



UWTASP
tele-antimicrobial stewardship program

echo

Anti-Infectives in the Pregnant Woman

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June 26, 2018

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Antibiotics in Pregnancy



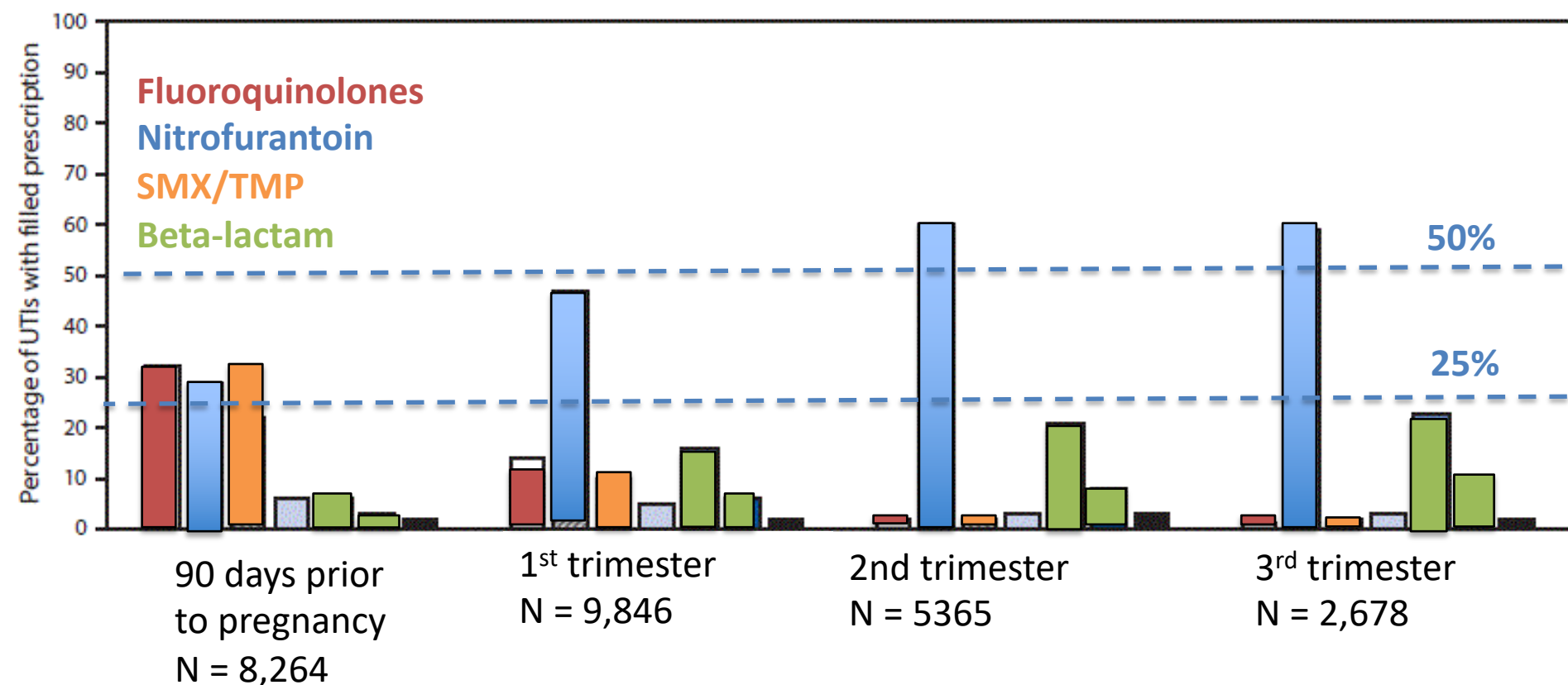
“One- to two-thirds of all pregnant women will take at least 1 medication during pregnancy.

The most commonly used drugs are antimicrobial agents, followed by antiemetics, tranquilizers, and analgesics.¹”

UTI: Most common bacterial infection in pregnancy

UTI	Incidence	Maternal Risk	Fetal Risk
Asymptomatic Bacteriuria	2 – 15%	Untreated, 20 – 40% develop symptomatic UTI Premature rupture of membranes (GBS)	GBS neonatal infection
Symptomatic Bacteriuria -Cystitis -Pyelonephritis	1 – 2%	Pre-eclampsia	Premature delivery Growth restriction Low birth weight

Antibiotic Prescribing in Pregnant Women with UTI



Drug ratings in pregnancy (US Food & Drug Administration)

Category	Interpretation
A	<p>Controlled studies show no risk</p> <p>Controlled studies in pregnant women fail to demonstrate a risk to the fetus in the first trimester with no evidence of risk in later trimesters. The possibility of fetal harm appears remote.</p>
B	<p>No evidence of human risk in controlled studies</p> <p>Either animal-reproduction studies have not demonstrated a fetal risk but there are no controlled studies in pregnant women, or animal-reproduction studies have shown an adverse effect (other than a decrease in fertility) that was not confirmed in controlled studies in women in the first trimester and there is no evidence of a risk in later trimesters.</p>
C	<p>Risk cannot be ruled out</p> <p>Either studies in animals have revealed adverse effects on the fetus (teratogenic or embryocidal effects or other) and there are no controlled studies in women, or studies in women and animals are not available. Drugs should be given only if the potential benefits justify the potential risk to the fetus.</p>
D	<p>Positive evidence of risk</p> <p>There is positive evidence of human fetal risk, but the benefits from use in pregnant women may be acceptable despite the risk (eg, if the drug is needed in a life-threatening situation or for a serious disease for which safer drugs cannot be used or are ineffective).</p>
X	<p>Contraindicated in pregnancy</p> <p>Studies in animals or human beings have demonstrated fetal abnormalities or there is evidence of fetal risk based on human experience, or both, and the risk of the use of the drug in pregnant women clearly outweighs any possible benefit. The drug is contraindicated in women who are or may become pregnant.</p>

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Antimicrobials with history of safety



Beta-lactams

(Penicillins, Cephalosporins, Carbapenems)

If Allergic

Azithromycin (B)
Clindamycin (B)
Gentamicin (C)
Vancomycin (C)

Skin test &
Desensitize
(syphilis)

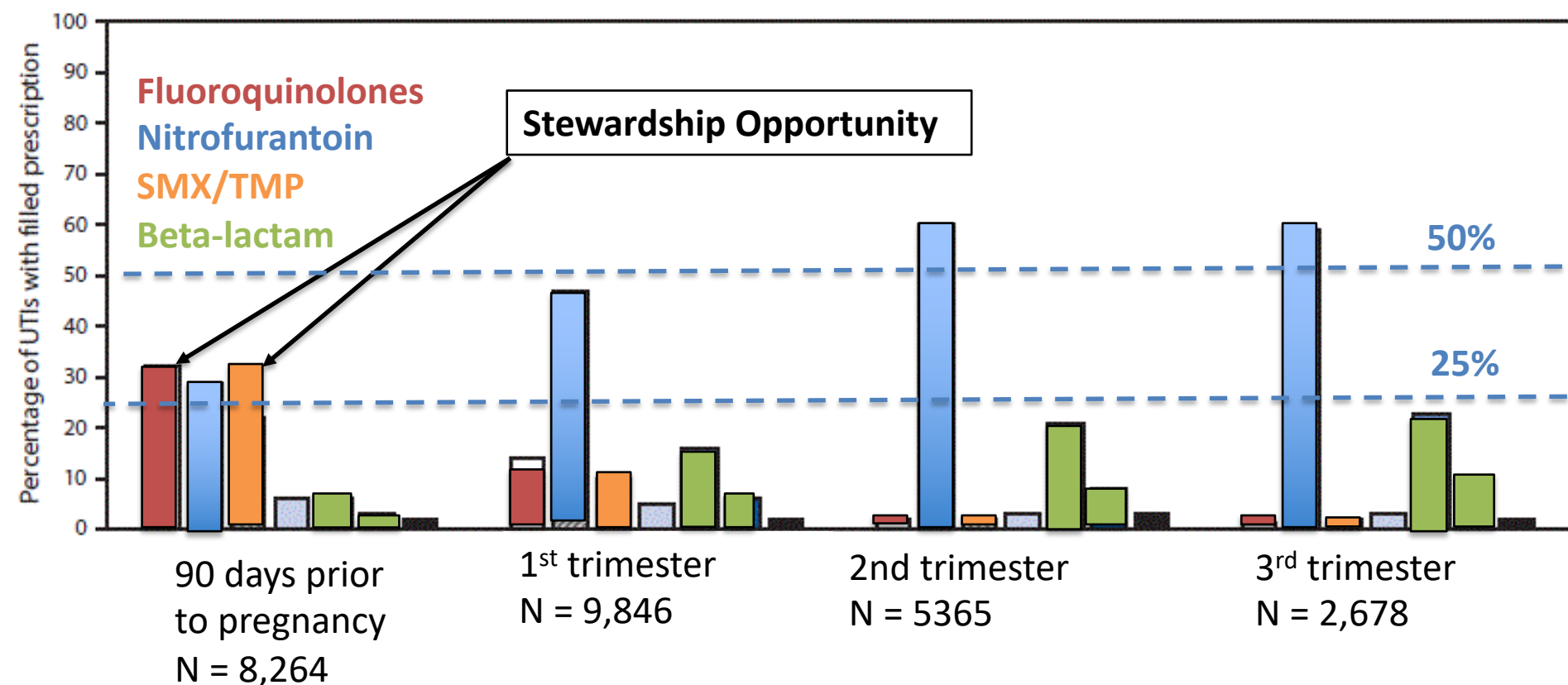
Others: Metronidazole (B), Sulfonamides (B/D at term), Nitrofurantoin (B)

Teratogenic Antibiotics

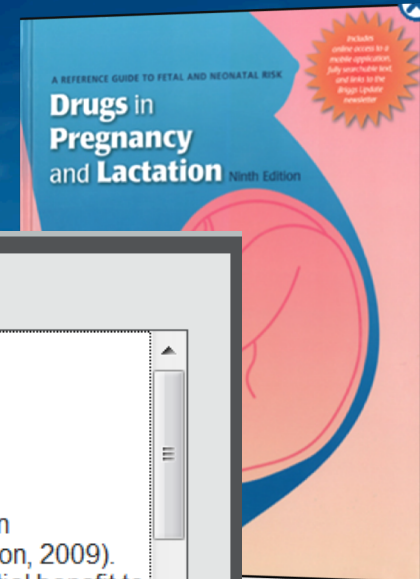
Antimicrobial	Risk Category	Fetal Effects
<i>Fluoroquinolones</i>	<i>C</i>	<i>Arthropathy in animals</i>
Streptomycin	D	8th cranial nerve damage
Sulfonamides	D	Avoid at term
Tetracyclines	D	Bone deposition, tooth discoloration, inhibition of longitudinal growth
Trimethoprim	C	Folate antagonist, avoid in 1st trimester



Antibiotic Prescribing in Pregnant Women with UTI



Resources



INTERACTION DETAIL

CIPROFLOXACIN

Patient Management:

As no adequate and well-controlled studies have been conducted, caution should be used when ciprofloxacin otic solution is administered during pregnancy (Prod Info CETRAXAL® otic solution, 2009). Systemic ciprofloxacin is not recommended for general use during pregnancy unless the potential benefit to the mother justifies the potential risk to the infant (Prod Info CIPRO® oral tablets, oral suspension, 2008). However, based on available yet limited data, ciprofloxacin does not appear to be a major human teratogen when used at therapeutic doses (Anon, 2001). Ciprofloxacin was among 3 antibiotics found at low concentrations in the amniotic fluid of 20 patients in a controlled study (Giamarellou et al, 1989). According to the Centers for Disease Control (CDC), ciprofloxacin is the antibiotic of choice for initial prophylactic treatment for asymptomatic pregnant women exposed to the anthrax virus (Anon, 2001). In cases of serious infection resistant to standard antibiotic regimens, the benefits probably outweigh the theoretical risks (Loebstein et al, 1998; Koul et al, 1995).

United States FDA Risk Category:

C: Studies have shown that the drug exerts animal teratogenic or embryocidal effects, but there are no controlled studies in women, or no studies are available in either animals or women.

Literature:

No studies have been reported in humans or animals evaluating the safety of ciprofloxacin hydrochloride otic solution in pregnancy. The extent of systemic absorption following administration is unknown. Studies in rats, mice, and rabbits evaluating systemically-administered ciprofloxacin at doses up to 100 mg/kg (oral) and 30 mg/kg (IV) revealed no teratogenic effects. Gastrointestinal disturbance and increased incidence of abortion were reported in rabbits receiving oral ciprofloxacin (Prod Info CETRAXAL® otic solution, 2009).

Opinion

The Bacteria Babies Need

By Kristin Lawless

Ms. Lawless writes frequently about food and health.

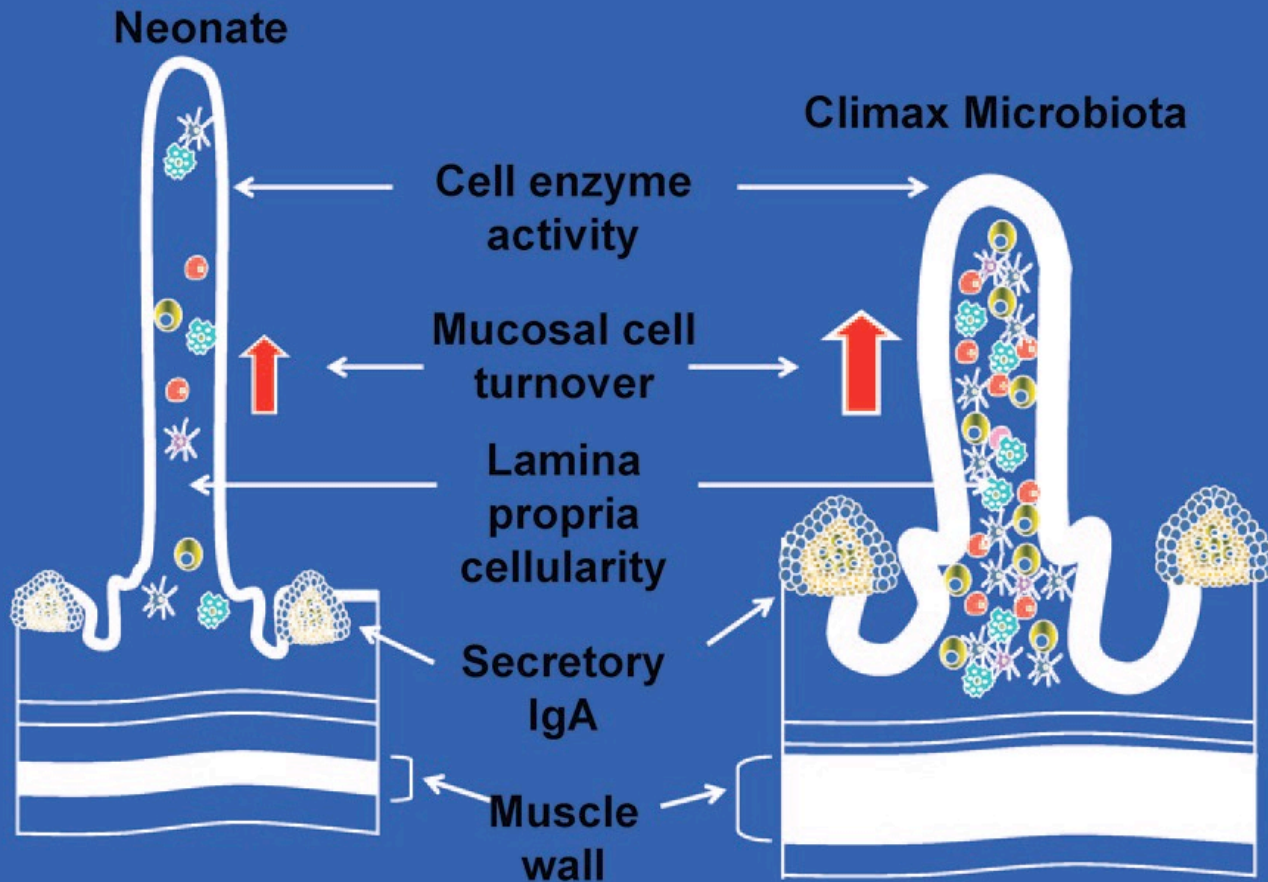
June 17, 2018



Scientists at the University of California, Davis, have found that a strain of bacteria called *B. infantis* that is thought to have been the dominant bacterium in the infant gut for all of human history is disappearing from the Western world. According to [their research](#), this was probably caused by the rise in cesarean births, the overuse of antibiotics and the use of infant formula in place of breast milk.

Indeed, nine out of 10 American babies don't harbor this bacterium in their gut, while [researchers suspect that](#) the majority of infants in less industrialized countries do. Bruce German, a professor of food science and technology and one of the U.C. Davis researchers, says, "The central benefits of having a microbiota dominated by *B. infantis* is that it crowds all the other guys out" — especially pathogenic bacteria, which can cause both acute illnesses and chronic inflammation that leads to disease.

Disrupting the Fetal Microbiome



Pediatric Research (2011) **69**, 465–472;

The Role of Microbes in Developmental Immunologic Programming

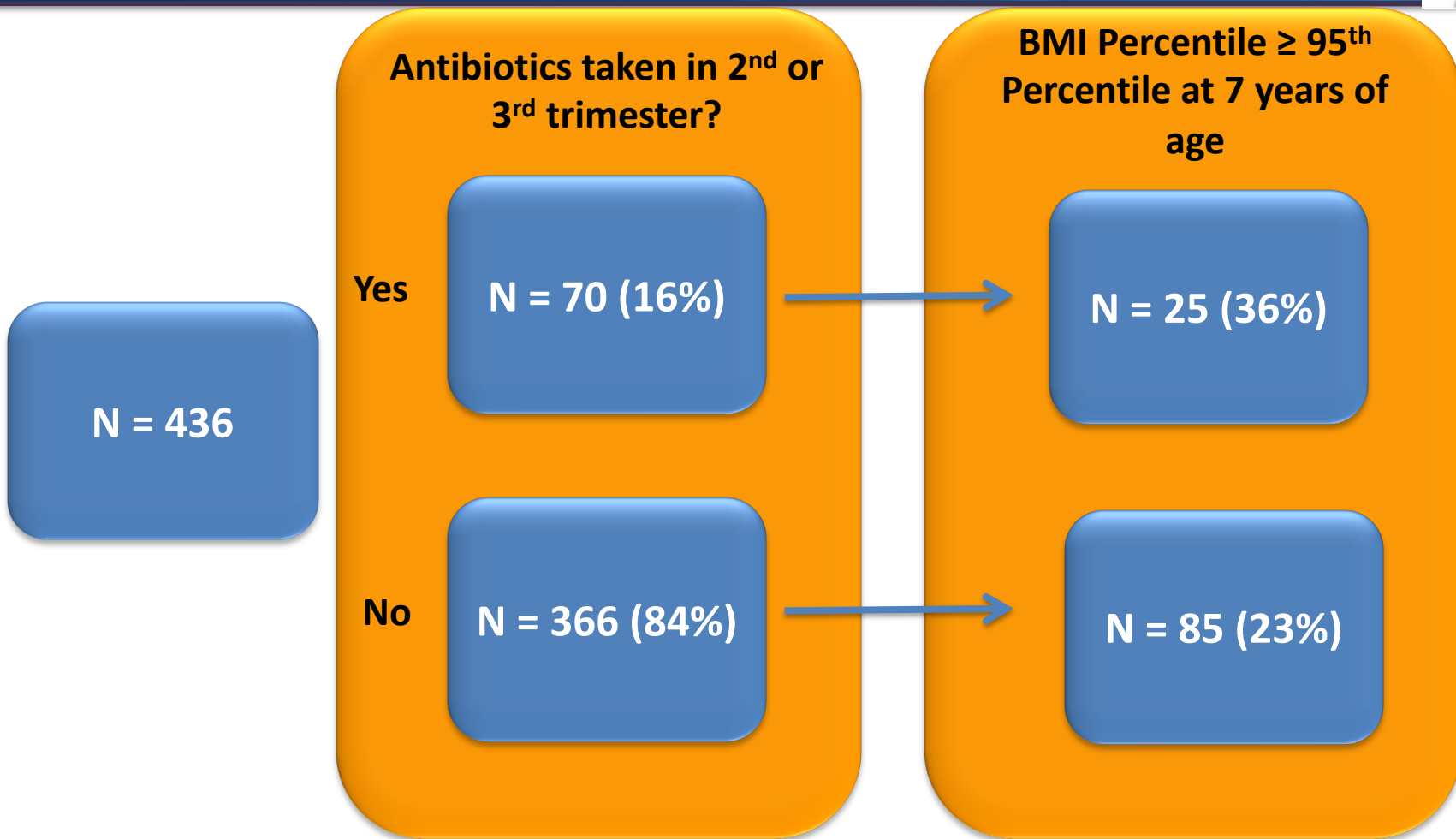
Jess L Kaplan¹, Hai Ning Shi¹ and W Allan Walker¹

Antibiotics During Pregnancy May Increase Child's Obesity Risk

By NICHOLAS BAKALAR

NOVEMBER 21, 2014 10:17 AM

10 Comments





The American College of
Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS

ACOG COMMITTEE OPINION

Number 717 • September 2017

(Replaces Committee Opinion 494, June 2011)

Committee on Obstetric Practice

This Committee Opinion was developed by the American College of Obstetricians and Gynecologists' Committee on Obstetric Practice.

INTERIM UPDATE: This Committee Opinion is updated as highlighted to reflect a limited, focused change in references and regarding glucose-6-phosphate dehydrogenase deficiency.

Sulfonamides, Nitrofurantoin, and Risk of Birth Defects

- In the 2nd/3rd trimester, sulfa & nitrofurantoin may be used 1st line
- In the 1st trimester they are appropriate when no alternative available
- Antibiotic should be prescribed for the shortest effective duration



Antimicrobials in Pregnancy

- **Use only when absolutely indicated, e.g. Confirmed infection**
- **If possible, avoid use during the first trimester**
- **Select a beta-lactam or nitrofurantoin if possible**
- **Single-agents are preferable to combination therapy**
- **Narrow spectrum therapy is preferable to broad spectrum therapy**