RESULTS: Samples of vaginal secretions from 3 women admitted for labor or induction of labor who were receiving IV ampicillin for GBS prophylaxis. The most common indication for admission was preterm labor. The average GA was 35.3 weeks. There were no significant differences in participating patients. Ampicillin concentrations ranged from 7.04-110.61 pg/ul (avg 53.19) at 30 min, 9.43-1765.34 (avg 390.31) at 60 min, 3.63-591.15 (avg 214.11) at 90 min. Ampicilloic acid concentrations ranged from 0.60-38.28 pg/ul (avg 8.70) at 30 min, 5.53-368.39 (avg 73.42) at 60 min, 2.41-101.97 (avg 97.95) at 90 min. Ampicillin diketopiperazine concentrations ranged from 0.56-10.69 pg/ul (avg 5.06) at 30 min, 5.52-368.39 (avg 73.42) at 60 min, 0.23-99.55 (avg 35.34) at 90 min. Ampicillin and both metabolite levels did not correlate with membrane rupture status or cervical dilation. The presence of gross blood or mucus in the sample also did not correlate with an increase in levels.
CONCLUSION: Ampicillin and two urinary metabolites, ampicilloic acid and diketopiperazine are detectable in vaginal transudate within 30 minutes of a single 2 g dose of IV ampicillin, although the concentrations vary widely between patients. No previous studies exist showing the presence of these compounds in the vaginal transudate. The results of this study raise other questions, including the potential effects of ampicillin and its metabolites on the vaginal microbiome and implications for GBS prophylaxis and virulence.
LEARNING OBJECTIVES: Learner can demonstrate knowledge of ampicillin and its metabolites in the vaginal transudate after IV administration of ampicillin.

4 Distribution of ampicillin in vaginal transudates on anterior and posterior fornix sampling

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OBJECTIVES: Ampicillin is one of the most widely used antibiotics in obstetrics, with well-established pharmacokinetics and previous studies elucidating ampicillin levels in maternal serum, amniotic fluid and fetal serum after doses maternal administration. However, no studies exist examining the effects of ampicillin on the vaginal transudate, including the potential differences in ampicillin concentration in different areas in the vagina.
METHODS: Pregnant women from 24-42 weeks gestation receiving ampicillin for GBS prophylaxis were eligible for participation. Samples of vaginal secretions were collected from the anterior and posterior vaginal fornixes using plastic cytology spatulas at 30, 60 and 90 minutes after a single dose of 2 g ampicillin IV. Ampicillin levels were measured using liquid chromatography/mass spectrometry. Clinical information, including rupture status was recorded in addition to information about the appearance and timing sampled for each sample.
RESULTS: 78 samples of vaginal secretions were collected from 10 women admitted for labor or induction of labor who were receiving IV ampicillin for GBS prophylaxis. The most common indication for admission was induction of labor. The average GA was 37.1 weeks. 7 patients had intact membranes, 2 patients were admitted with ruptured membranes and 1 patient ruptured while enrolled. Anterior and posterior vaginal samples were obtained at the level of the cervix. For anterior samples, ampicillin concentrations ranged from 0.007-0.503 ug/ml (mean 0.064) at 30 min, 0.009-0.298 ug/ml (mean 0.134) at 60 min and 0.004-0.218 ug/ml (mean 0.144) at 90 min. For posterior fornix samples, ampicillin concentrations ranged from 0.009-0.329 ug/ml (mean 0.061) at 30 min, 0.016-1.765 ug/ml (mean 0.223) at 60 min and 0.007-1.442 ug/ml (mean 0.209) at 90 min. Levels were noted to be higher in posterior compared to anterior with subsequent timed sampling.
CONCLUSION: Ampicillin is detectable in vaginal transudate within 30 minutes of a single 2 g dose, although in highly variable concentrations between patients. Samples collected from the posterior fornix had higher levels than samples collected from the anterior fornix. This could be explained by gravity causing pooling of ampicillin and metabolites in the posterior fornix over time after intravenous ampicillin administration. Variable distribution of ampicillin in the vagina could have implications for the microbiome as well as prophylaxis for GBS.
LEARNING OBJECTIVES: Learners will be able to identify trends in ampicillin levels in different areas of the vagina.

5 Prognosis and long term outcome of women with idiopathic recurrent vulvovaginal candidiasis caused by Candida albicans

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OBJECTIVES: The prognosis and most effective long-term management of women with recurrent candida vulvovaginitis (RVVC) remains poorly understood, and few studies focus on patients with idiopathic disease. The aim of this study is to evaluate the use of long-term antifungal therapy beyond an initial six month maintenance course of weekly fluconazole, with a unique focus on premenopausal patients with idiopathic RVVC due to C.albicans.
METHODS: A retrospective chart review was performed of women seen in WSU Vaginitis Clinic identified as having confirmed idiopathic RVVC due to Candida albicans during a ten year period (January 2006 through December 2015). Only patients who were without recognized risk factors for secondary VVC and initiated a 6-month course of once-weekly maintenance fluconazole therapy were selected. Data collected included long-term use of fluconazole therapy, treatment efficacy, and development of fluconazole resistance. Follow-up questionnaires were mailed to gain perspective into the patient's subjective experience after fluconazole therapy.
RESULTS: Of 883 patients with diagnosis of RVVC based on clinical records, 191 were found to have confirmed culture positive idiopathic RVVC due to C. albicans. One hundred forty seven (77.0%) completed the initial therapy of fluconazole induction with six months of weekly maintenance dosing, and 107 (72.8%) continued maintenance past the 6 month benchmark. The most common reason for continuation of fluconazole therapy was confirmed post-treatment VVC recurrence seen in (55.1%), with secondary reasons being partial symptom resolution (18, 16.8%), patient preference in absence of clinical relapse (11, 10.3%), and undocumented reason (6, 5.6%) Mean duration of fluconazole maintenance was 35.7 (range 7-288) months. Upon questionnaire follow-up, 92.2% of the 51 respondents reported benefit during the maintenance regimen, however 80.9% described relapse of symptoms after discontinuation of weekly fluconazole therapy. Fluconazole resistance emerged in 6.8% of all 191 women.
CONCLUSION: Fluconazole suppression therapy was highly effective in preventing VVC symptoms, but the disease was rarely curative and VVC relapse occurred frequently after discontinuation of maintenance therapy. Long term fluconazole was remarkably safe, with minimal adverse effects. Drug resistance although uncommon is a previously unrecognized complication. The majority of patients report benefit from fluconazole, even after years of treatment, however cure remain elusive.

LEARNING OBJECTIVES: more confidently treat patients with RVVC using maintenance fluconazole for longer than the previously described six months.

6 Time has come for routine penicillin skin allergy testing in obstetrics

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OBJECTIVES: Penicillin skin allergy testing has been advocated as part of antimicrobial stewardship initiatives, yet no estimate is available to determine how many women during pregnancy would benefit from this intervention. We evaluated the feasibility of penicillin skin allergy testing during pregnancy.

METHODS: Between January 1, 2018 to December 31, 2018, an Institutional Review Board-approved retrospective electronic medical record review of women who delivered and reported a penicillin allergy was performed. Sociodemographic variables, antibiotics utilization and indications, and allergic reactions from the first prenatal visit up through 6 weeks postpartum were extracted. All penicillin allergies were reviewed and coded for low or high risk for anaphylaxis.

RESULTS: 6321 deliveries occurred, of which 446 (7%) reported a penicillin allergy. Allergies were recorded at the initial encounter in 100% of patients at a mean gestational age of 15.2 ± 7.5 weeks gestation. Allergies associated with low risk of an anaphylaxis were reported in 45% (201/446) of women. Ten percent (44/446) of women had no documentation of the allergy severity. A total of 75% (334/446) of women received an antibiotic during the course of the pregnancy. The most common antibiotic indications were administration for cesarean prophylaxis (182/334, 54%), group B streptococcus (GBS) colonization (104/334, 31%), and urinary tract infection (62/334, 18%). Of the women categorized as low risk for anaphylaxis and eligible for a first generation cephalosporin, 49% (20/41) of those colonized with GBS and 51% (33/65) that underwent cesarean delivery did not receive an appropriate antibiotic regimen.

CONCLUSION: A majority of women during pregnancy that report an allergy to penicillin receive antibiotics. Over half of these women could be candidates for penicillin skin allergy testing. Most of these women are identified at a gestational age that allows the implementation of testing in an outpatient setting. Despite guidelines on the proper use of antibiotic prophylaxis in women with penicillin allergy during pregnancy, the variation in the recorded allergies and suboptimal antibiotic use suggest that penicillin skin allergy testing may improve antibiotic stewardship. Although optimization of guideline adherence could improve antibiotic selection, penicillin skin allergy testing determines the true risk of anaphylactic reaction rather than relying on the interpretation of the clinical history.

LEARNING OBJECTIVES: Leaners will have an understanding that a large portion of women during pregnancy will benefit from penicillin skin allergy testing.

7 Plague during pregnancy: a systematic literature review

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OBJECTIVES: To examine maternal and fetal mortality, risk of maternal-fetal transmission, and other outcomes associated with Yersinia pestis infection in order to better understand the clinical implications of plague during pregnancy.

METHODS: We searched twelve literature databases, performed hand searches, and consulted plague subject matter experts to identify articles published on plague during pregnancy. Articles that reported cases of infection during pregnancy and at least one maternal or fetal outcome were included. We abstracted information related to the clinical features of plague, maternal antibiotic treatment, maternal and fetal morbidity and mortality, and evidence for maternal-fetal transmission of Yersinia pestis.

RESULTS: Our search identified 5,922 articles, of which 59 were eligible for inclusion and described a total of 159 cases of plague in pregnant women. Cases were reported between 1897 and 2002 from 20 different countries worldwide. The majority of cases were published during the pre-antibiotic era; only 24 (15%) patients in this review were treated with antibiotics. Of those with primary manifestation of plague reported, 85% were bubonic, 13% were pneumonic and 3% were septicemic. Maternal and fetal fatality was 66% and 73%, respectively, among mothers not treated with antibiotics. In comparison, among mothers treated with antibiotics, maternal and fetal fatality was 29% and 62%, respectively. Of the 33 live births from untreated mothers, 21% were born preterm and 33% subsequently resulted in neonatal death. Among the five live births from treated mothers, there were no reports of premature birth or neonatal death. In untreated mothers, there were five cases with laboratory evidence of Yersinia pestis in either placental, fetal, or neonatal tissues examined immediately after delivery.

CONCLUSION: Plague during pregnancy is associated with high rates of maternal and fetal mortality; however, with appropriate antibiotic treatment, mothers and infants can survive. There is evidence to suggest that without maternal antibiotic treatment, maternal-fetal transmission of Yersinia pestis can occur. Taken together, these results indicate the need to define the ideal antibiotic regimen to treat pregnant women with plague to maximize maternal and infant survival.

LEARNING OBJECTIVES: Learners will be able to identify cases of plague during pregnancy and the risks of associated maternal and infant morbidity and mortality. This knowledge will help providers treat pregnant women with plague more effectively.

8 The impact of the vaginal microbiome on HIV infectivity among pregnant and non-pregnant women

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OBJECTIVES: Epidemiologic studies have demonstrated that disruption of vaginal flora in the form of bacterial vaginosis is related to increased risk of HIV acquisition. However, there is a paucity of biologic data to support this association. In this study, we aim to identify the specific alterations in the vaginal microbiome associated with risk of HIV infectivity.

METHODS: We analyzed cervicovaginal lavage specimens previously collected from 42 (22 pregnant and 20 non-pregnant) healthy