

Introduction

Placental culture is often collected in combination with placental pathology in pregnant women with suspected chorioamnionitis. While multiple studies have looked at the correlation of placental cultures with neonatal outcomes, there have been limited studies looking at the composition of placental cultures in terms of the number of organisms and their identification. As many infants of mothers with suspected chorioamnionitis also receive blood cultures, it is valuable to compare organisms found in such cultures with those found in placental cultures. Our study aims to describe such characteristics of placental cultures and to compare organisms found in placental cultures with those in maternal and infant blood cultures.

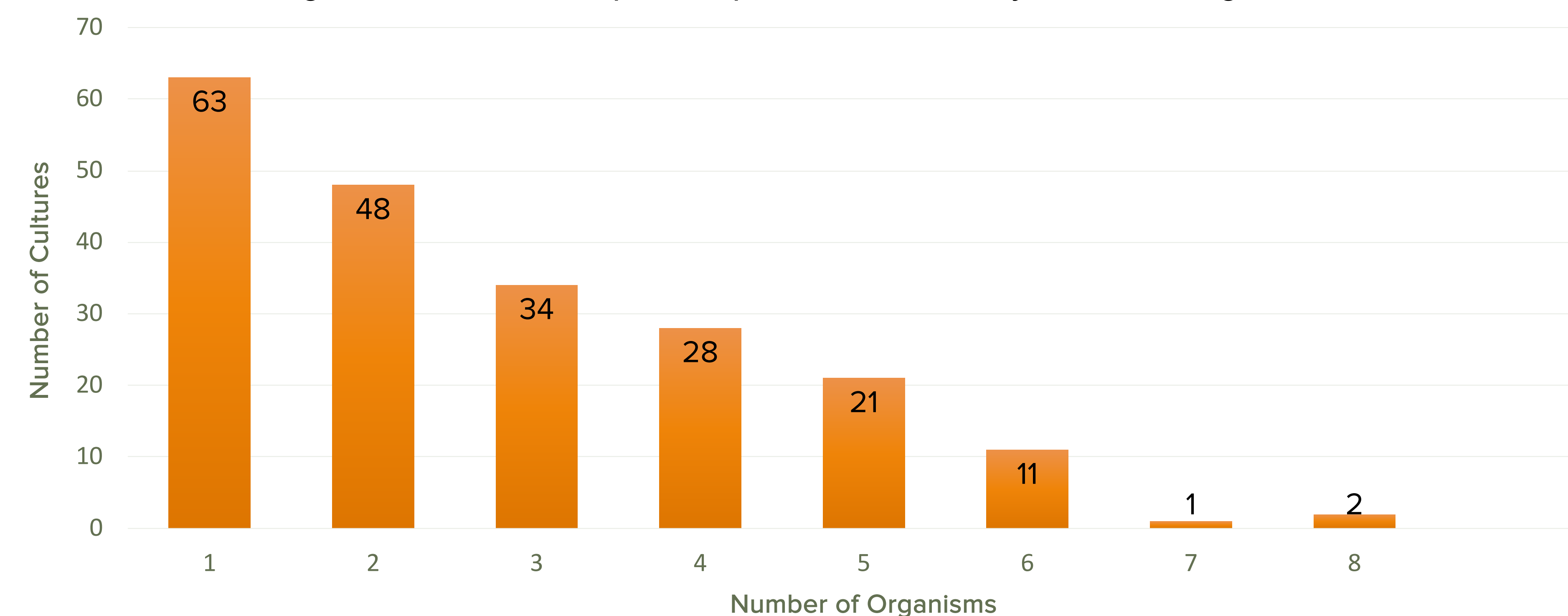
Objectives

- To identify the most common organisms found in placental cultures of mothers with suspected chorioamnionitis
- To compare the most common organisms in monomicrobial placental cultures to those in polymicrobial placental cultures
- To compare the organisms found in placental cultures to those found in both maternal and infant blood cultures

Methods

- We performed retrospective chart reviews on all mothers for whom a placental culture was sent at Loyola University Medical Center between January 2017 and December 2019.
- We separated the mothers based the results of their placental cultures (positive or negative). 208 total placental cultures were positive. We then separated the placental cultures based on the number of organisms identified in each culture; cultures with just one organism were categorized as monomicrobial while those with two or more organisms were identified as polymicrobial.
- We analyzed the organism composition of the positive cultures and compared the organisms in placental cultures to those in both infant and maternal blood cultures.

Figure 1: Distribution of positive placental cultures by number of organisms.



Results

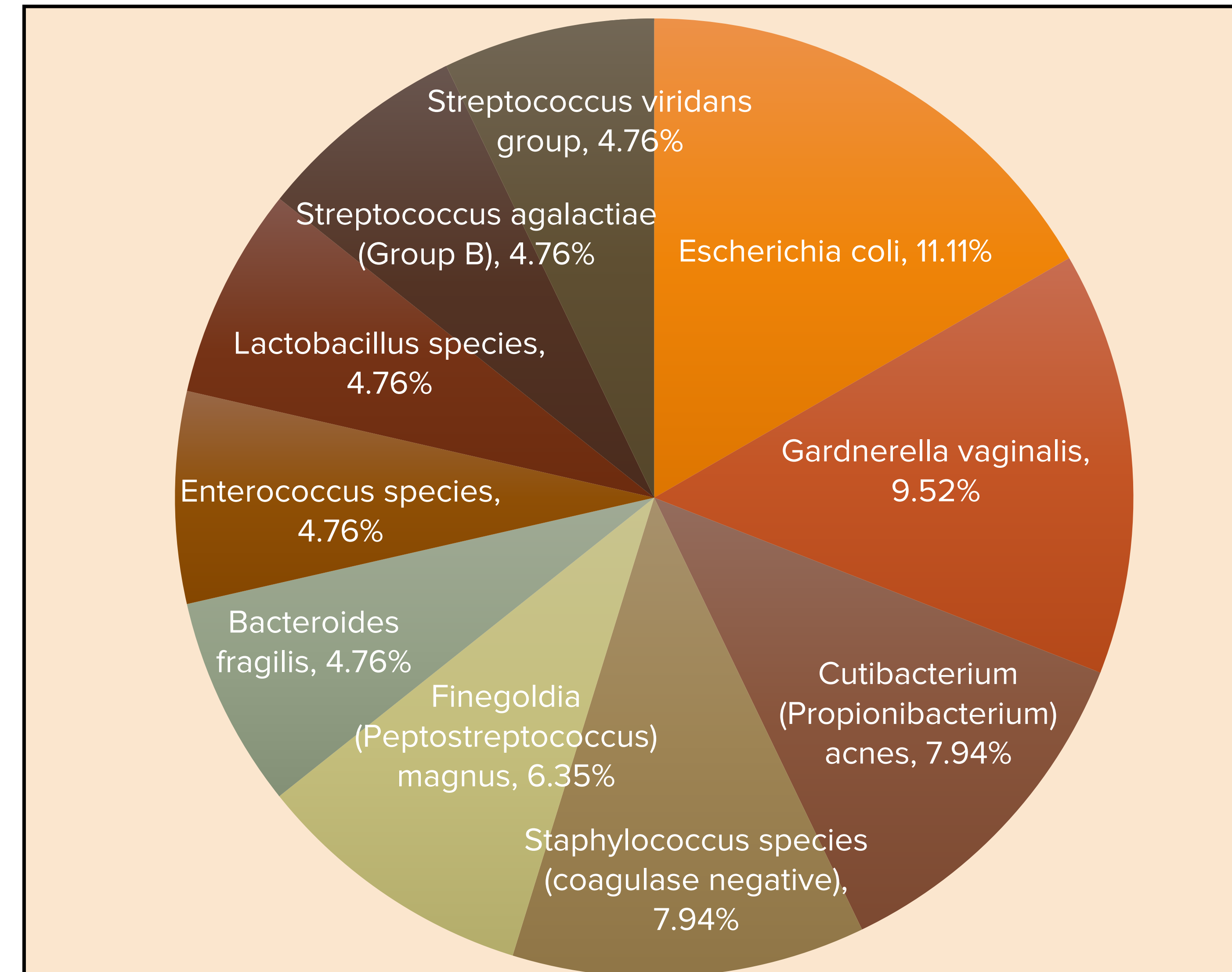


Figure 2: Most common organisms identified in monomicrobial placental cultures.

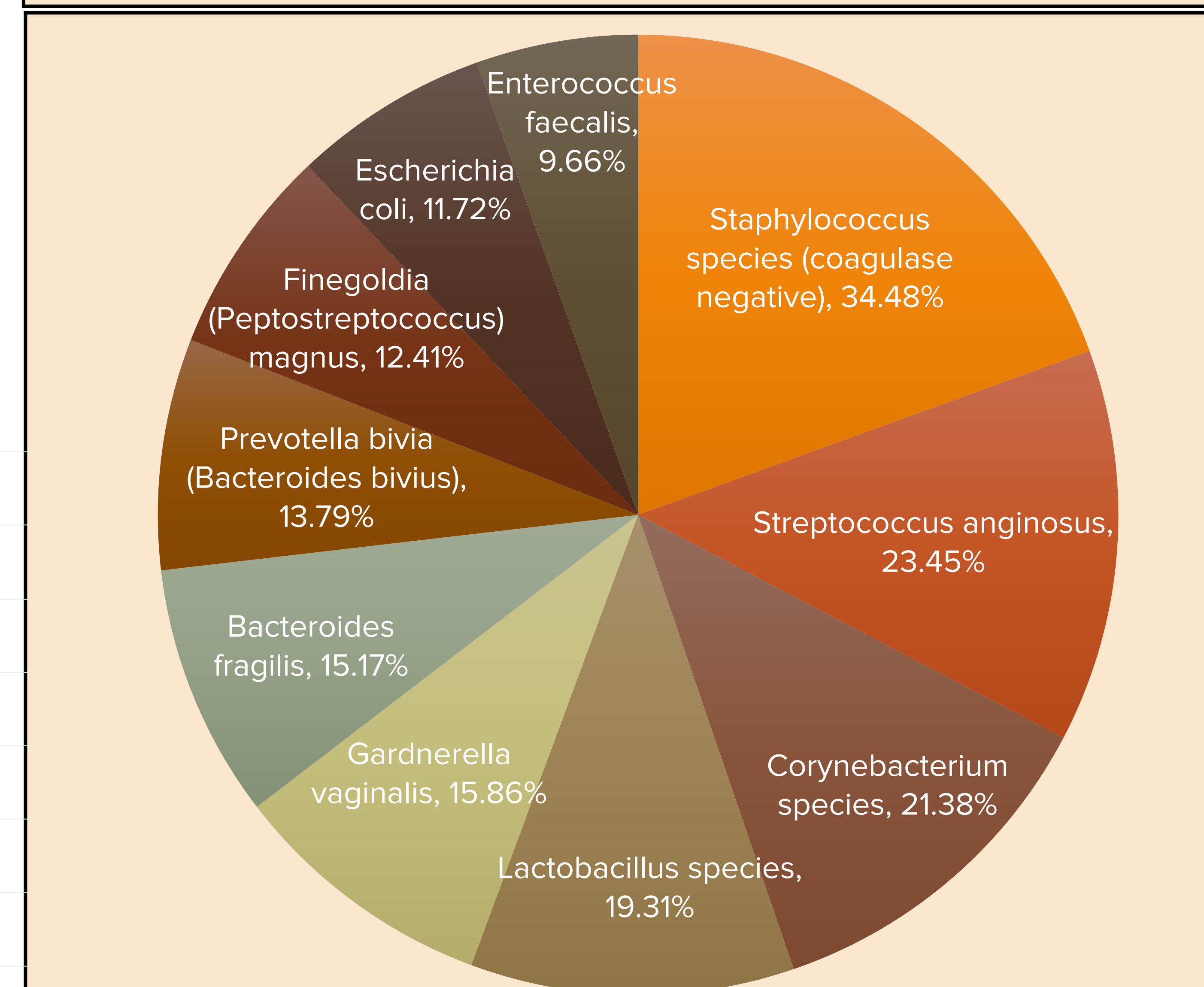


Figure 3: Most common organisms identified in polymicrobial placental cultures.

| Organism | Frequency of organism | Percent Frequency of Total Organisms | Percent of Positive Cultures Containing Organism |
|---|-----------------------|--------------------------------------|--|
| Staphylococcus species (coagulase negative) | 55 | 9.86% | 26.44% |
| Streptococcus anginosus | 35 | 6.27% | 16.83% |
| Corynebacterium species | 31 | 5.56% | 14.90% |
| Lactobacillus species | 31 | 5.56% | 14.90% |
| Gardnerella vaginalis | 29 | 5.20% | 13.94% |
| Bacteroides fragilis | 25 | 4.48% | 12.02% |
| Escherichia coli | 24 | 4.30% | 11.54% |
| Finegoldia (Peptostreptococcus) magnus | 22 | 3.94% | 10.58% |
| Prevotella bivia (Bacteroides bivius) | 20 | 3.58% | 9.62% |
| Enterococcus faecalis | 14 | 2.51% | 6.73% |

Table 1: Distribution of most common organisms found in all positive placental cultures.

| Type of blood culture | Number of positive cultures | Number of positive blood cultures with positive placental culture | Number of double-positive cultures with matching organisms | Number of cases in which placental cultures contained organisms not found in blood cultures |
|-----------------------|-----------------------------|---|--|---|
| Infant | 9 (4.33%) | 7/9 (78%) | 5/7 (71%) | 7/7 (100%) |
| Maternal | 8 (3.85%) | 6/8 (75%) | 6/6 (100%) | 5/6 (83%) |

Table 2: Comparison of placental culture organisms to maternal and infant blood culture organisms.

Conclusion & Future Directions

- The most prevalent organisms found in all placental cultures were coagulase negative Staphylococcus, Streptococcus anginosus, Corynebacterium species, Lactobacillus species, and Gardnerella vaginalis. The most prevalent placental culture organisms were similar between monomicrobial and polymicrobial cultures.
- Only very low fractions of placental cultures collected were associated with positive infant and/or maternal blood cultures.
- In most cases in which either maternal or infant blood cultures and placental cultures were both positive, there were shared organisms identified between the two. However, in these cases, placental cultures often contained organisms that were not identified in blood cultures. This ultimately suggests that placental cultures are important to obtain in addition to blood cultures when considering pathogens responsible for clinical sepsis in these infants.
- Future directions may include differentiating placental culture composition (by number and type of organisms) based on maternal chorioamnionitis status. This further investigation is needed to understand whether the specific organisms in placental cultures can help readily predict infections such as chorioamnionitis.

References

- Bhola, K., AL-KINDI, H., Fadia, M., Kent, A. L., Collignon, P., & Dahlstrom, J. E. (2008). Placental cultures in the era of peripartum antibiotic use. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 48(2), 179-184.
- da Mota, V. Q., Prodhom, G., Yan, P., Hohlfeld, P., Greub, G., & Rouleau, C. (2013). Correlation between placental bacterial culture results and histological chorioamnionitis: a prospective study on 376 placentas. *Journal of clinical pathology*, 66(3), 243-248.
- Fouks, Y., Many, A., Orbach, R., Shapira, U., Amit, S., Grisaru-Soen, G., ... & Shinar, S. (2017). Is there a role for placental cultures in cases of clinical chorioamnionitis complicating preterm premature rupture of membranes?. *American journal of perinatology*, 34(09), 867-873.
- Liu, Z., Tang, Z., Li, J., & Yang, Y. (2014). Effects of placental inflammation on neonatal outcome in preterm infants. *Pediatrics & Neonatology*, 55(1), 35-40.
- Park, J. W., Park, K. H., & Jung, E. Y. (2017). Clinical significance of histologic chorioamnionitis with a negative amniotic fluid culture in patients with preterm labor and premature membrane rupture. *PLoS one*, 12(3), e0173312.