

**COMPARISON ON ANTIBIOTIC RECOMMENDATION
OF EARLY ONSET NEONATAL SEPSIS CALCULATOR
AND AAP 2018 GUIDELINES IN A TERTIARY
HOSPITAL FROM 2019-2023**

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BACKGROUND



The pathogenesis of early onset sepsis is multifactorial. Due to its broad range, many neonates are started on antibiotics even if they are well-appearing.



- The **Early Onset Sepsis (EOS) calculator** has been created to minimize rampant use of antibiotics.
- The American Academy of Pediatrics (**AAP**) has also set **guidelines** to limit antibiotic use to infants at risk for sepsis.

Please enter details below.

Predictor	Scenario
Incidence of Early-Onset Sepsis [?]	<input type="text"/>
Gestational age [?]	<input type="text"/> weeks <input type="text"/> days
Highest maternal antepartum temperature [?]	<input type="text"/> Fahrenheit <input type="text"/>
ROM (Hours) [?]	<input type="text"/>
Maternal GBS status [?]	<input type="radio"/> Negative <input type="radio"/> Positive <input type="radio"/> Unknown
Type of intrapartum antibiotics [?]	<input type="radio"/> Broad spectrum antibiotics > 4 hrs prior to birth <input type="radio"/> Broad spectrum antibiotics 2-3.9 hrs prior to birth <input type="radio"/> GBS specific antibiotics > 2 hrs prior to birth <input type="radio"/> No antibiotics or any antibiotics < 2 hrs prior to birth

Calculate » Clear

Risk per 1000/births			
EOS Risk @ Birth			
EOS Risk after Clinical Exam			
EOS Risk after Clinical Exam	Risk per 1000/births	Clinical Recommendation	Vitals
Well Appearing			
Equivocal			
Clinical Illness			

Classification of Infant's Clinical Presentation [Clinical Illness](#) [Equivocal](#) [Well Appearing](#)

Fig 1. The EOS calculator above is a web-based risk assessment tool where investigators input variables to calculate the risk of newborn for sepsis.

GENERAL OBJECTIVE

To determine if there is significant difference between the proportion of newborns recommended for antibiotics using the EOS calculator and AAP 2018 guidelines for neonatal sepsis

Objective 2

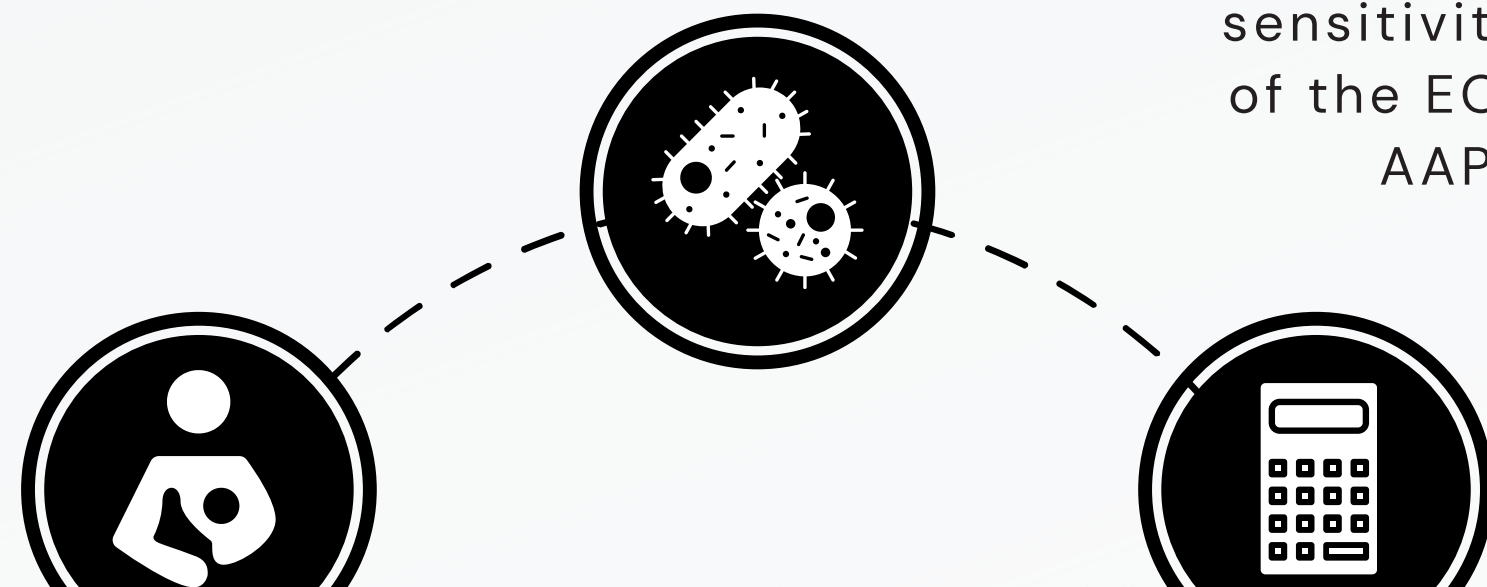
to identify neonates with growth on blood culture and compare if antibiotic treatment was recommended to these culture-proven sepsis cases

Objective 3

to calculate the sensitivity and specificity of the EOS calculator and AAP guidelines

Objective 1

to classify newborns recommended to start antibiotics according to the EOS calculator and AAP 2018 guidelines



METHODOLOGY

Retrospective cohort study was done where the investigator reviewed the charts of neonates **≥34 weeks AOG** who were started on intravenous antibiotics within 72 hours of life in a tertiary hospital from year 2019-2023.

Maternal and neonatal risk factors were reviewed and used to calculate early onset sepsis **(EOS) risk score** and identify neonates recommended for antibiotics using the **AAP 2018 guidelines**.



McNemar's test using SPSS software was used to determine significant difference between the two proportions.



Those with growth on blood culture were identified. **Sensitivity and specificity** for both were calculated.

ANTIBIOTIC RECOMMENDATION BY EOS CALCULATOR AND AAP 2018 GUIDELINES

EOS: to start antibiotics?	n	%
YES	345	38
NO	571	62

AAP: to start antibiotics?	n	%
YES	469	51
NO	447	49

EOS & AAP/CDC		
EOS	AAP/CDC	
	No	Yes
No	422	149
Yes	25	320

Fig 2. Comparison of antibiotic recommendation of EOS calculator and AAP 2018 guidelines.

Test Statistics ^a	
	EOS & AAP/CDC
N	916
Chi-Square ^b	86.948
Asymp. Sig.	.000

a. McNemar Test

b. Continuity Corrected

Out of 916 newborns, only 345 (38%) were recommended by the EOS calculator for empiric antibiotic therapy while it was 461 (51%) using the AAP 2018 guidelines. A McNemar test using the SPSS software revealed that the **EOS calculator could significantly reduce antibiotic use** with p value of <0.001

BLOOD CULTURE RESULTS AND RECOMMENDATION OF EOS CALCULATOR AND AAP 2018 GUIDELINES

		Blood CS		Total
		With growth	Without growth	
Recommended by EOS to start antibiotics	Yes	6 (5.1)	112 (94.9)	118
	No	0 (0.0)	90 (100.0)	90
Recommended by AAP/CDC to start antibiotics	Yes	6 (4.2)	138 (95.8)	144
	No	0 (0.0)	64 (100.0)	64

Blood culture samples were taken from 208 newborns. **Six** had growth.

MICROORGANISMS IDENTIFIED IN CULTURE-PROVEN CASES OF SEPSIS AND ANTIBIOTIC RECOMMENDATIONS

Newborn ID no.	Organism identified	EOS	AAP
Newborn #570	Staphylococcus haemolyticus	YES	YES
Newborn #578	Streptococcus agalactiae	YES	YES
Newborn #595	Pantoea spp.	YES	YES
Newborn #636	Staphylococcus warnerii	YES	YES
Newborn #669	Sphingomonas paucimobilis	YES	YES
Newborn #731	Enterobacter cloacae complex	YES	YES

These are the microorganisms identified in newborns who had growth on blood culture. **Both** the EOS calculator and AAP guidelines **recommended antibiotics** for these culture-proven sepsis cases.

SENSITIVITY AND SPECIFICITY OF EOS CALCULATOR AND AAP GUIDELINES

		Culture proven sepsis	Sepsis not proven by culture
EOS	YES	6	112
	NO	0	90

		Culture proven sepsis	Sepsis not proven by culture
AAP	YES	6	138
	NO	0	64

EOS Calculator

Sensitivity: 100%
Specificity: 44.6%

AAP 2018 guidelines

Sensitivity: 100%
Specificity: 31.7%

Both the EOS calculator and AAP guidelines had 100% sensitivity and recommended antibiotics to culture-proven sepsis cases. The EOS calculator had higher specificity.

CONCLUSION



The proportion of those who were recommended for antibiotics using the EOS calculator was **significantly lower** than those who were recommended for antibiotics using the AAP 2018 guidelines. The **EOS calculator** could **significantly reduce antibiotic use** (p value <0.001).

The **EOS calculator** has **higher specificity** than the AAP 2018 guidelines.



RECOMMENDATIONS



Prospective application and implementation of the EOS calculator prior to starting empiric antibiotic therapy is recommended to further investigate its safety.

The investigator suggests of a modified EOS calculator at the local setting that would include feeding difficulty or poor suck as a risk factor for sepsis in calculating for the risk score for sepsis.

