloxacin, are particularly notorious for causing significant disruptions to the microbiome.

- Antibiotics are **vital in obstetric and gynecologic practice** for both **therapeutic treatment** and **prophylaxis** to reduce maternal and neonatal morbidity and mortality.

- Obstetric infections frequently arise from **endogenous flora** of the vagina, gastrointestinal tract, or skin — many are polymicrobial.

How to use antibiotic

- **Target the Most Likely Pathogen**
- **Empiric therapy first**, then refine based on culture results.
- **Patient factors**: allergy history (e.g., penicillin allergy), pregnancy status, renal/hepatic function.
- **Narrow-spectrum preferred.**
- **Appropriate dose, route, and duration** based on evidence-based guidelines.

**Bactericidal antibiotics:
remember of “BANG Q R.I.P.”**

Beta-lactams

Aminoglycosides

Nitroimidazoles (metronidazole)

Glycopeptides (vancomycin)

Quinolones

Rifampicin

Polymyxins (colistin)

**Bacteriostatic antibiotics:
remember of “Ms. Colt”**

Macrolides

Sulfonamides

Chloramphenicol

Oxazolidinones

Lincosamides (clindamycin)

Tetracyclines

Classification of antibiotic

Penicillins:

- a) Amoxicillin (E-mox)
- b) Amoxicillin + Clavulanate Potassium

Sulfonamide:

Sulfadiazine, Sulfamethoxazole

Cephalosporins:

- a) 1st Generation – Cephadrine (Efrad), Cephalexin (Edicef).
- b) 2nd Generation- Cefuroxime.
- c) 3rd Generation- Cefixime (3-C), Ceftriaxone (Edrucef).
- d) 4th Generation- Meropenem (Edrupen).

Fluoroquinolones:

- a) 1st Generation - Nalidixic acid, Cinoxacin.
- b) 2nd Generation- Ciprofloxacin (Cipron), Norfloxacin.
- c) 3rd Generation- Levofloxacin (3-F), Gemifloxacin.
- d) 4th Generation- Trovafloxacin.

Tetracycline:

Doxycycline (E-doxy), Chlortetracycline

Aminoglycoside:

Gentamycin (Egen), Streptomycin

Macrolides:

Erythromycin, Azithromycin (Ezith), Clarithromycin

Critical Care Antibiotic Guide

pharmacyjoe.com

Always refer to patient & local sensitivities!

Gram Positives

Daptomycin † *
Telavancin † Vancomycin †

Gram Negatives

Aztreonam ◆
Aminoglycosides ◆
△ Ciprofloxacin
Colistimethate ◆ \$

Anaerobes

Metronidazole

Cefepime ◆
Ceftriaxone
Ceftaroline †
Ceftazidime-avibactam ◆ # \$
Ceftolozone-tazobactam ◆ #
△ Levofloxacin

Doripenem ◆ #
Imipenem ◆ #
Meropenem ◆ #
△ Ertapenem #
△ Moxifloxacin
△ Tigecycline \$
Piperacillin-Tazobactam ◆

Linezolid † *
△ Clindamycin

Antibiotics marked with a △ may not be appropriate for critically ill patients - use caution and consult a tertiary reference or guideline

Additional Coverage vs.

◆ Pseudomonas
ESBL
† MRSA
* VRE
\$ KPC

MORE...

Empiric abx selection: pharmacyjoe.com/episode8
CRRT abx dosing: pharmacyjoe.com/episode13

Updated March 2019

1. First Generation:

- **Activity:** Primarily effective against gram-positive bacteria, such as Staphylococcus and Streptococcus, with limited gram-negative coverage.
- **Common Drugs:** Cefazolin, Cephalexin, Cefadroxil.
- **Uses:** Skin and soft tissue infections, surgical prophylaxis.

2. Second Generation:

- **Activity:** Increased activity against gram-negative bacteria compared to the first generation, but with reduced effectiveness against gram-positive organisms.
- **Common Drugs:** Cefuroxime, Cefoxitin, Cefaclor.
- **Uses:** Respiratory tract infections, otitis media, and surgical prophylaxis for abdominal procedures.

3. Third Generation:

- **Activity:** Broader gram-negative coverage and some retain good activity against gram-positive bacteria. They are often used in severe infections.
- **Common Drugs:** Ceftriaxone, Ceftazidime, Cefotaxime.
- **Uses:** Meningitis, pneumonia, gonorrhea, and severe urinary tract infections.

4. Fourth Generation:

- **Activity:** Enhanced activity against gram-negative bacteria, including *Pseudomonas*, and improved stability against beta-lactamases.
- **Common Drugs:** Cefepime, Cefpirome.
- **Uses:** Hospital-acquired infections, febrile neutropenia, and resistant infections.

5. Fifth Generation:

- **Activity:** Effective against methicillin-resistant *Staphylococcus aureus* (MRSA) and retains activity against gram-negative bacteria.
- **Common Drugs:** Ceftaroline, Ceftobiprole.
- **Uses:** Community-acquired pneumonia and skin infections caused by resistant bacteria.

Side effect

RASH



DIZZINESS



NAUSEA



DIARRRHEA



YEAST INFECTIONS



Obstetric Indications

- **Cesarean Section**

- reduces endometritis and wound infections (SSI).
- Typical choice: **cefazolin** given prior to incision.

- **Group B Streptococcus (GBS) Prophylaxis**

- In labor with positive GBS screening — usually **penicillin/ampicillin**

- **Urinary Tract Infections (UTIs)**

- Most common obstetric infection → treat promptly to prevent pyelonephritis.

- **Intra-amniotic infection, postpartum endometritis**

- Often polymicrobial — requires broad coverage (anaerobes + aerobes).

- **Sepsis and neonatal infection**

- Standard empiric therapy often begins with **ampicillin + aminoglycoside** in neonates


TABLE 1


Recommended antibiotic prophylaxis regimens for cesarean delivery





Antimicrobial	Recommended dose & timing	Target pathogens	Clinical notes/evidence
Cefazolin (first-line)	2 g IV within 60 min before incision; increase to 3 g if ≥ 120 kg; redose if procedure > 2 half-lives (~ 4 h) or blood loss > 1500 mL	<i>Staphylococcus aureus</i> , <i>Streptococcus</i> spp., Enterobacteriaceae (<i>Escherichia coli</i> , <i>Klebsiella</i> , <i>Proteus</i>)	High tissue penetration; proven reduction in SSI and endometritis; safe for neonate; cost-effective; guideline-endorsed by ACOG, CDC, WHO
Azithromycin (adjunct to cefazolin)	500 mg IV infused before incision	<i>Ureaplasma</i> spp.	RCTs/meta-analyses show benefit in unscheduled cesareans with labor or rupture of membranes; limited/no benefit in scheduled cesareans; useful in obese, high-risk patients
Clindamycin+gentamicin (severe β -lactam allergy)	Clindamycin 900 mg IV+gentamicin 5 mg/kg IV within 60 min before incision	Clindamycin: Gram-positive cocci, anaerobes; gentamicin: Gram-negative rods	Alternative when cefazolin contraindicated; higher SSI risk vs β -lactams; resistance concerns (<i>Staphylococcus</i> / <i>Streptococcus</i> to clindamycin); adverse effects include <i>Clostridium difficile</i> colitis, nephrotoxicity/ototoxicity
Vancomycin (if colonized by methicillin-resistant <i>Staphylococcus aureus</i>)	1.5 mg/kg IV (infuse over ≥ 60 min)	Methicillin-resistant <i>Staphylococcus aureus</i> , Gram-positive cocci	Reserved for MRSA carriers; less effective vs Gram-negatives; infusion-related "red man syndrome" possible; not used routinely.
Postoperative oral regimen (select high-risk patients)	Cephalexin 500 mg+metronidazole 500 mg PO every 8 h \times 48 h after cesarean	Gram-positive cocci, Gram-negatives, anaerobes	In obese women, RCTs showed reduced SSI and wound complications vs placebo; not standard, but may be considered in high-risk patients


Summary of recommended prophylactic antimicrobial agents, dosing, timing, and target pathogens. Regimens reflect guideline-endorsed best practice (Centers for Disease Control and Prevention [CDC], the American College of Obstetricians and Gynecologists [ACOG], and the World Health Organization [WHO]) and evidence from randomized controlled trials and meta-analyses.

ACOG, American College of Obstetricians and Gynecologists; CDC, Centers for Disease Control and Prevention; IV, intravenous; MRSA, methicillin-resistant *Staphylococcus aureus*; PO, per os (oral); RCT, randomized controlled trial; SSI, surgical site infection; WHO, World Health Organization.

Infection	Key points	Medicine	Doses		Length	Visual summary		
			Adult	Child				
▼ Urinary tract infections								
Lower urinary tract infection NICE UK Health Security Agency Last updated: Oct 2018	<p>Advise paracetamol or ibuprofen for pain.</p> <p>Non-pregnant women: back up antibiotic (to use if no improvement in 48 hours or symptoms worsen at any time) or immediate antibiotic.</p> <p>Pregnant women, men, children or young people: immediate antibiotic.</p> <p>When considering antibiotics, take account of severity of symptoms, risk of complications, previous urine culture and susceptibility results, previous antibiotic use which may have led to resistant bacteria and local antimicrobial resistance data.</p> <p>If people have symptoms of pyelonephritis (such as fever) or a complicated UTI, see acute pyelonephritis (upper urinary tract infection) for antibiotic choices.</p> <p><i>For detailed information click on the visual summary. See also the NICE guideline on urinary tract infection in under 16s: diagnosis and management and the UK Health Security Agency urinary tract infection: diagnostic tools for primary care.</i></p>	Non-pregnant women first choice: nitrofurantoin (if eGFR ≥ 45 ml/minute) OR	100mg m/r BD (or if unavailable 50mg QDS)	-	3 days			
		trimethoprim (if low risk of resistance)	200mg BD	-				
		Non-pregnant women second choice: nitrofurantoin (if eGFR ≥ 45 ml/minute) OR	100mg m/r BD (or if unavailable 50mg QDS)	-	3 days			
		pivmecillinam (a penicillin) OR	400mg initial dose, then 200mg TDS	-	3 days			
		fosfomycin	3g single dose sachet	-	single dose			
		Pregnant women first choice: nitrofurantoin (avoid at term) – if eGFR ≥ 45 ml/minute	100mg m/r BD (or if unavailable 50mg QDS)	-	7 days			
		Pregnant women second choice: amoxicillin (only if culture results available and susceptible) OR	500mg TDS	-	7 days			
		cefalexin	500mg BD	-				
		Treatment of asymptomatic bacteriuria in pregnant women: choose from nitrofurantoin (avoid at term), amoxicillin or cefalexin based on recent culture and susceptibility results						
		Men first choice: trimethoprim OR	200mg BD	-	7 days			
nitrofurantoin (if eGFR ≥ 45 ml/minute)	100mg m/r BD (or if unavailable 50mg QDS)	-						

Infection	Key points	Medicine	Doses		Length	Visual summary		
			Adult	Child				
Acute pyelonephritis (upper urinary tract) NICE UK Health Security Agency Last updated: September 2024	Advise paracetamol (+/- low-dose weak opioid) for pain for people over 12. Offer an antibiotic. When prescribing antibiotics, take account of severity of symptoms, risk of complications, previous urine culture and susceptibility results, previous antibiotic use which may have led to resistant bacteria and local antimicrobial resistance data. Avoid antibiotics that don't achieve adequate levels in renal tissue, such as nitrofurantoin. <i>For detailed information click on the visual summary. See also the NICE guideline on urinary tract infection in under 16s: diagnosis and management and the UK Health Security Agency urinary tract infection: diagnostic tools for primary care.</i> <i>*See the MHRA January 2024 advice on restrictions and precautions for using fluoroquinolone antibiotics because of the risk of disabling and potentially long-lasting or irreversible side effects. Fluoroquinolones must now only be prescribed when other commonly recommended antibiotics are inappropriate.</i>	Non-pregnant women and men first choice: cefalexin OR	500mg BD or TDS (up to 1g to 1.5g TDS or QDS for severe infections)	-	7 to 10 days			
		co-amoxiclav (only if culture results available and susceptible) OR	500/125mg TDS	-	7 to 10 days			
		trimethoprim (only if culture results available and susceptible) OR	200mg BD	-	14 days			
		ciprofloxacin* (only if other first-choice antibiotics are unsuitable)	500mg BD	-	7 days			
		Non-pregnant women and men IV antibiotics (click on visual summary)						
		Pregnant women first choice: cefalexin	500mg BD or TDS (up to 1g to 1.5g TDS or QDS for severe infections)	-	7 to 10 days			
		Pregnant women second choice or IV antibiotics (click on visual summary)						
		Children and young people (3 months and over) first choice: cefalexin OR	-	-	-		-	
		co-amoxiclav (only if culture results available and susceptible)	-	-	-		-	
		Children and young people (3 months and over) IV antibiotics (click on visual summary)						

Infection	Key points	Medicine	Doses		Length	Visual summary
			Adult	Child		
Recurrent urinary tract infection NICE UK Health Security Agency Last updated: April 2025	<p>Refer or seek specialist advice for: men, trans-women and people with a male urinary system, people with recurrent upper UTI (rUTI), if the underlying cause of rUTI is unknown, pregnant people, children under 16 years (see NICE guideline on UTI in under 16s), people with suspected cancer (see NICE guideline on suspected cancer), and anyone who has had surgery structurally altering the urethra.</p> <p>For non-pregnant women, trans-men and non-binary people with a female urinary system:</p> <ul style="list-style-type: none"> • First advise about behavioural and personal hygiene measures and self-care treatments to reduce the risk of UTI (e.g. cranberry products etc...) (see NICE guideline on recurrent UTI). • If no improvement after behavioural or personal hygiene measures or if these are not appropriate: for those who are experiencing perimenopause, menopause, or are postmenopausal, consider vaginal oestrogen (review within 12 months). • If no improvement after vaginal oestrogen or if it is not appropriate: consider single-dose antibiotic prophylaxis for exposure to a trigger (review within 6 months). • If no improvement after trying vaginal oestrogen, and/or prophylaxis for triggers and/or there is no identifiable 	Antiseptic prophylaxis: methenamine hippurate	1g BD	-	review within 6 months, and then every 12 months, or earlier if agreed with the person	
		First choice antibiotic prophylaxis: trimethoprim (avoid in pregnancy) OR	200mg single dose when exposed to a trigger or 100mg nightly		review within 6 months	
		nitrofurantoin (avoid at term) - if eGFR ≥ 45 ml/minute	100mg single dose when exposed to a trigger or 50 to 100mg nightly		review within 6 months	
		Second choice antibiotic prophylaxis: amoxicillin OR	500mg single dose when exposed to a trigger or 250mg nightly		review within 6 months	

Infection	Key points	Medicine	Doses		Length	Visual summary
			Adult	Child		
	<p>trigger: consider methenamine hippurate as an alternative to daily prophylaxis, as long as any current UTI is treated (review within 6 months, and then every 12 months, or earlier if agreed with the person).</p> <ul style="list-style-type: none"> If no improvement after antiseptic prophylaxis or if it is not appropriate: consider a trial of daily antibiotic prophylaxis (review within 6 months). <p><i>For detailed information click on the visual summary. See also the NICE guideline on urinary tract infection in under 16s: diagnosis and management and the UK Health Security Agency urinary tract infection: diagnostic tools for primary care.</i></p>	cefalexin	500mg single dose when exposed to a trigger or 125mg nightly		review within 6 months	

Gynecologic Indications

- **Surgical Prophylaxis**
- **Hysterectomy:** First- or second-generation cephalosporin (e.g., **cefazolin**).
- Prophylaxis generally *not* recommended for clean laparoscopic procedures without risk factors.
- **Pelvic Inflammatory Disease (PID)**
- Combination therapy to cover gonorrhea, chlamydia, and anaerobes
(**ceftriaxone + doxycycline + metronidazole**)
- **Bacterial vaginosis.**

1. Sexually Transmitted Infections (STIs)

Tailored regimens for gonorrhoea, chlamydia, etc. (often ceftriaxone for gonorrhoea).

Doxycycline 100mg bd for 7 days is now recommended as first line treatment for uncomplicated urogenital, pharyngeal and rectal chlamydia infections, with test of cure (TOC) for diagnosed rectal infections.(BASHH)

2. UTIs and uncomplicated cystitis

Antibiotic choice based on local resistance data.

Cesarean & surgical prophylaxis

Skin/anaerobes

Cefazolin, add **metronidazole** if anaerobic risk high PMC

UTI in pregnancy

E. coli, Klebsiella

Nitrofurantoin, **cephalexin**

PID

N. gonorrhoeae, Chlamydia,
anaerobes

Ceftriaxone + doxycycline ± metronidazole
CDC

Endometritis post-delivery

Polymicrobial

Clindamycin + gentamicin

Intra-amniotic infection

Polymicrobial, anaerobes

Broad-spectrum combinations

Wound/Surgical site infection

Skin flora (Staph/Strep)

Based on local antibiogram

Antibiotic Resistance

AMR

- AMR occurs when the microorganisms which cause disease (including bacteria, viruses, fungi and parasites) are no longer affected by antimicrobial medicines such as antibiotics, antivirals, antifungals and antiparasitics that we use to kill them, prevent and treat the disease.
- (AMR) has been identified as one of the most pressing global challenges facing this century by WHO.

- It is accelerated by:

1. Inappropriate use of antimicrobial drugs
2. Poor infection prevention and control practices
3. Lack of new antimicrobial drugs being developed
4. Insufficient global surveillance of infection rates

What is needed from a healthcare perspective to tackle resistance?

- Early prevention of infections
- Timely, accurate diagnosis
- Appropriate prescribing and use of antimicrobials only when there is an infection for which they are the most appropriate treatment
- Effective management of infections
- Development of alternatives to current antimicrobials

