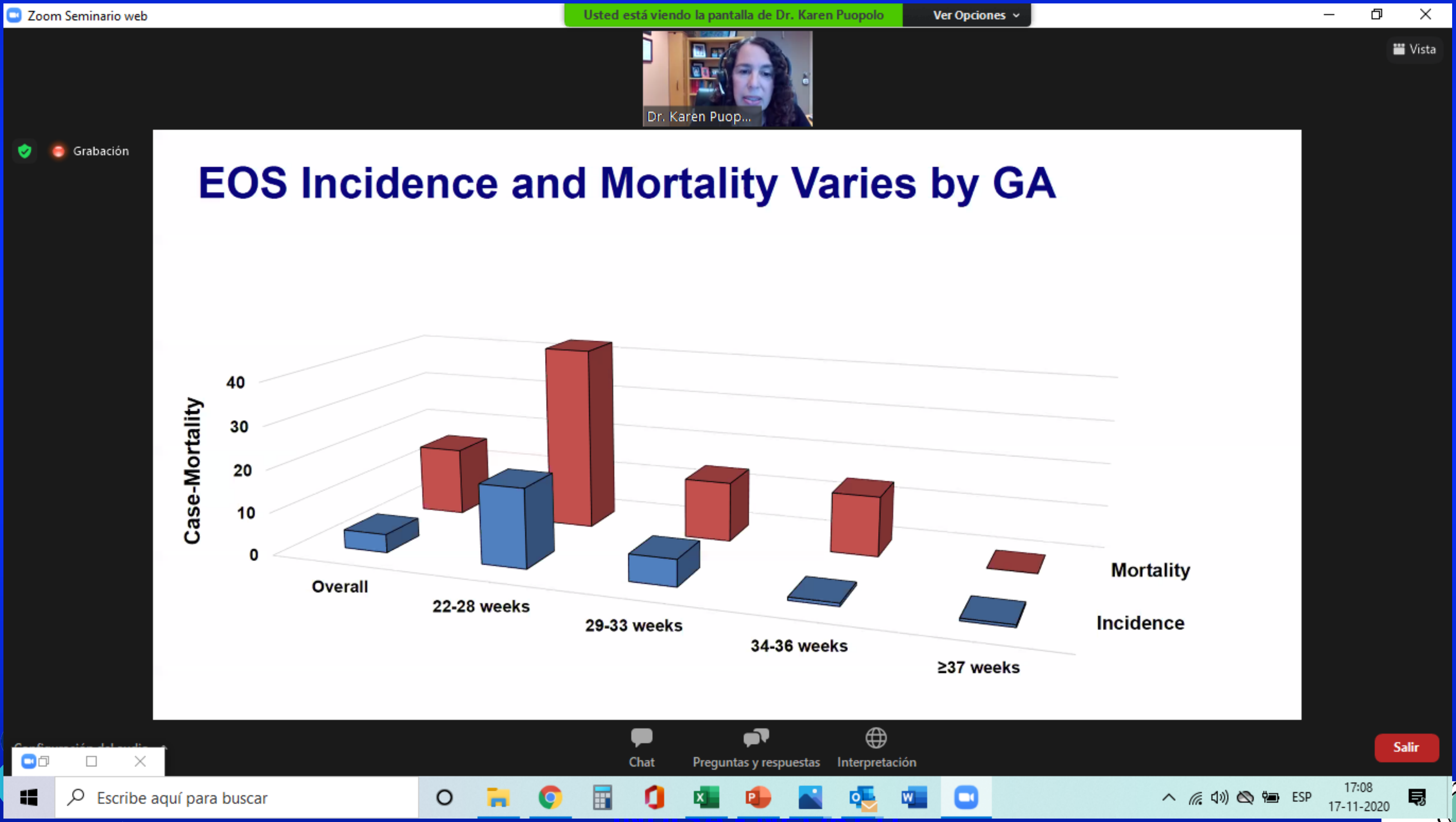
Sepsis Neonatal Precoz

Dr Sergio Ambiado

19 de noviembre 2020

Riesgo de sepsis precoz y mortalidad Datos NICHD Conferencia Miami 2020 Dra K Puopulo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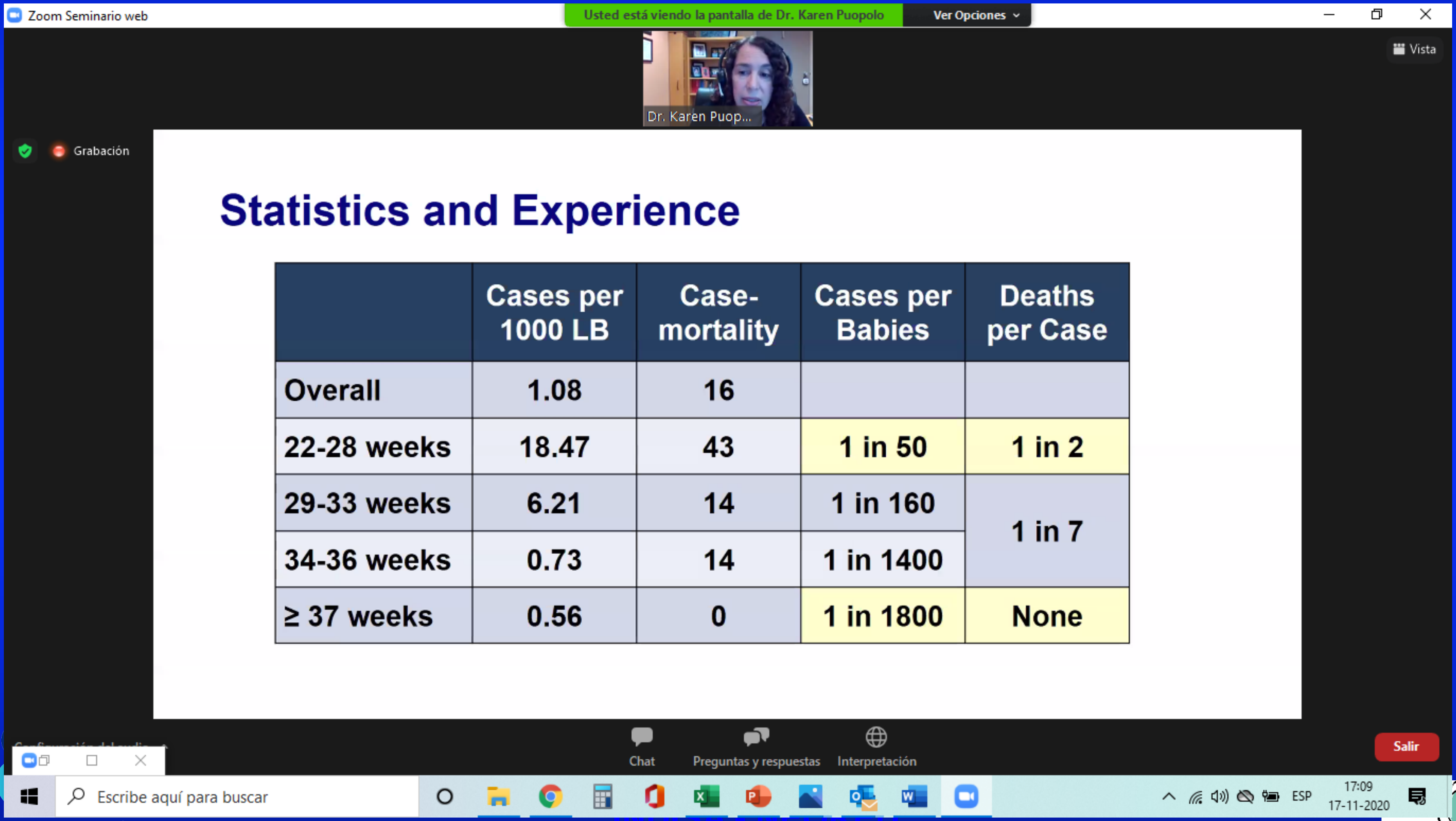
EOS Incidence and Mortality Varies by GA

Case-Mortality
0
10
20
30
40
Overall
22-28 weeks
29-33 weeks
34-36 weeks
≥37 weeks
Mortality
Incidence

Riesgo de sepsis precoz y mortalidad Datos NICHD Conferencia Miami 2020 Dra K Puopulo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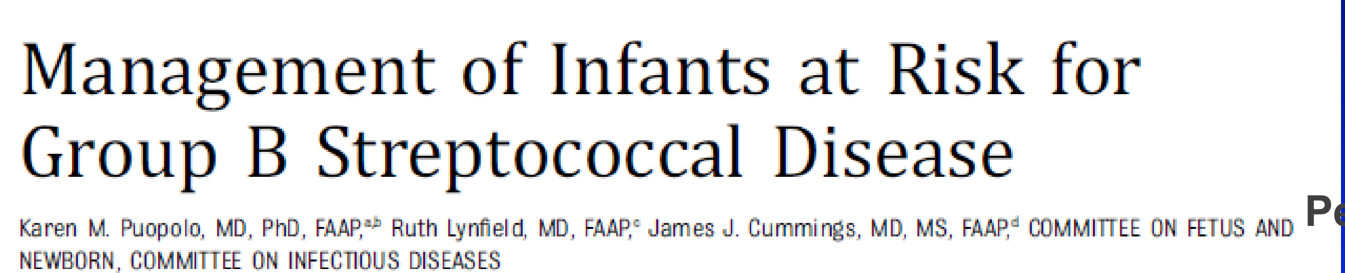
Statistics and Experience

	Cases per 1000 LB	Case-mortality	Cases per Babies	Deaths per Case
Overall	1.08	16		
22-28 weeks	18.47	43	1 in 50	1 in 2
29-33 weeks	6.21	14	1 in 160	1 in 7
34-36 weeks	0.73	14	1 in 1400	
≥ 37 weeks	0.56	0	1 in 1800	None

¿ Cual RN debemos evaluar?
¿Cuál RN debe recibir antibióticos empíricos?

- Cada método utiliza factores de riesgo para identificar RN con riesgo aumentado de sepsis precoz
- Ninguna estrategia identifica inmediatamente al nacer a todo RN que desarrollará sepsis precoz
- Ninguna estrategia evitará que algunos RN no infectados reciban ATB

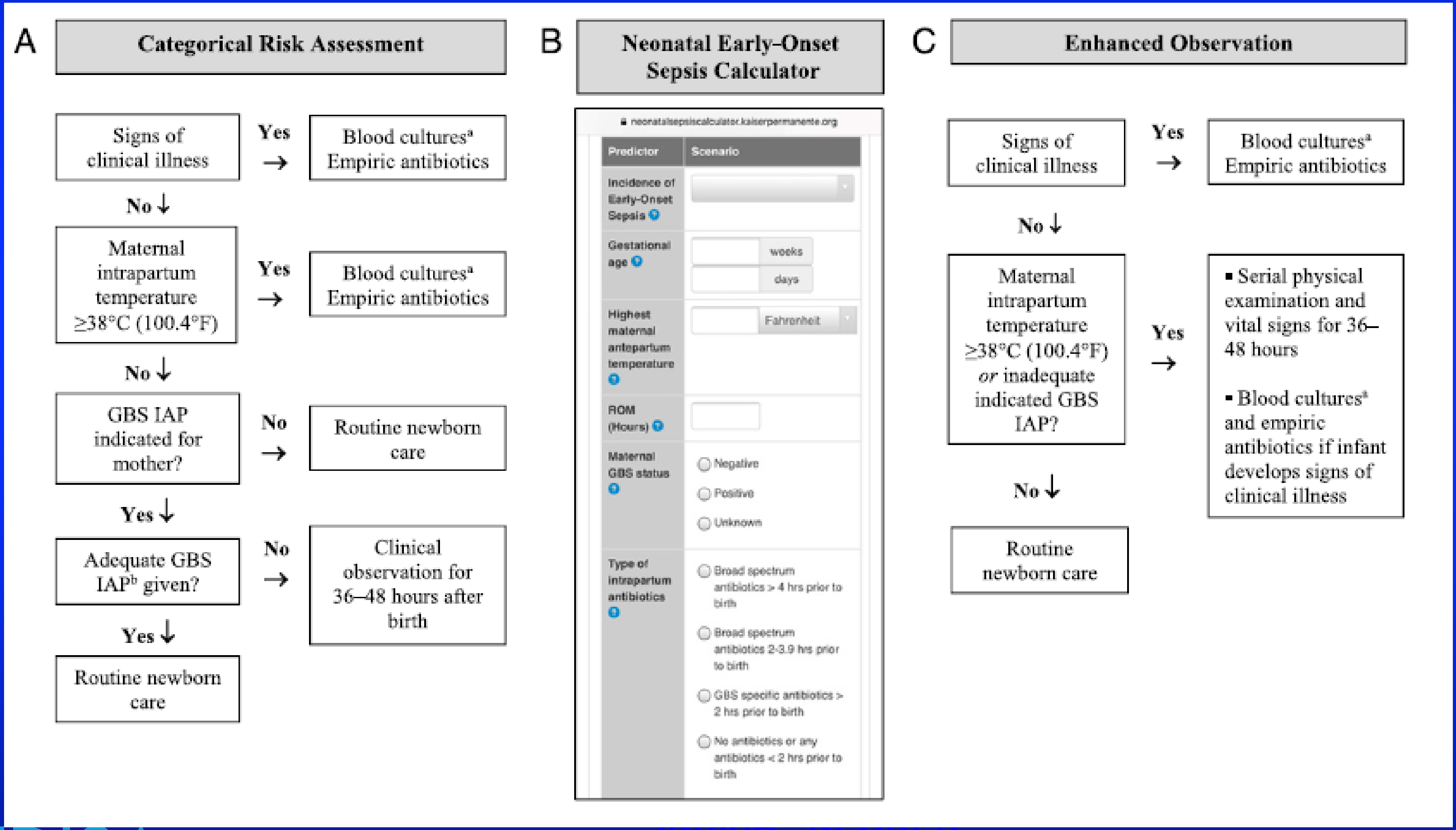
-
- Los clínicos deben desarrollar el protocolo más adecuado considerando:
- Recursos y organización del cuidado neonatal
- Probabilidad de Infección
- Costo-efectividad de tratar innecesariamente RN no infectados vs retrasar tratamiento antibiotico en RN infectados



Management of Infants at Risk for Group B Streptococcal Disease

Karen M. Puopolo, MD, PhD, FAAP,[a,b] Ruth Lynfield, MD, FAAP,[c] James J. Cummings, MD, MS, FAAP,[d] COMMITTEE ON FETUS AND NEWBORN, COMMITTEE ON INFECTIOUS DISEASES

Pediatrics 2019



A

Categorical Risk Assessment

Signs of clinical illness — Yes → Blood cultures[a] Empiric antibiotics

No ↓

Maternal intrapartum temperature ≥38°C (100.4°F) — Yes → Blood cultures[a] Empiric antibiotics

No ↓

GBS IAP indicated for mother? — No → Routine newborn care

Yes ↓

Adequate GBS IAP[b] given? — No → Clinical observation for 36–48 hours after birth

Yes ↓

Routine newborn care

B

Neonatal Early-Onset Sepsis Calculator

neonatalsepsiscalculator.kaiserpermanente.org

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

C

Enhanced Observation

Signs of clinical illness — Yes → Blood cultures[a] Empiric antibiotics

No ↓

Maternal intrapartum temperature ≥38°C (100.4°F) *or* inadequate indicated GBS IAP? — Yes →
- Serial physical examination and vital signs for 36–48 hours
- Blood cultures[a] and empiric antibiotics if infant develops signs of clinical illness

No ↓

Routine newborn care

A. CDC. AAP. Limitaciones

Amplio uso de antibióticos

- Todo RN que se enferma
- Todo RN hijo de madre con corioamnionitis o Fiebre

Limitaciones de usar variables dicotómicas SI/NO:

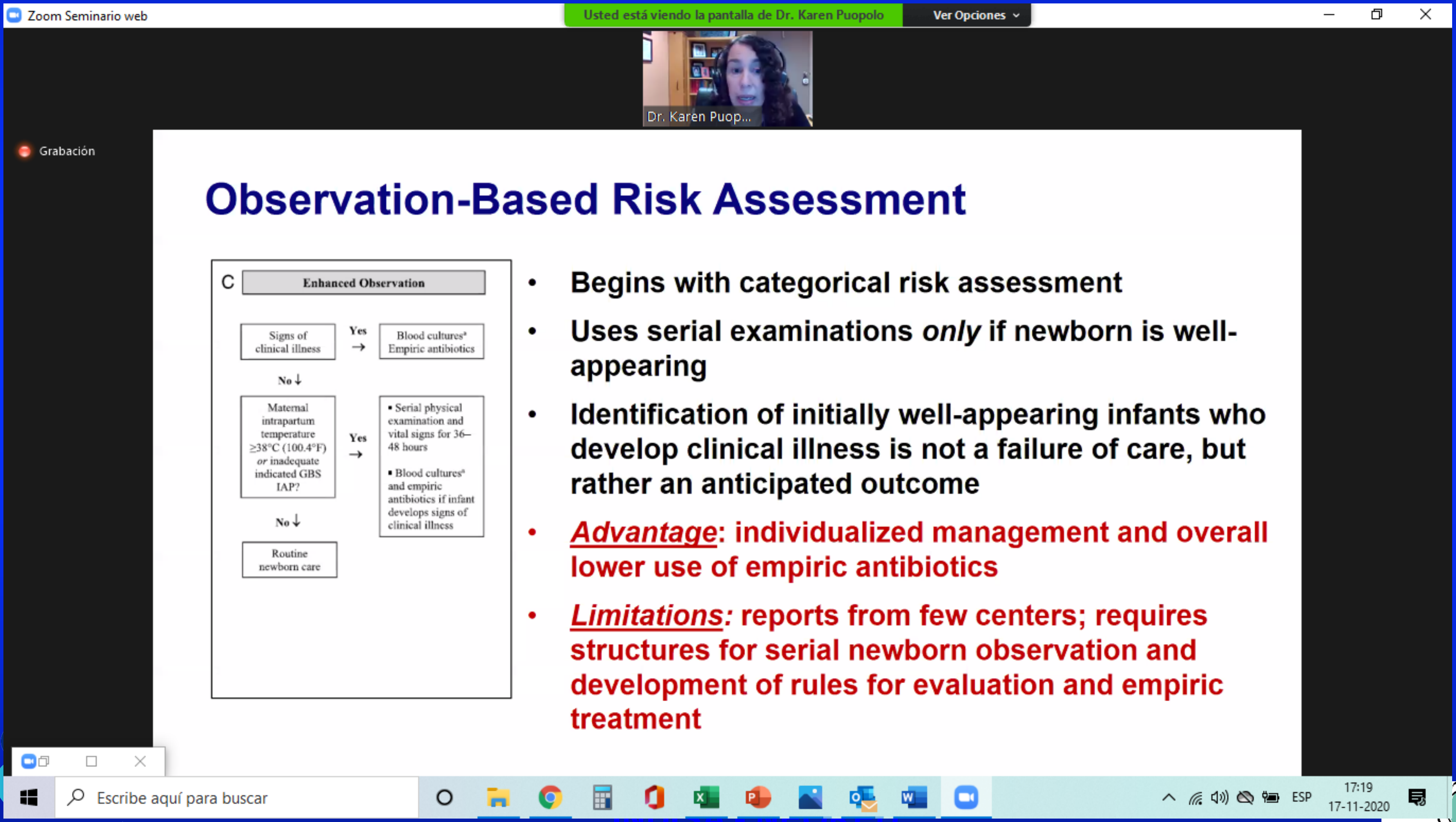
- Algoritmo se basa en categorías:
  - Es lo mismo una RPO 1 h vs 16 h ?
  - Es lo mismo T° materna en parto 37°C vs 38,5°C?
- No se contabiliza la interacción entre los factores de riesgo: Como afecta en el riesgo el efecto sumatorio de colonización SGB y RPO prolongada

Con guias basados en categorías CDC-AAP se somete a RN a muchos exámenes y antibióticos empíricos

Lugar	Política	Años	Población	Hemocultivos y/o laboratorio	ATB	Sepsis
Boston	CDC 2010	2011-2012	≥ 36 sem n: 6544	13%	12%	0,4/1000
Philadelphia	AAP 2103	2012-2014	≥ 36 sem n: 7493	24%	7%	0,3/1000
Carolina Del Norte	CDC 2010	2010-2012	≥ 35 sem n: 95344	14%	5%	0,06/1000

Muckopadbayad et al Pediatrics 2014, Kuzniewicz et al Jama Pediatr 2017, Bhudasia et al. Hosp Pediatr 2018.

C. Evaluación del riesgo basado de observación clínica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Observation-Based Risk Assessment

C **Enhanced Observation**

Signs of clinical illness → Yes → Blood cultures* Empiric antibiotics

No ↓

Maternal intrapartum temperature ≥38°C (100.4°F) *or* inadequate indicated GBS IAP? → Yes →
- Serial physical examination and vital signs for 36–48 hours
- Blood cultures* and empiric antibiotics if infant develops signs of clinical illness

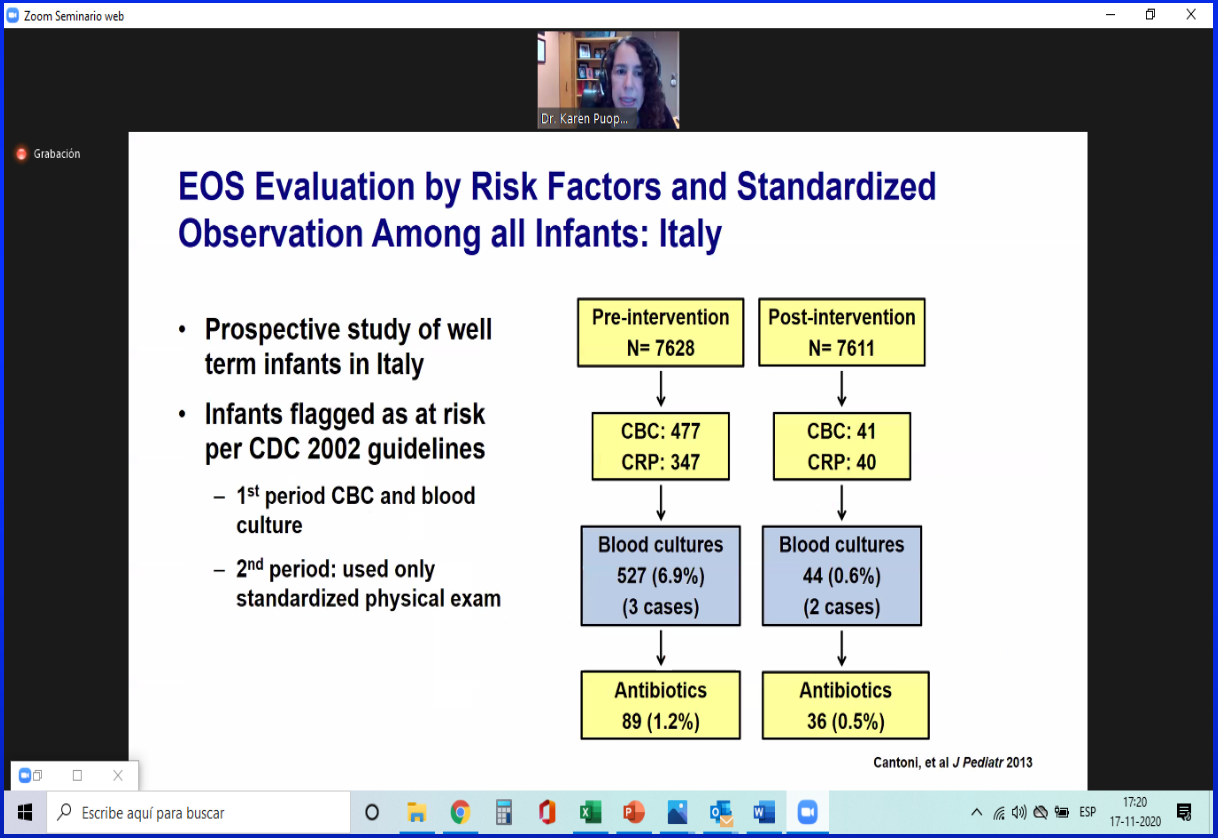
No ↓

Routine newborn care

- Begins with categorical risk assessment
- Uses serial examinations *only* if newborn is well-appearing
- Identification of initially well-appearing infants who develop clinical illness is not a failure of care, but rather an anticipated outcome
- *Advantage*: individualized management and overall lower use of empiric antibiotics
- *Limitations:* reports from few centers; requires structures for serial newborn observation and development of rules for evaluation and empiric treatment

Physical Examination Instead of Laboratory Tests for Most Infants Born to Mothers Colonized with Group B *Streptococcus*: Support for the Centers for Disease Control and Prevention's 2010 Recommendations

Luigi Cantoni, MD[1], Luca Ronfani, MD, PhD[2], Rosalia Da Riol, MD[3], and Sergio Demarini, MD[4], on behalf of the Perinatal Study Group of the Region Friuli-Venezia Giulia* J Pediatr 2013



EOS Evaluation by Risk Factors and Standardized Observation Among all Infants: Italy

- **Prospective study of well term infants in Italy**
- **Infants flagged as at risk per CDC 2002 guidelines**
  - 1st period CBC and blood culture
  - 2nd period: used only standardized physical exam

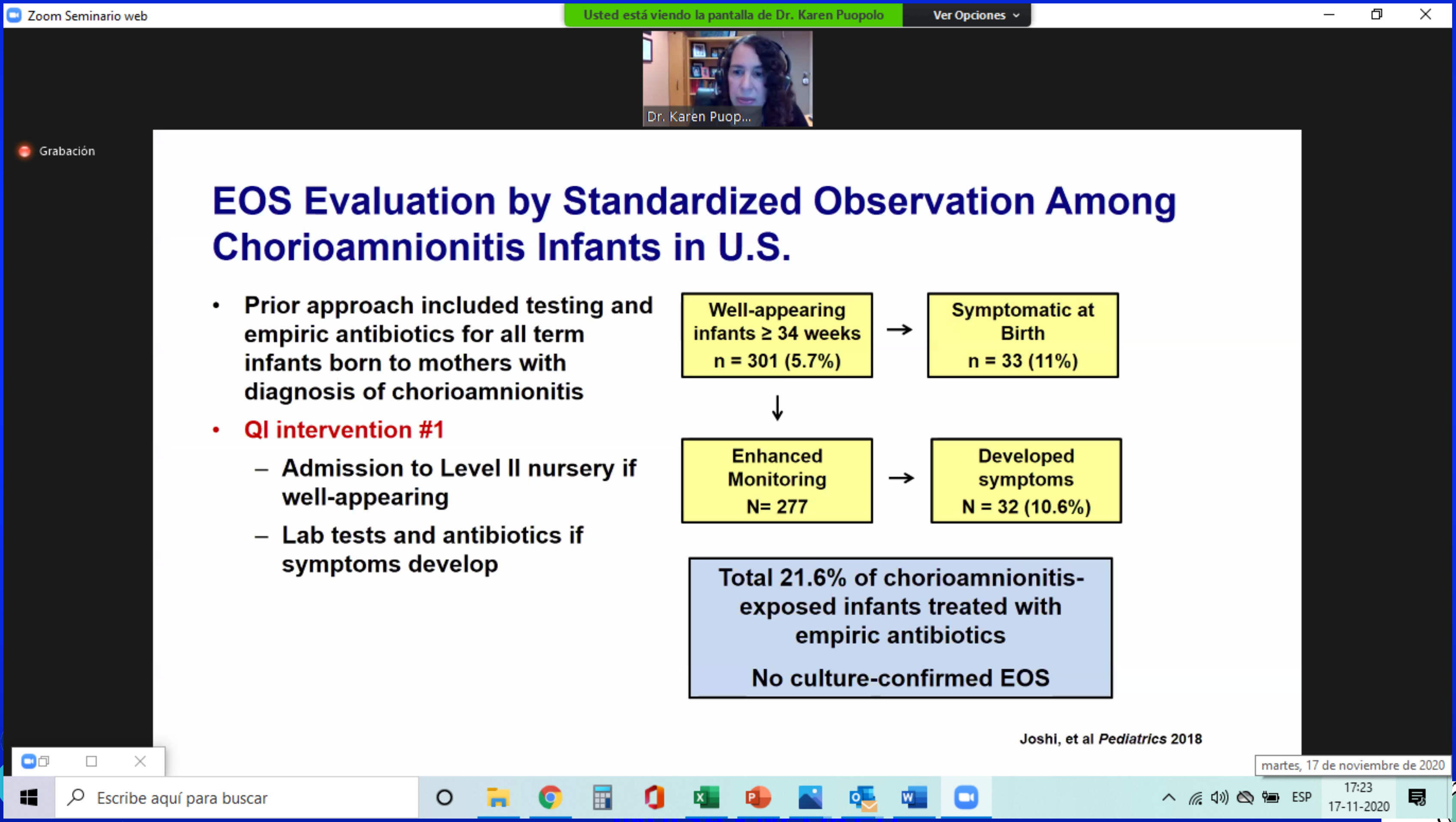
Pre-intervention N= 7628	Post-intervention N= 7611
CBC: 477 CRP: 347	CBC: 41 CRP: 40
Blood cultures 527 (6.9%) (3 cases)	Blood cultures 44 (0.6%) (2 cases)
Antibiotics 89 (1.2%)	Antibiotics 36 (0.5%)

Cantoni, et al *J Pediatr* 2013

INDISA - NEORED

Un Nuevo Concepto en Medicina Perinatal

Evaluación con observación estandarizada en RN con madres con corioamnionitis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EOS Evaluation by Standardized Observation Among Chorioamnionitis Infants in U.S.

- Prior approach included testing and empiric antibiotics for all term infants born to mothers with diagnosis of chorioamnionitis
- QI intervention #1
  - Admission to Level II nursery if well-appearing
  - Lab tests and antibiotics if symptoms develop

Well-appearing infants ≥ 34 weeks
n = 301 (5.7%)

→ Symptomatic at Birth
n = 33 (11%)

↓

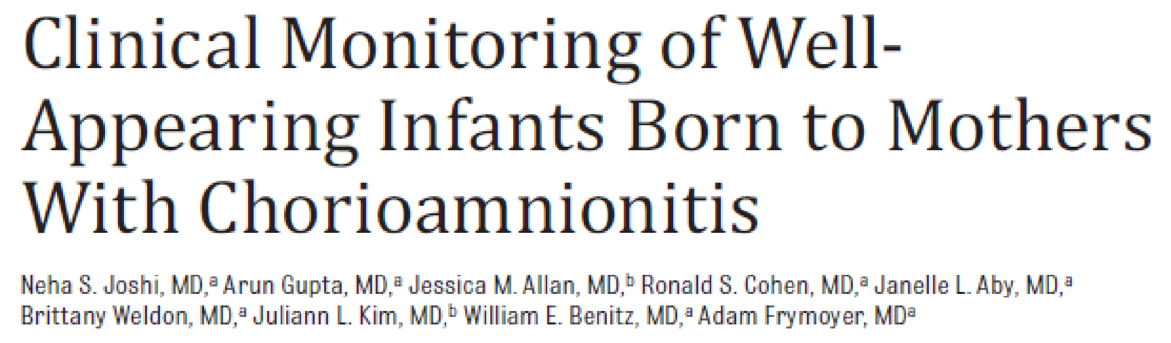
Enhanced Monitoring
N= 277

→ Developed symptoms
N = 32 (10.6%)

Total 21.6% of chorioamnionitis-exposed infants treated with empiric antibiotics

No culture-confirmed EOS

Joshi, et al *Pediatrics* 2018



Clinical Monitoring of Well-Appearing Infants Born to Mothers With Chorioamnionitis

Neha S. Joshi, MD,[a] Arun Gupta, MD,[a] Jessica M. Allan, MD,[b] Ronald S. Cohen, MD,[a] Janelle L. Aby, MD,[a] Brittany Weldon, MD,[a] Juliann L. Kim, MD,[b] William E. Benitz, MD,[a] Adam Frymoyer, MD[a]

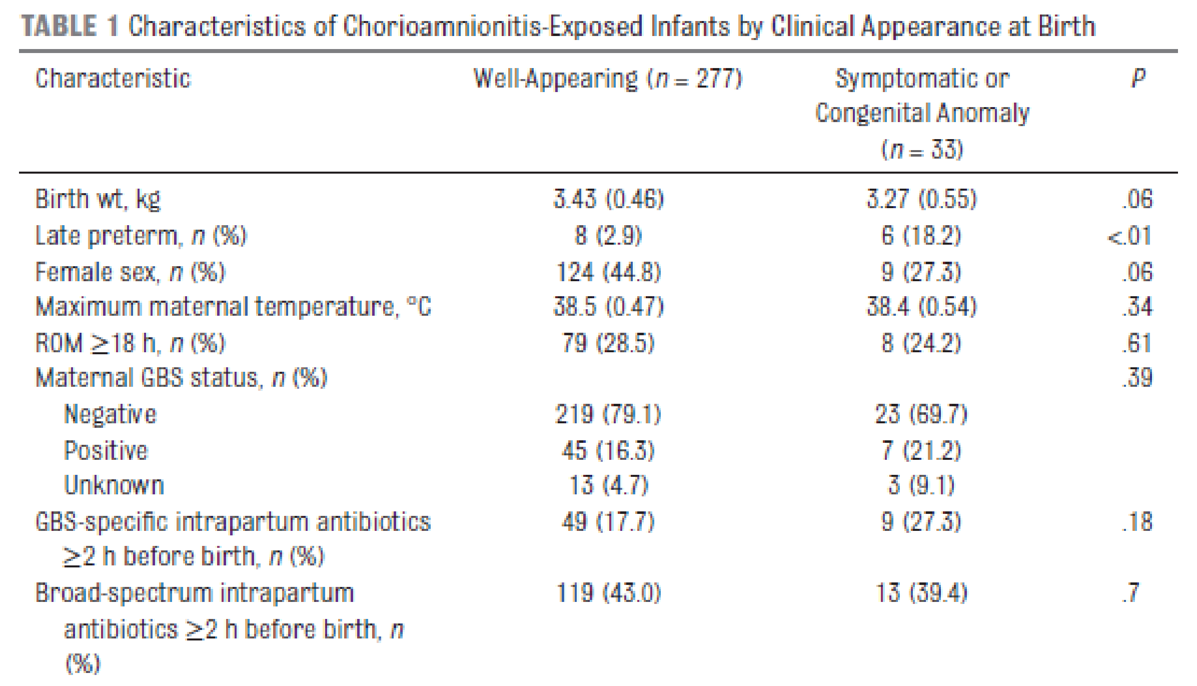


TABLE 1 Characteristics of Chorioamnionitis-Exposed Infants by Clinical Appearance at Birth

Characteristic	Well-Appearing (*n* = 277)	Symptomatic or Congenital Anomaly (*n* = 33)	*P*
Birth wt, kg	3.43 (0.46)	3.27 (0.55)	.06
Late preterm, *n* (%)	8 (2.9)	6 (18.2)	<.01
Female sex, *n* (%)	124 (44.8)	9 (27.3)	.06
Maximum maternal temperature, °C	38.5 (0.47)	38.4 (0.54)	.34
ROM ≥18 h, *n* (%)	79 (28.5)	8 (24.2)	.61
Maternal GBS status, *n* (%)			.39
Negative	219 (79.1)	23 (69.7)	
Positive	45 (16.3)	7 (21.2)	
Unknown	13 (4.7)	3 (9.1)	
GBS-specific intrapartum antibiotics ≥2 h before birth, *n* (%)	49 (17.7)	9 (27.3)	.18
Broad-spectrum intrapartum antibiotics ≥2 h before birth, *n* (%)	119 (43.0)	13 (39.4)	.7

All data are in mean (SD) or number of patients (%). ROM, rupture of membranes.

M .

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Un Nuevo Concepto en Medicina Perinatal

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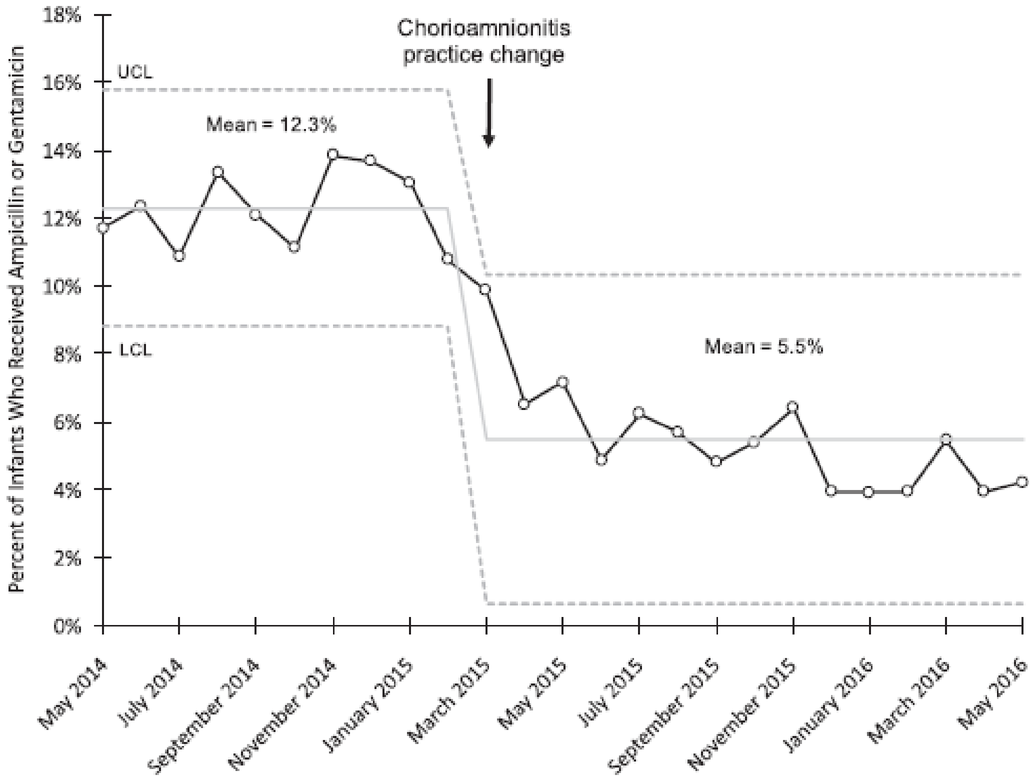

FIGURE 2

Percentage of infants ≥34 weeks' gestation who received ampicillin or gentamicin at any time during the first 3 days after birth before and after the chorioamnionitis practice change. Data represent all infants born at the study hospital during the reported time period. The median number of live births per month was 353 (interquartile range 332–371). LCL, lower control limit; UCL, upper control limit.

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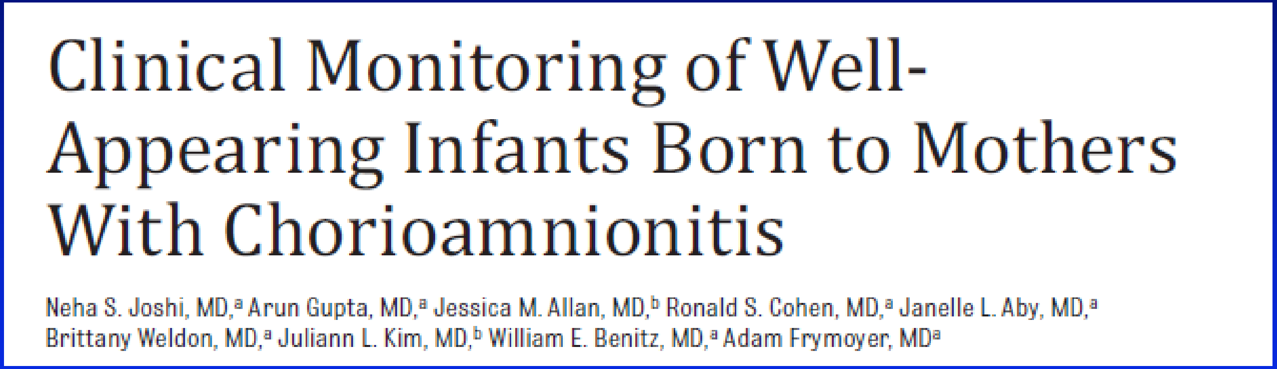
INDISA
CLINICA DE FAMILIA

Neo Red



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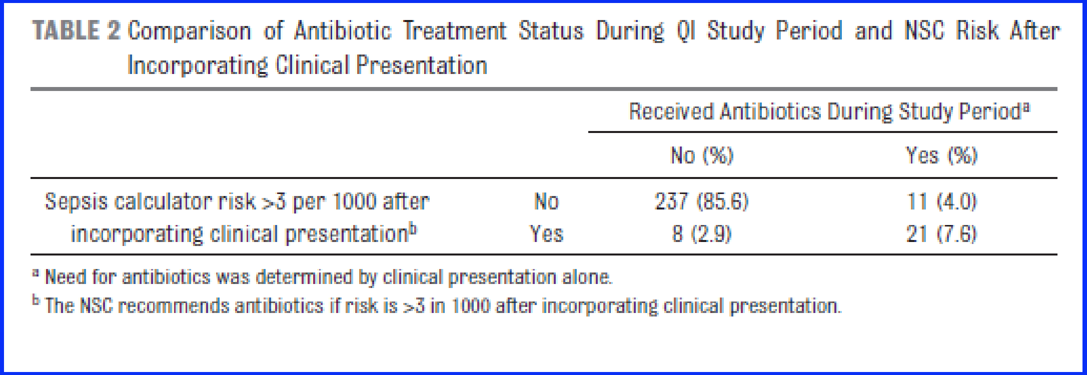

TABLE 2 Comparison of Antibiotic Treatment Status During QI Study Period and NSC Risk After Incorporating Clinical Presentation

		Received Antibiotics During Study Period[a]	
		No (%)	Yes (%)
Sepsis calculator risk >3 per 1000 after incorporating clinical presentation[b]	No	237 (85.6)	11 (4.0)
	Yes	8 (2.9)	21 (7.6)

[a] Need for antibiotics was determined by clinical presentation alone.

[b] The NSC recommends antibiotics if risk is >3 in 1000 after incorporating clinical presentation.

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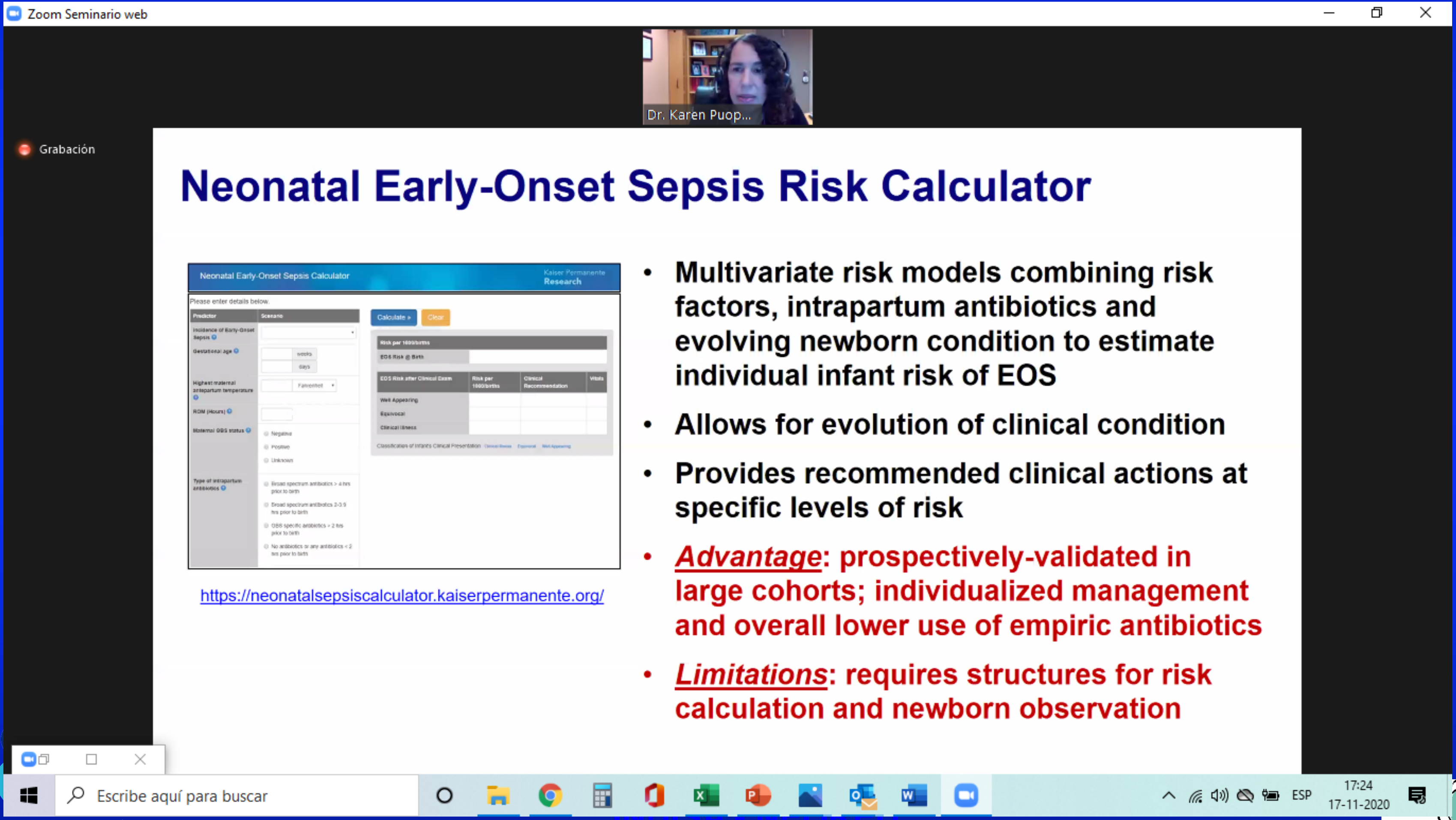
Cambios: se requiere

- Identificar el riesgo individual de un RN
- Evaluar con seguridad a menos RN y administrar < ATB y aún así identificar a los infectados
- Identificar los RN con alta probabilidad de sepsis en población asintomática
- Evitar el diagnóstico de corioamnionitis al definir el riesgo de EOS

USO DE CALCULADORA DE RIESGO KAYSER

C. Calculadora riesgo de Sepsis Precoz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Neonatal Early-Onset Sepsis Calculator
Kaiser Permanente Research
Please enter details below.
Predictor
Scenario
Incidence of Early-Onset Sepsis
Gestational age
weeks
days
Highest maternal antepartum temperature
Fahrenheit
ROM (Hours)
Maternal GBS status
Negative
Positive
Unknown
Type of intrapartum antibiotics
Broad spectrum antibiotics > 4 hrs prior to birth
Broad spectrum antibiotics 2-3.9 hrs prior to birth
GBS specific antibiotics > 2 hrs prior to birth
No antibiotics or any antibiotics < 2 hrs prior to birth
Calculate »
Clear
Risk per 1000/births
EOS Risk @ Birth
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
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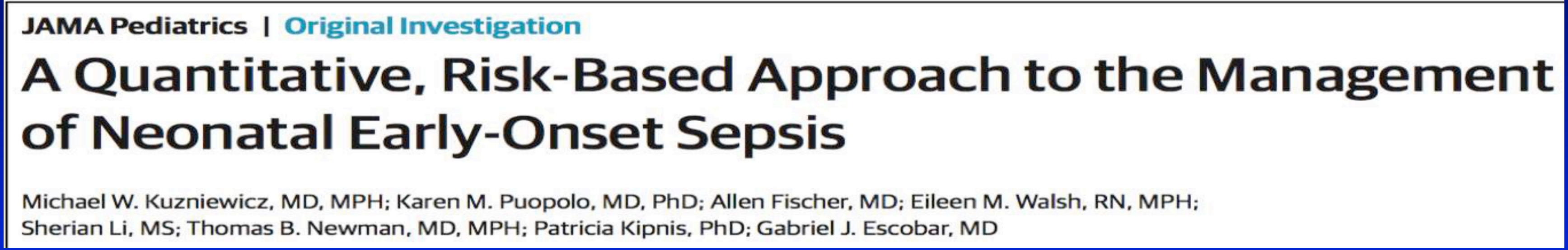
Neonatal Early-Onset Sepsis Risk Calculator

https://neonatalsepsiscalculator.kaiserpermanente.org/

- **Multivariate risk models combining risk factors, intrapartum antibiotics and evolving newborn condition to estimate individual infant risk of EOS**
- **Allows for evolution of clinical condition**
- **Provides recommended clinical actions at specific levels of risk**
- ***Advantage*: prospectively-validated in large cohorts; individualized management and overall lower use of empiric antibiotics**
- ***Limitations*: requires structures for risk calculation and newborn observation**

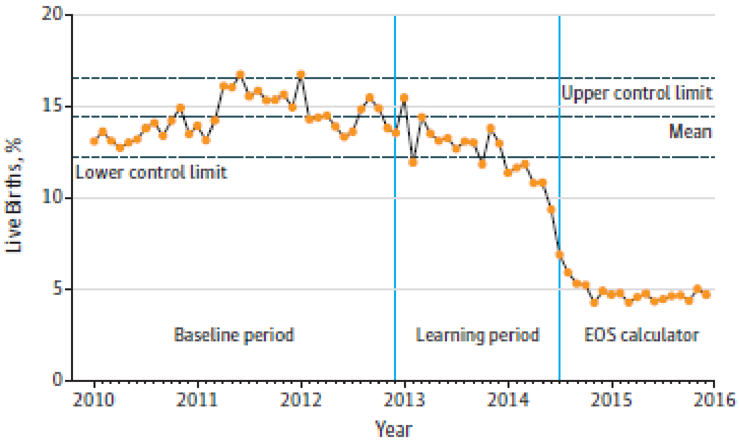


JAMA Pediatrics | Original Investigation

A Quantitative, Risk-Based Approach to the Management of Neonatal Early-Onset Sepsis

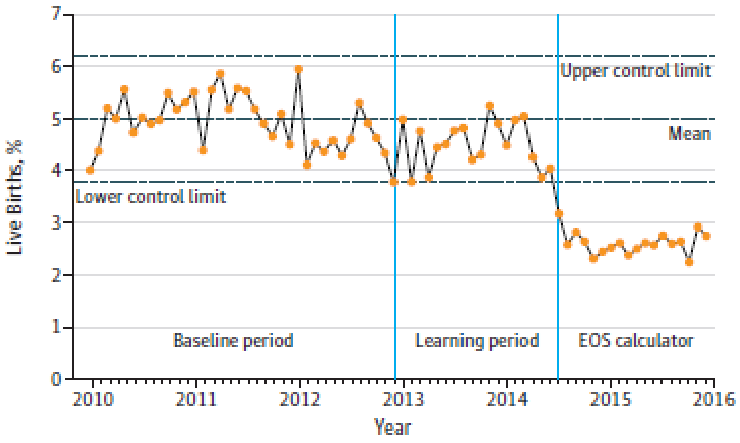
Michael W. Kuzniewicz, MD, MPH; Karen M. Puopolo, MD, PhD; Allen Fischer, MD; Eileen M. Walsh, RN, MPH;
Sherian Li, MS; Thomas B. Newman, MD, MPH; Patricia Kipnis, PhD; Gabriel J. Escobar, MD

Figure 1. Monthly Early-Onset Sepsis (EOS) Evaluation Rate



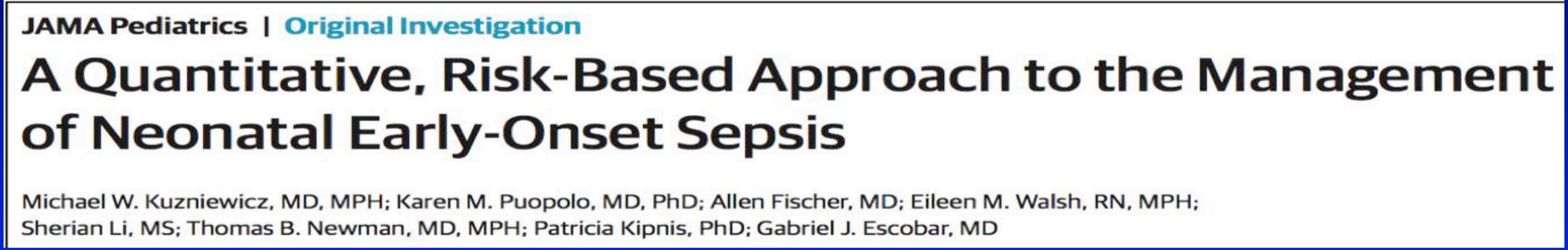
Monthly percentage of infants born at 35 weeks' gestation or later undergoing EOS evaluation with a blood culture performed in the first 24 hours of life.

Figure 2. Monthly Antibiotic Treatment Rate



Monthly percentage of infants born at 35 weeks' gestation or later receiving intravenous antibiotic therapy in the first 24 hours of life. EOS indicates early-onset sepsis.

50% reducción uso antibióticos empíricos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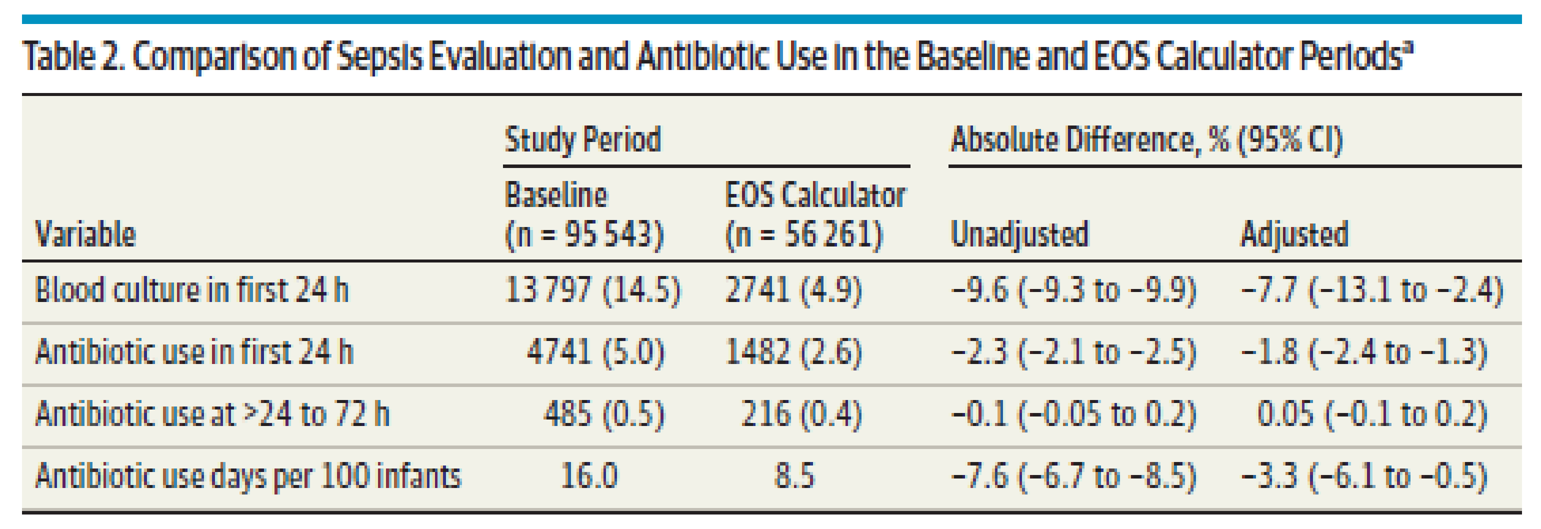
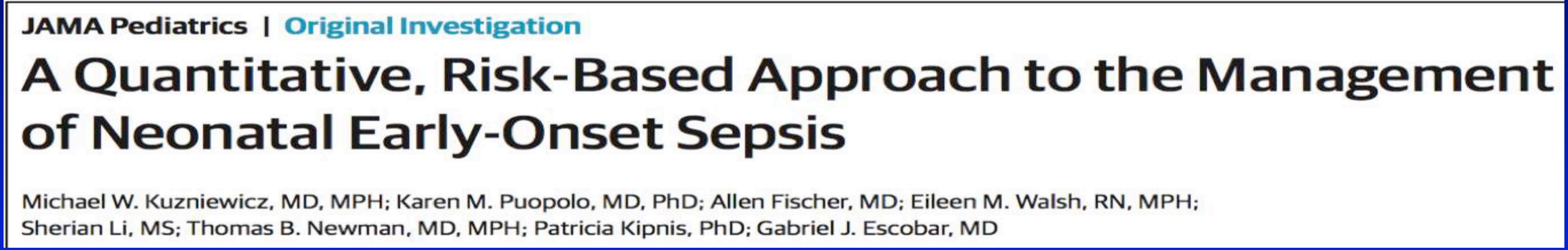


Table 2. Comparison of Sepsis Evaluation and Antibiotic Use in the Baseline and EOS Calculator Periods[a]

	Study Period		Absolute Difference, % (95% CI)	
Variable	Baseline (n = 95 543)	EOS Calculator (n = 56 261)	Unadjusted	Adjusted
Blood culture in first 24 h	13 797 (14.5)	2741 (4.9)	−9.6 (−9.3 to −9.9)	−7.7 (−13.1 to −2.4)
Antibiotic use in first 24 h	4741 (5.0)	1482 (2.6)	−2.3 (−2.1 to −2.5)	−1.8 (−2.4 to −1.3)
Antibiotic use at >24 to 72 h	485 (0.5)	216 (0.4)	−0.1 (−0.05 to 0.2)	0.05 (−0.1 to 0.2)
Antibiotic use days per 100 infants	16.0	8.5	−7.6 (−6.7 to −8.5)	−3.3 (−6.1 to −0.5)

50% reducción uso antibióticos empíricos



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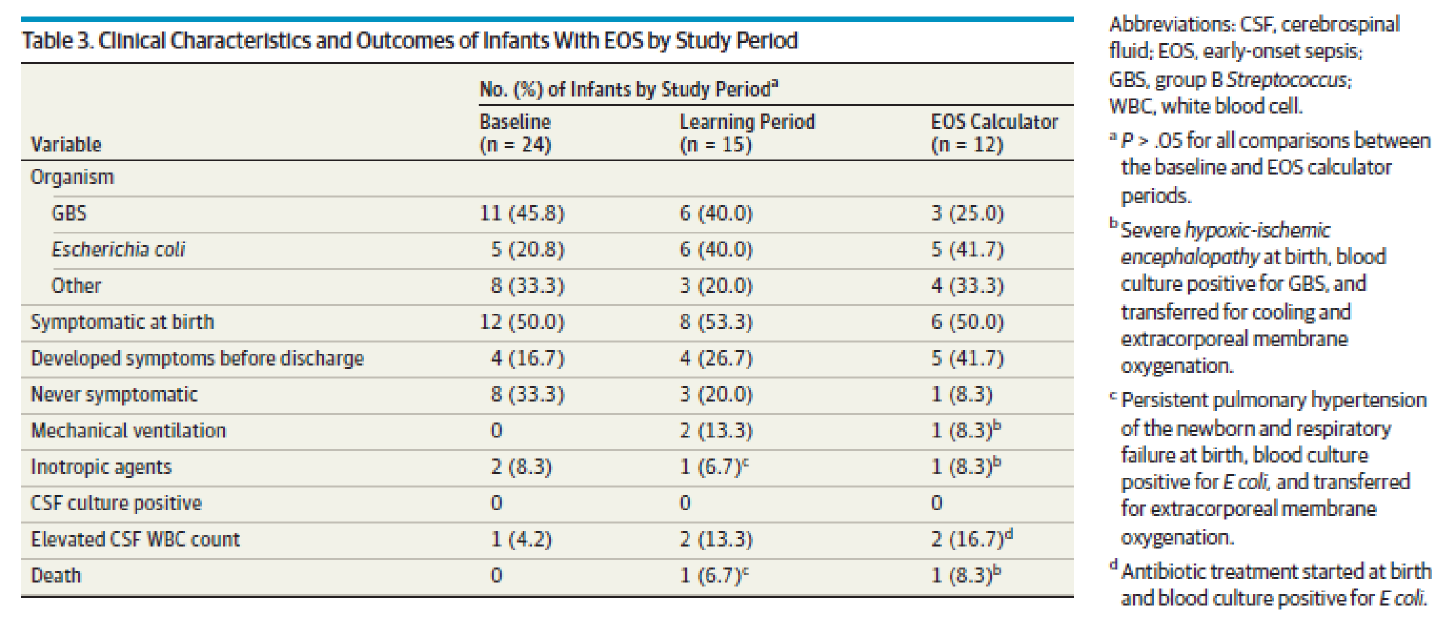


Table 3. Clinical Characteristics and Outcomes of Infants With EOS by Study Period

Variable	No. (%) of Infants by Study Period[a] Baseline (n = 24)	Learning Period (n = 15)	EOS Calculator (n = 12)
Organism			
GBS	11 (45.8)	6 (40.0)	3 (25.0)
Escherichia coli	5 (20.8)	6 (40.0)	5 (41.7)
Other	8 (33.3)	3 (20.0)	4 (33.3)
Symptomatic at birth	12 (50.0)	8 (53.3)	6 (50.0)
Developed symptoms before discharge	4 (16.7)	4 (26.7)	5 (41.7)
Never symptomatic	8 (33.3)	3 (20.0)	1 (8.3)
Mechanical ventilation	0	2 (13.3)	1 (8.3)[b]
Inotropic agents	2 (8.3)	1 (6.7)[c]	1 (8.3)[b]
CSF culture positive	0	0	0
Elevated CSF WBC count	1 (4.2)	2 (13.3)	2 (16.7)[d]
Death	0	1 (6.7)[c]	1 (8.3)[b]

Abbreviations: CSF, cerebrospinal fluid; EOS, early-onset sepsis; GBS, group B *Streptococcus*; WBC, white blood cell.

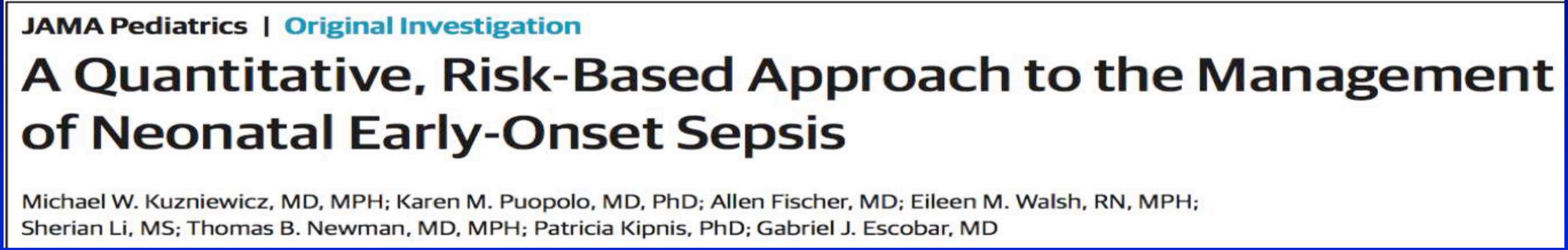
[a] *P* > .05 for all comparisons between the baseline and EOS calculator periods.

[b] Severe *hypoxic-ischemic encephalopathy* at birth, blood culture positive for GBS, and transferred for cooling and extracorporeal membrane oxygenation.

[c] Persistent pulmonary hypertension of the newborn and respiratory failure at birth, blood culture positive for *E coli*, and transferred for extracorporeal membrane oxygenation.

[d] Antibiotic treatment started at birth and blood culture positive for *E coli*.

50% sintomático al nacer. RN que desarrolla síntomas después sube de 26% en período de aprendizaje y a 41%en último período



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Seguridad de calculadora: Tasa de Readmisión

Política	Población	Casos	Tasa
CDC	98457	5	0,05/1000
Aprendizaje Calculadora	56644	1	0,02/1000
Calculadora	115092	6	0,05/1000

Todos: RNT, asintomáticos, consultan por fiebre

Riesgo de no reconocer caso con calculadora
Datos NICHD
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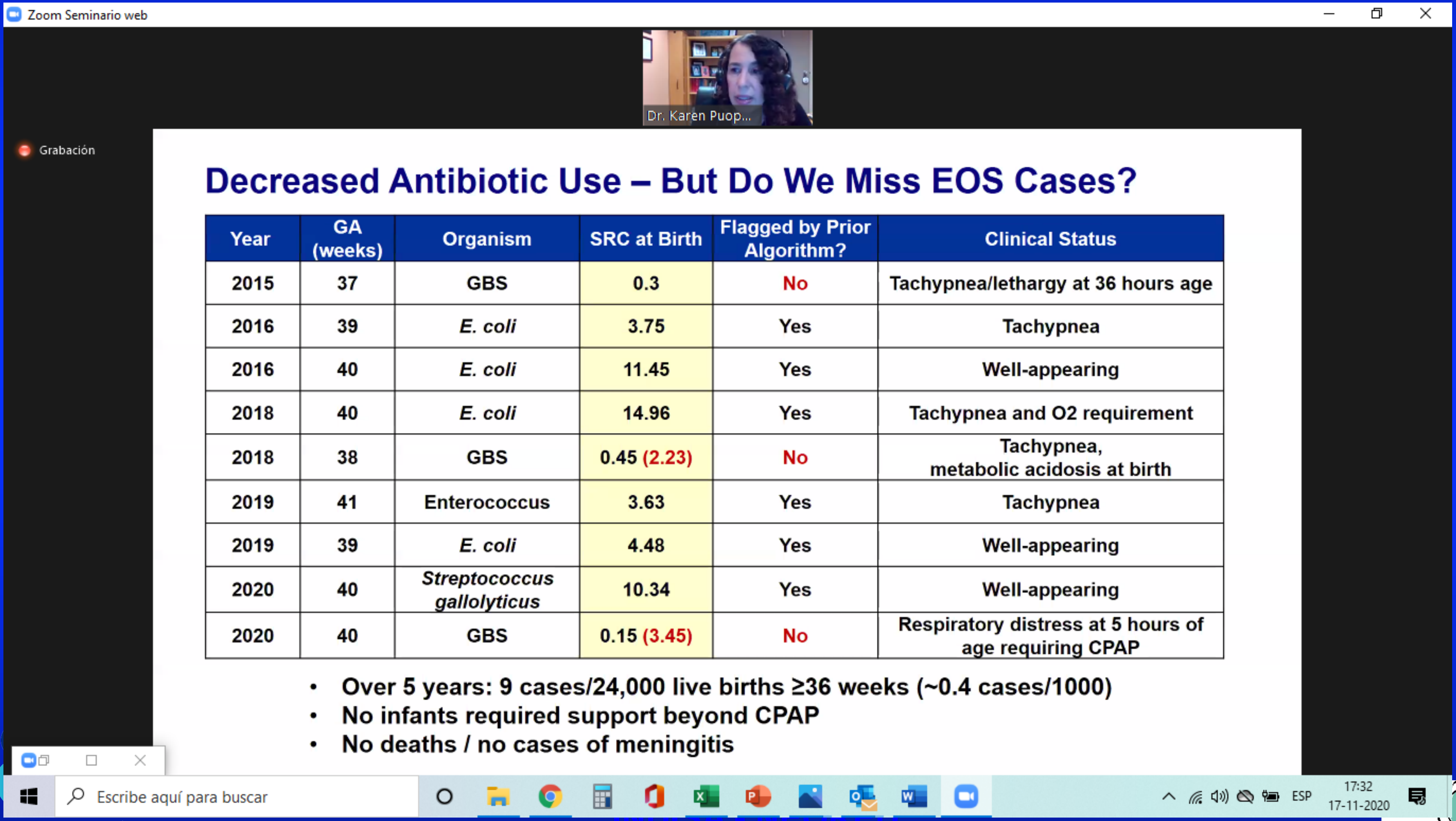

Decreased Antibiotic Use – But Do We Miss EOS Cases?

Year	GA (weeks)	Organism	SRC at Birth	Flagged by Prior Algorithm?	Clinical Status
2015	37	GBS	0.3	No	Tachypnea/lethargy at 36 hours age
2016	39	*E. coli*	3.75	Yes	Tachypnea
2016	40	*E. coli*	11.45	Yes	Well-appearing
2018	40	*E. coli*	14.96	Yes	Tachypnea and O2 requirement
2018	38	GBS	0.45 (2.23)	No	Tachypnea, metabolic acidosis at birth
2019	41	Enterococcus	3.63	Yes	Tachypnea
2019	39	*E. coli*	4.48	Yes	Well-appearing
2020	40	*Streptococcus gallolyticus*	10.34	Yes	Well-appearing
2020	40	GBS	0.15 (3.45)	No	Respiratory distress at 5 hours of age requiring CPAP

- Over 5 years: 9 cases/24,000 live births ≥36 weeks (~0.4 cases/1000)
- No infants required support beyond CPAP
- No deaths / no cases of meningitis

Datos NICHD
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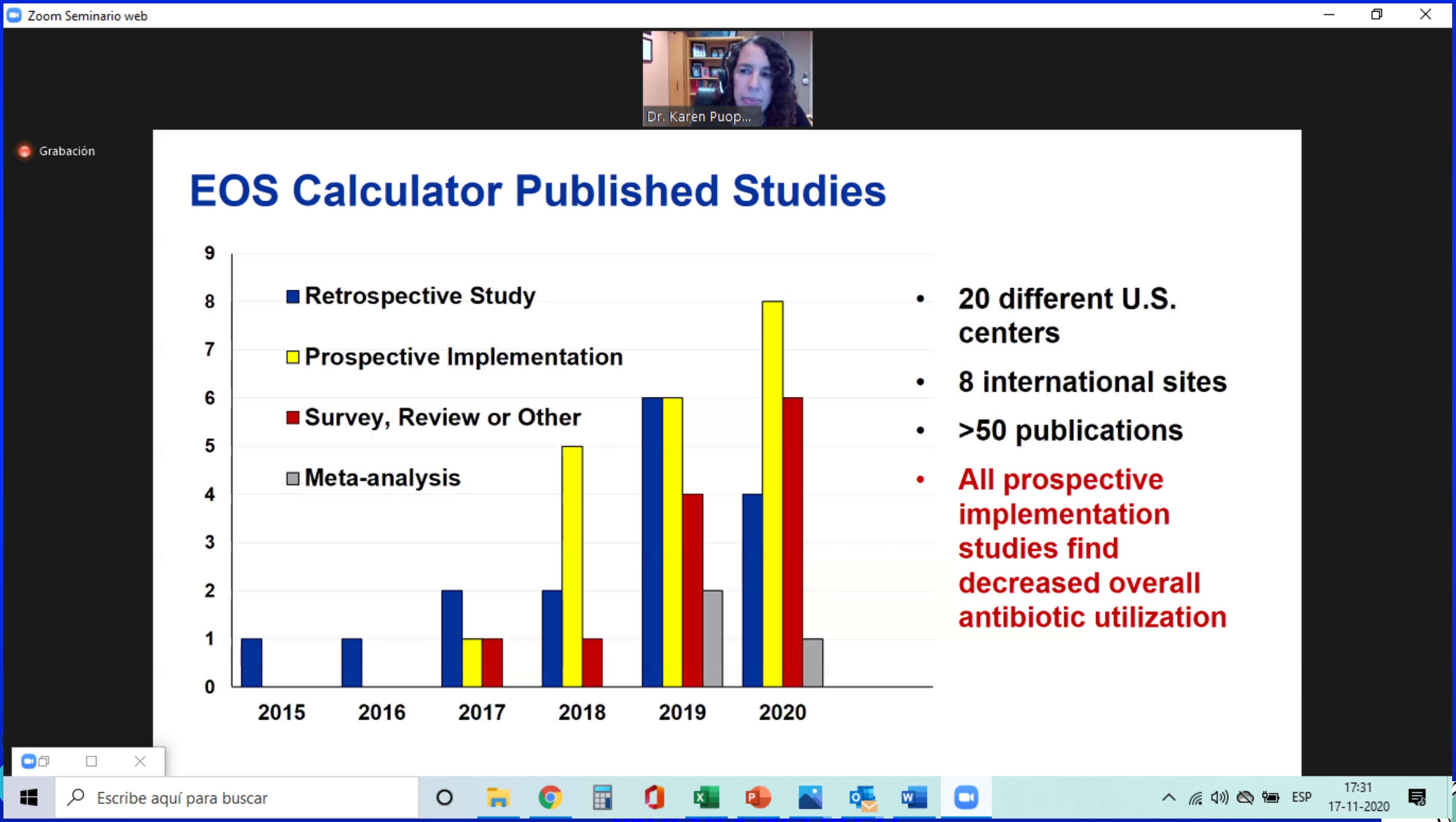
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ESP
17:31
17-11-2020

EOS Calculator Published Studies

9
8
7
6
5
4
3
2
1
0
■ Retrospective Study
■ Prospective Implementation
■ Survey, Review or Other
■ Meta-analysis
2015
2016
2017
2018
2019
2020

- 20 different U.S. centers
- 8 international sites
- >50 publications
- All prospective implementation studies find decreased overall antibiotic utilization

Implementación Calculadora en Australia Strunk T.Neonatology 2018

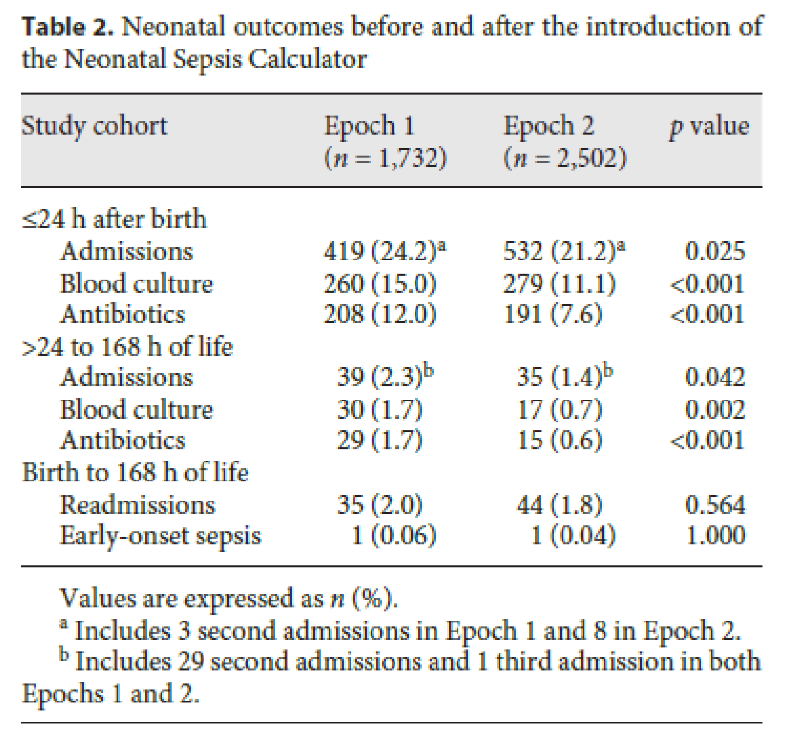


Table 2. Neonatal outcomes before and after the introduction of the Neonatal Sepsis Calculator

Study cohort	Epoch 1 (n = 1,732)	Epoch 2 (n = 2,502)	p value
≤24 h after birth			
Admissions	419 (24.2)[a]	532 (21.2)[a]	0.025
Blood culture	260 (15.0)	279 (11.1)	<0.001
Antibiotics	208 (12.0)	191 (7.6)	<0.001
>24 to 168 h of life			
Admissions	39 (2.3)[b]	35 (1.4)[b]	0.042
Blood culture	30 (1.7)	17 (0.7)	0.002
Antibiotics	29 (1.7)	15 (0.6)	<0.001
Birth to 168 h of life			
Readmissions	35 (2.0)	44 (1.8)	0.564
Early-onset sepsis	1 (0.06)	1 (0.04)	1.000

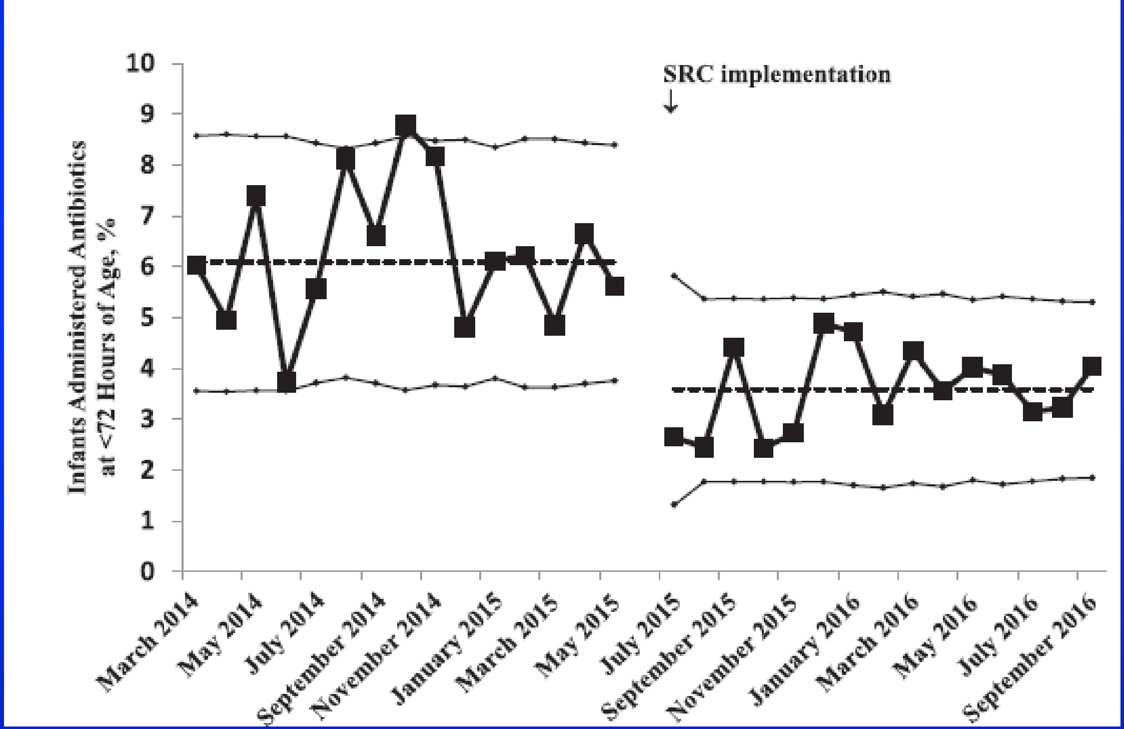
Values are expressed as n (%).

[a] Includes 3 second admissions in Epoch 1 and 8 in Epoch 2.

[b] Includes 29 second admissions and 1 third admission in both Epochs 1 and 2.

Implementación Calculadora de riesgo en Pennsylvania Hospital

Dhudasia B, Pupolo K . Hosp Pediatrics 2018



Implementación Calculadora de riesgo en Pennsylvania Hospital

Dhudasia B, Pupolo K . Hosp Pediatrics 2018

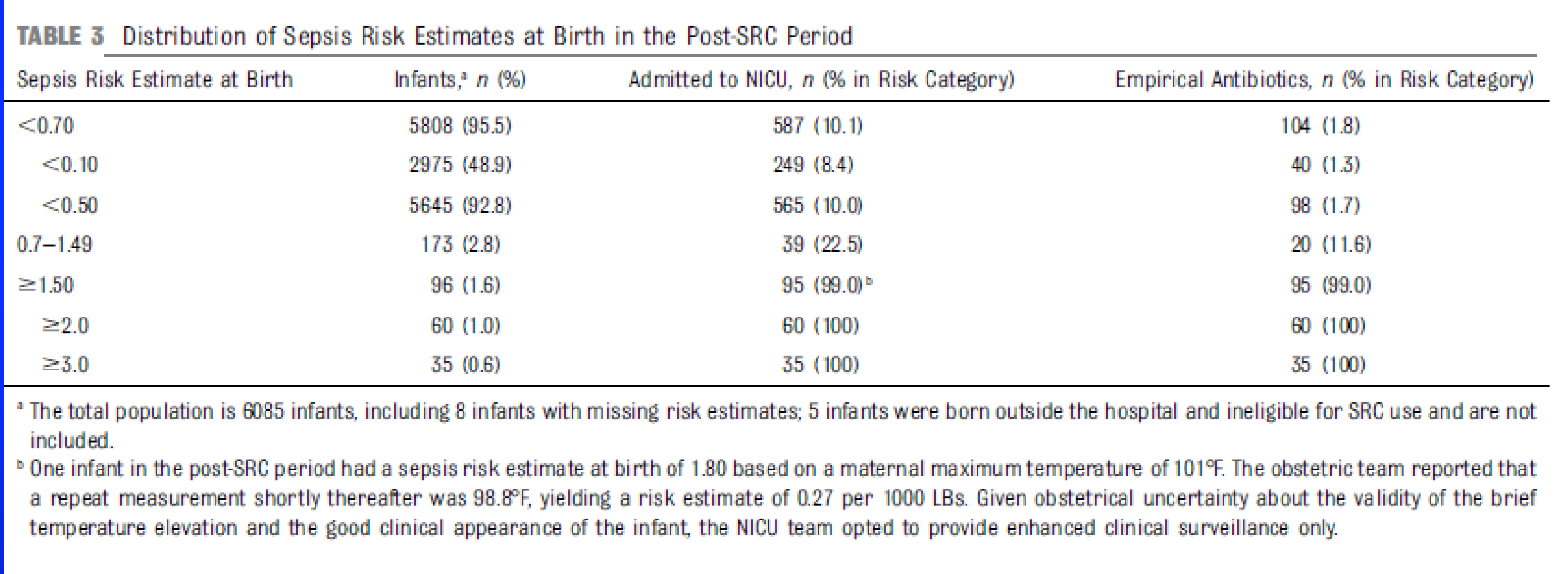
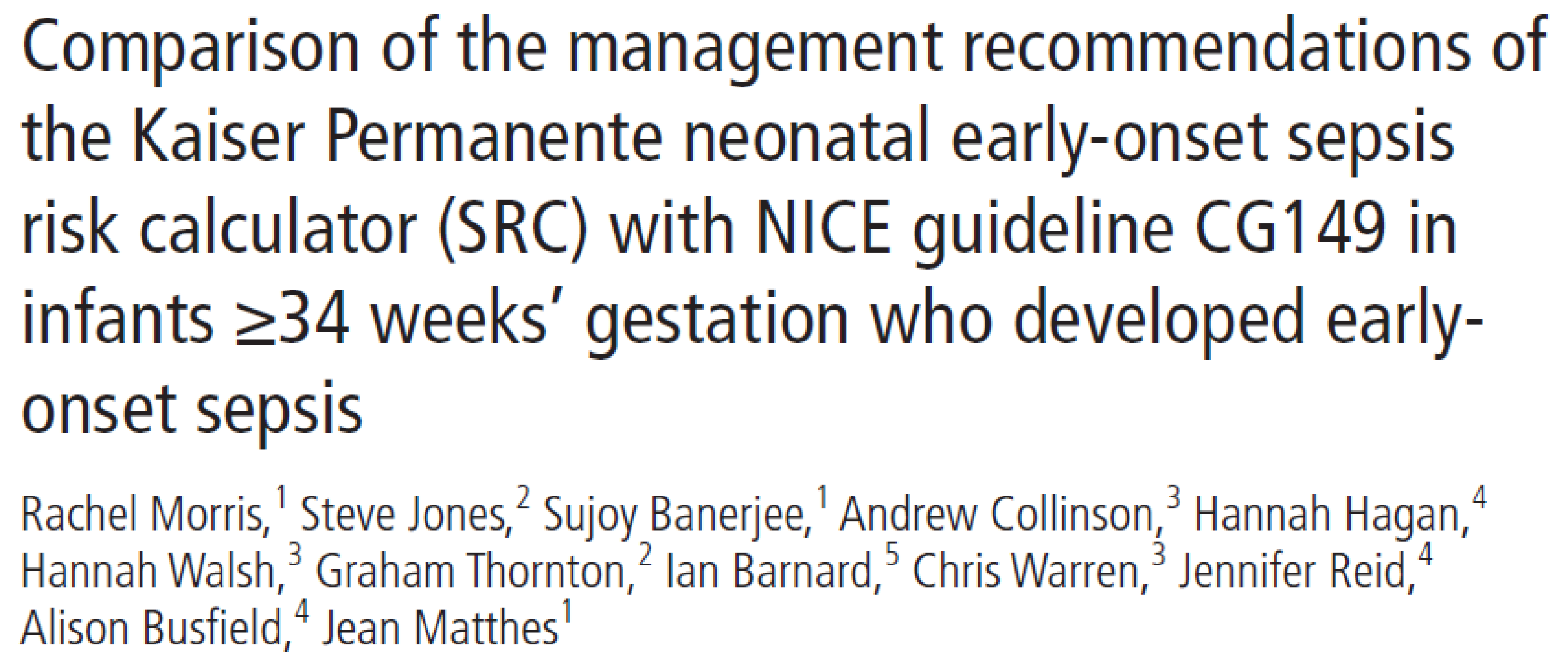


TABLE 3 Distribution of Sepsis Risk Estimates at Birth in the Post-SRC Period

Sepsis Risk Estimate at Birth	Infants,[a] *n* (%)	Admitted to NICU, *n* (% in Risk Category)	Empirical Antibiotics, *n* (% in Risk Category)
<0.70	5808 (95.5)	587 (10.1)	104 (1.8)
<0.10	2975 (48.9)	249 (8.4)	40 (1.3)
<0.50	5645 (92.8)	565 (10.0)	98 (1.7)
0.7–1.49	173 (2.8)	39 (22.5)	20 (11.6)
≥1.50	96 (1.6)	95 (99.0)[b]	95 (99.0)
≥2.0	60 (1.0)	60 (100)	60 (100)
≥3.0	35 (0.6)	35 (100)	35 (100)

[a] The total population is 6085 infants, including 8 infants with missing risk estimates; 5 infants were born outside the hospital and ineligible for SRC use and are not included.

[b] One infant in the post-SRC period had a sepsis risk estimate at birth of 1.80 based on a maternal maximum temperature of 101°F. The obstetric team reported that a repeat measurement shortly thereafter was 98.8°F, yielding a risk estimate of 0.27 per 1000 LBs. Given obstetrical uncertainty about the validity of the brief temperature elevation and the good clinical appearance of the infant, the NICU team opted to provide enhanced clinical surveillance only.



Comparison of the management recommendations of the Kaiser Permanente neonatal early-onset sepsis risk calculator (SRC) with NICE guideline CG149 in infants ≥34 weeks' gestation who developed early-onset sepsis

Rachel Morris,[1] Steve Jones,[2] Sujoy Banerjee,[1] Andrew Collinson,[3] Hannah Hagan,[4] Hannah Walsh,[3] Graham Thornton,[2] Ian Barnard,[5] Chris Warren,[3] Jennifer Reid,[4] Alison Busfield,[4] Jean Matthes[1]

Trabajo leido semana pasada :

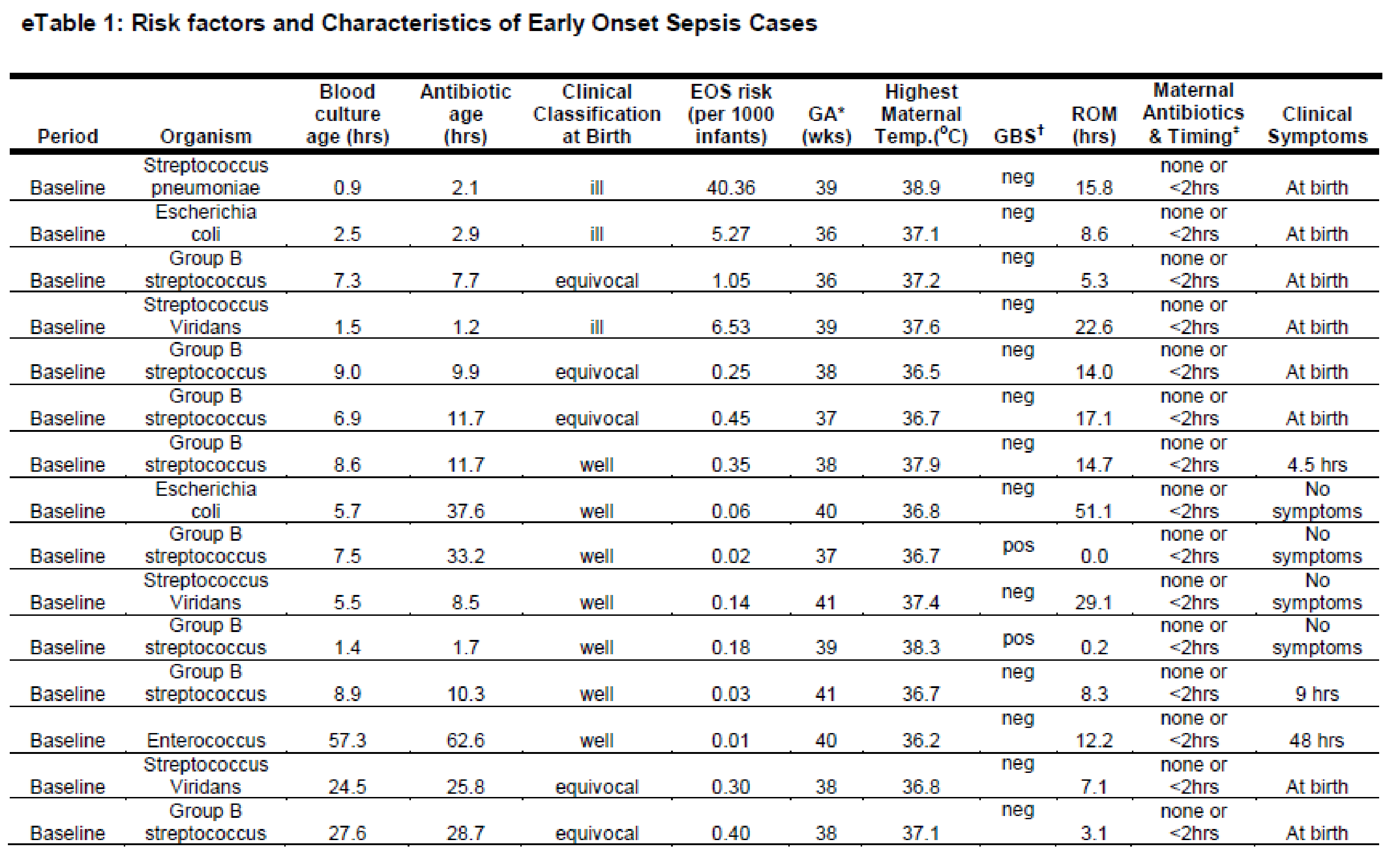
Sensibilidad calculadora Kayser 38%

Sólo evaluó realizar cálculo en primeras 4 h

Limitaciones calculadora

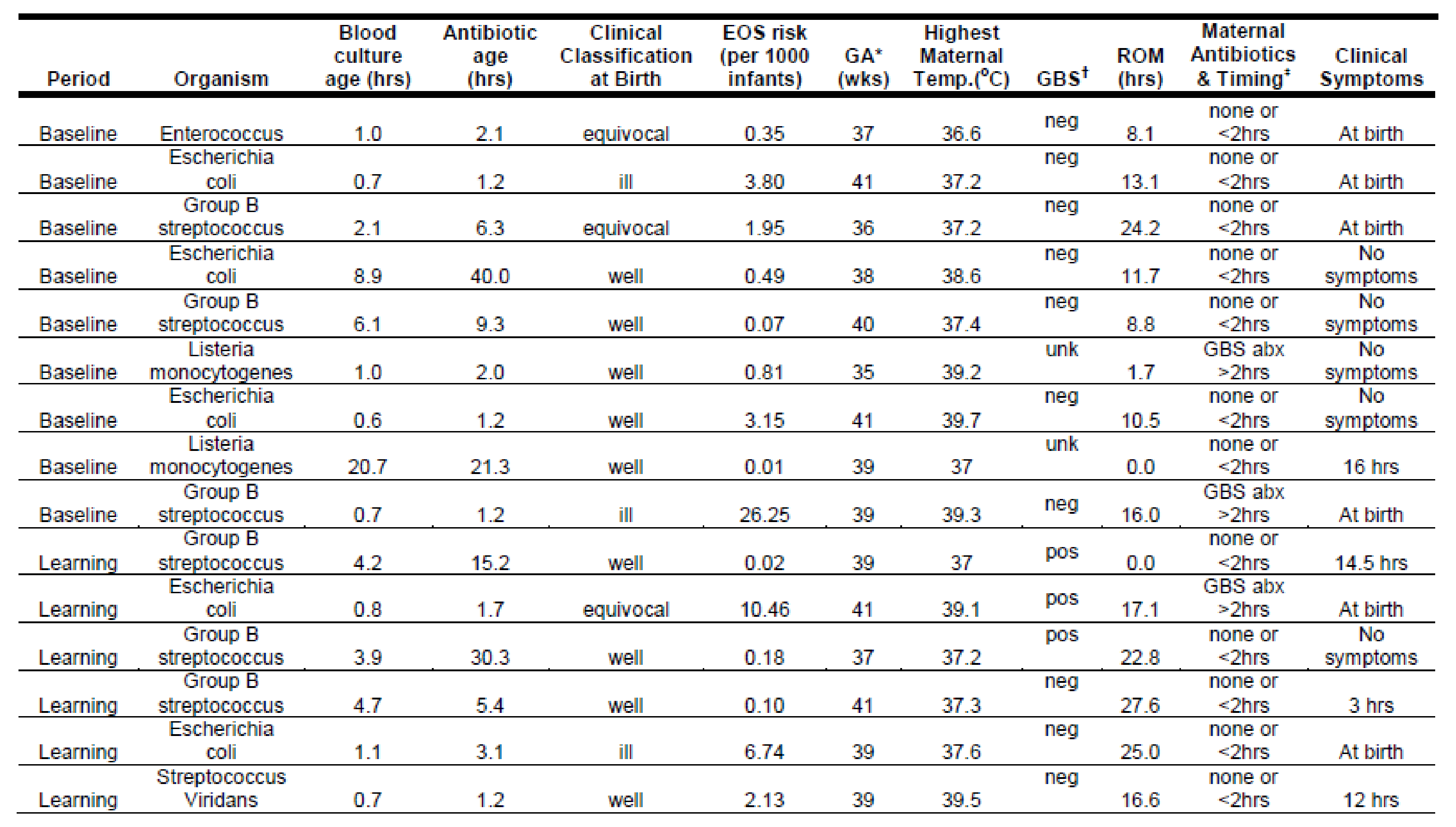
- Requiere una organización del cuidado de neonatal que permita calcular el riesgo después del nacimiento
- Requiere observación del recién nacido en nursery
- Inicial “well appearing” o “equivocal” con una bajo riesgo en la calculadora puede deteriorarse

Casos Sepsis Jama 2017

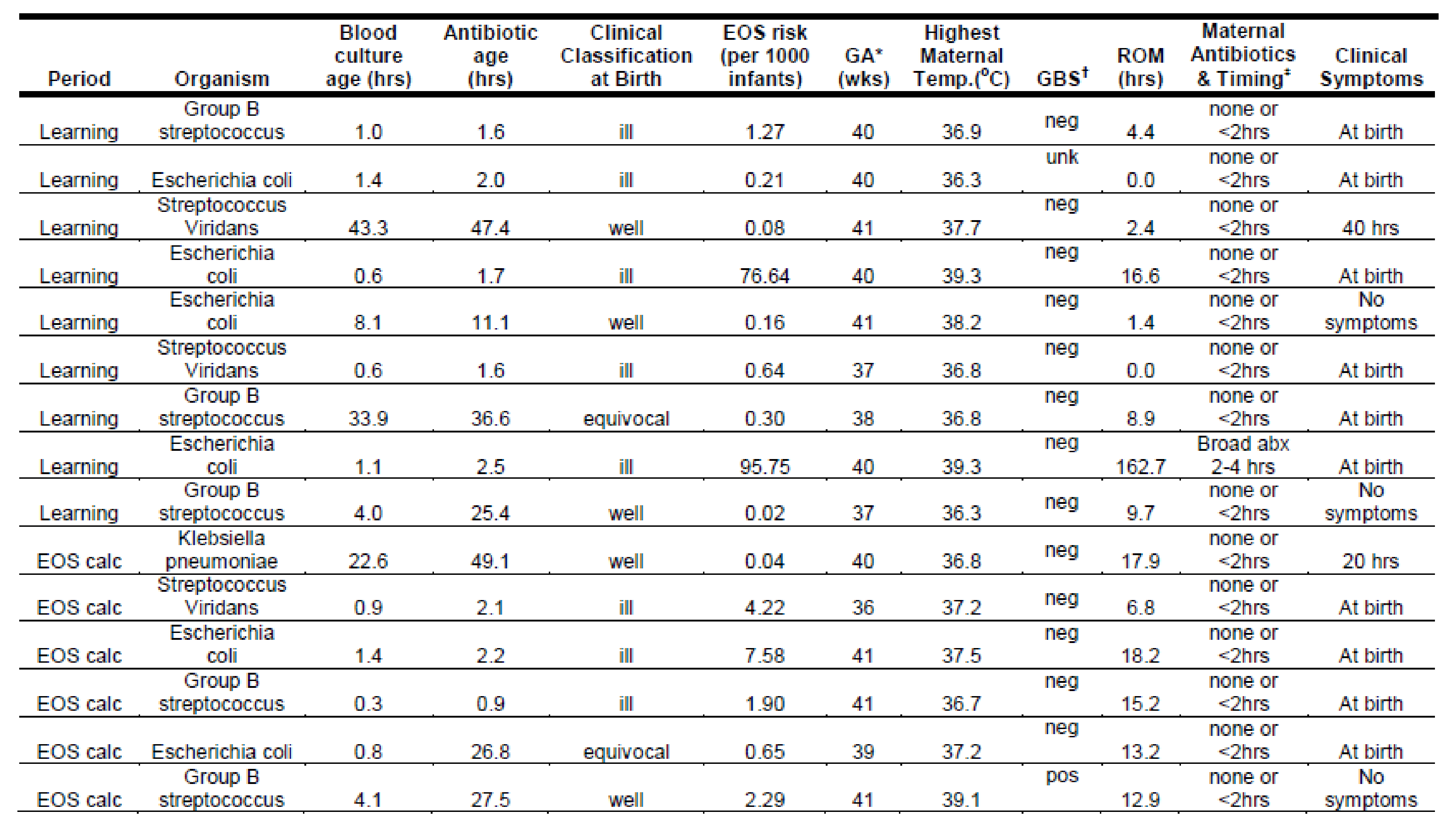


eTable 1: Risk factors and Characteristics of Early Onset Sepsis Cases

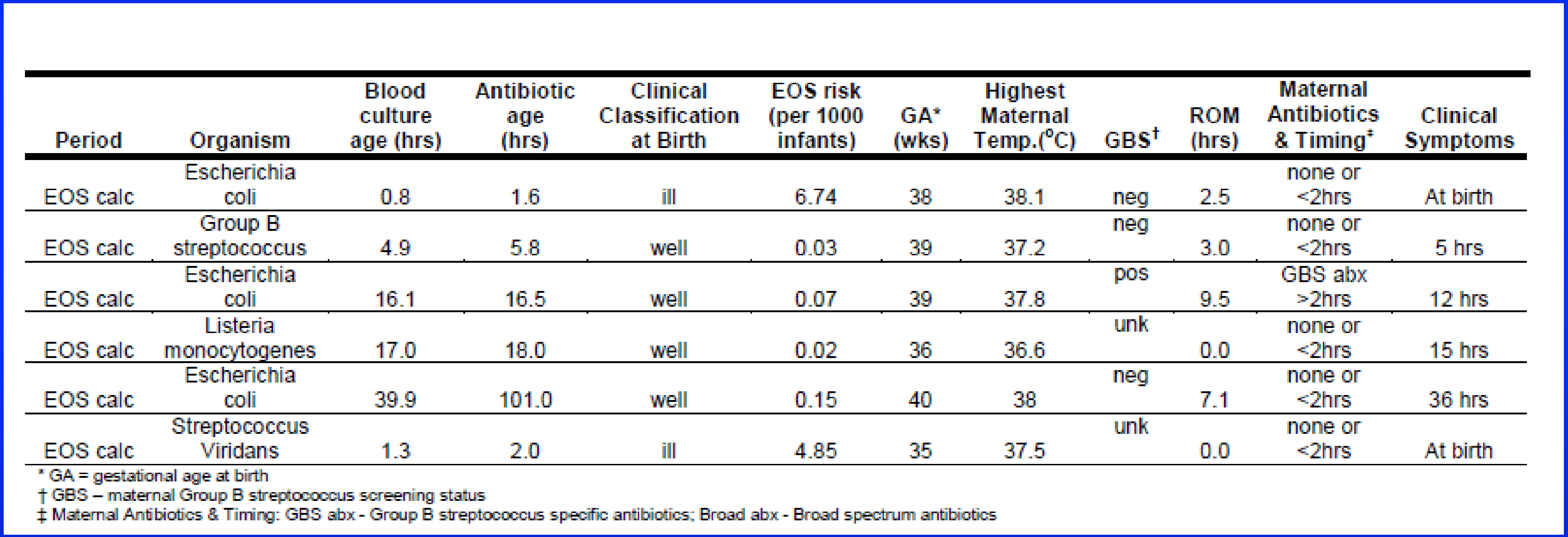
Period	Organism	Blood culture age (hrs)	Antibiotic age (hrs)	Clinical Classification at Birth	EOS risk (per 1000 infants)	GA* (wks)	Highest Maternal Temp.(^{o}C)	GBS[†]	ROM (hrs)	Maternal Antibiotics & Timing[‡]	Clinical Symptoms
Baseline	Streptococcus pneumoniae	0.9	2.1	ill	40.36	39	38.9	neg	15.8	none or <2hrs	At birth
Baseline	Escherichia coli	2.5	2.9	ill	5.27	36	37.1	neg	8.6	none or <2hrs	At birth
Baseline	Group B streptococcus	7.3	7.7	equivocal	1.05	36	37.2	neg	5.3	none or <2hrs	At birth
Baseline	Streptococcus Viridans	1.5	1.2	ill	6.53	39	37.6	neg	22.6	none or <2hrs	At birth
Baseline	Group B streptococcus	9.0	9.9	equivocal	0.25	38	36.5	neg	14.0	none or <2hrs	At birth
Baseline	Group B streptococcus	6.9	11.7	equivocal	0.45	37	36.7	neg	17.1	none or <2hrs	At birth
Baseline	Group B streptococcus	8.6	11.7	well	0.35	38	37.9	neg	14.7	none or <2hrs	4.5 hrs
Baseline	Escherichia coli	5.7	37.6	well	0.06	40	36.8	neg	51.1	none or <2hrs	No symptoms
Baseline	Group B streptococcus	7.5	33.2	well	0.02	37	36.7	pos	0.0	none or <2hrs	No symptoms
Baseline	Streptococcus Viridans	5.5	8.5	well	0.14	41	37.4	neg	29.1	none or <2hrs	No symptoms
Baseline	Group B streptococcus	1.4	1.7	well	0.18	39	38.3	pos	0.2	none or <2hrs	No symptoms
Baseline	Group B streptococcus	8.9	10.3	well	0.03	41	36.7	neg	8.3	none or <2hrs	9 hrs
Baseline	Enterococcus	57.3	62.6	well	0.01	40	36.2	neg	12.2	none or <2hrs	48 hrs
Baseline	Streptococcus Viridans	24.5	25.8	equivocal	0.30	38	36.8	neg	7.1	none or <2hrs	At birth
Baseline	Group B streptococcus	27.6	28.7	equivocal	0.40	38	37.1	neg	3.1	none or <2hrs	At birth



Period	Organism	Blood culture age (hrs)	Antibiotic age (hrs)	Clinical Classification at Birth	EOS risk (per 1000 infants)	GA* (wks)	Highest Maternal Temp.(°C)	GBS†	ROM (hrs)	Maternal Antibiotics & Timing‡	Clinical Symptoms
Baseline	Enterococcus	1.0	2.1	equivocal	0.35	37	36.6	neg	8.1	none or <2hrs	At birth
Baseline	Escherichia coli	0.7	1.2	ill	3.80	41	37.2	neg	13.1	none or <2hrs	At birth
Baseline	Group B streptococcus	2.1	6.3	equivocal	1.95	36	37.2	neg	24.2	none or <2hrs	At birth
Baseline	Escherichia coli	8.9	40.0	well	0.49	38	38.6	neg	11.7	none or <2hrs	No symptoms
Baseline	Group B streptococcus	6.1	9.3	well	0.07	40	37.4	neg	8.8	none or <2hrs	No symptoms
Baseline	Listeria monocytogenes	1.0	2.0	well	0.81	35	39.2	unk	1.7	GBS abx >2hrs	No symptoms
Baseline	Escherichia coli	0.6	1.2	well	3.15	41	39.7	neg	10.5	none or <2hrs	No symptoms
Baseline	Listeria monocytogenes	20.7	21.3	well	0.01	39	37	unk	0.0	none or <2hrs	16 hrs
Baseline	Group B streptococcus	0.7	1.2	ill	26.25	39	39.3	neg	16.0	GBS abx >2hrs	At birth
Learning	Group B streptococcus	4.2	15.2	well	0.02	39	37	pos	0.0	none or <2hrs	14.5 hrs
Learning	Escherichia coli	0.8	1.7	equivocal	10.46	41	39.1	pos	17.1	GBS abx >2hrs	At birth
Learning	Group B streptococcus	3.9	30.3	well	0.18	37	37.2	pos	22.8	none or <2hrs	No symptoms
Learning	Group B streptococcus	4.7	5.4	well	0.10	41	37.3	neg	27.6	none or <2hrs	3 hrs
Learning	Escherichia coli	1.1	3.1	ill	6.74	39	37.6	neg	25.0	none or <2hrs	At birth
Learning	Streptococcus Viridans	0.7	1.2	well	2.13	39	39.5	neg	16.6	none or <2hrs	12 hrs



Period	Organism	Blood culture age (hrs)	Antibiotic age (hrs)	Clinical Classification at Birth	EOS risk (per 1000 infants)	GA* (wks)	Highest Maternal Temp.(°C)	GBS†	ROM (hrs)	Maternal Antibiotics & Timing‡	Clinical Symptoms
Learning	Group B streptococcus	1.0	1.6	ill	1.27	40	36.9	neg	4.4	none or <2hrs	At birth
Learning	Escherichia coli	1.4	2.0	ill	0.21	40	36.3	unk	0.0	none or <2hrs	At birth
Learning	Streptococcus Viridans	43.3	47.4	well	0.08	41	37.7	neg	2.4	none or <2hrs	40 hrs
Learning	Escherichia coli	0.6	1.7	ill	76.64	40	39.3	neg	16.6	none or <2hrs	At birth
Learning	Escherichia coli	8.1	11.1	well	0.16	41	38.2	neg	1.4	none or <2hrs	No symptoms
Learning	Streptococcus Viridans	0.6	1.6	ill	0.64	37	36.8	neg	0.0	none or <2hrs	At birth
Learning	Group B streptococcus	33.9	36.6	equivocal	0.30	38	36.8	neg	8.9	none or <2hrs	At birth
Learning	Escherichia coli	1.1	2.5	ill	95.75	40	39.3	neg	162.7	Broad abx 2-4 hrs	At birth
Learning	Group B streptococcus	4.0	25.4	well	0.02	37	36.3	neg	9.7	none or <2hrs	No symptoms
EOS calc	Klebsiella pneumoniae	22.6	49.1	well	0.04	40	36.8	neg	17.9	none or <2hrs	20 hrs
EOS calc	Streptococcus Viridans	0.9	2.1	ill	4.22	36	37.2	neg	6.8	none or <2hrs	At birth
EOS calc	Escherichia coli	1.4	2.2	ill	7.58	41	37.5	neg	18.2	none or <2hrs	At birth
EOS calc	Group B streptococcus	0.3	0.9	ill	1.90	41	36.7	neg	15.2	none or <2hrs	At birth
EOS calc	Escherichia coli	0.8	26.8	equivocal	0.65	39	37.2	neg	13.2	none or <2hrs	At birth
EOS calc	Group B streptococcus	4.1	27.5	well	2.29	41	39.1	pos	12.9	none or <2hrs	No symptoms



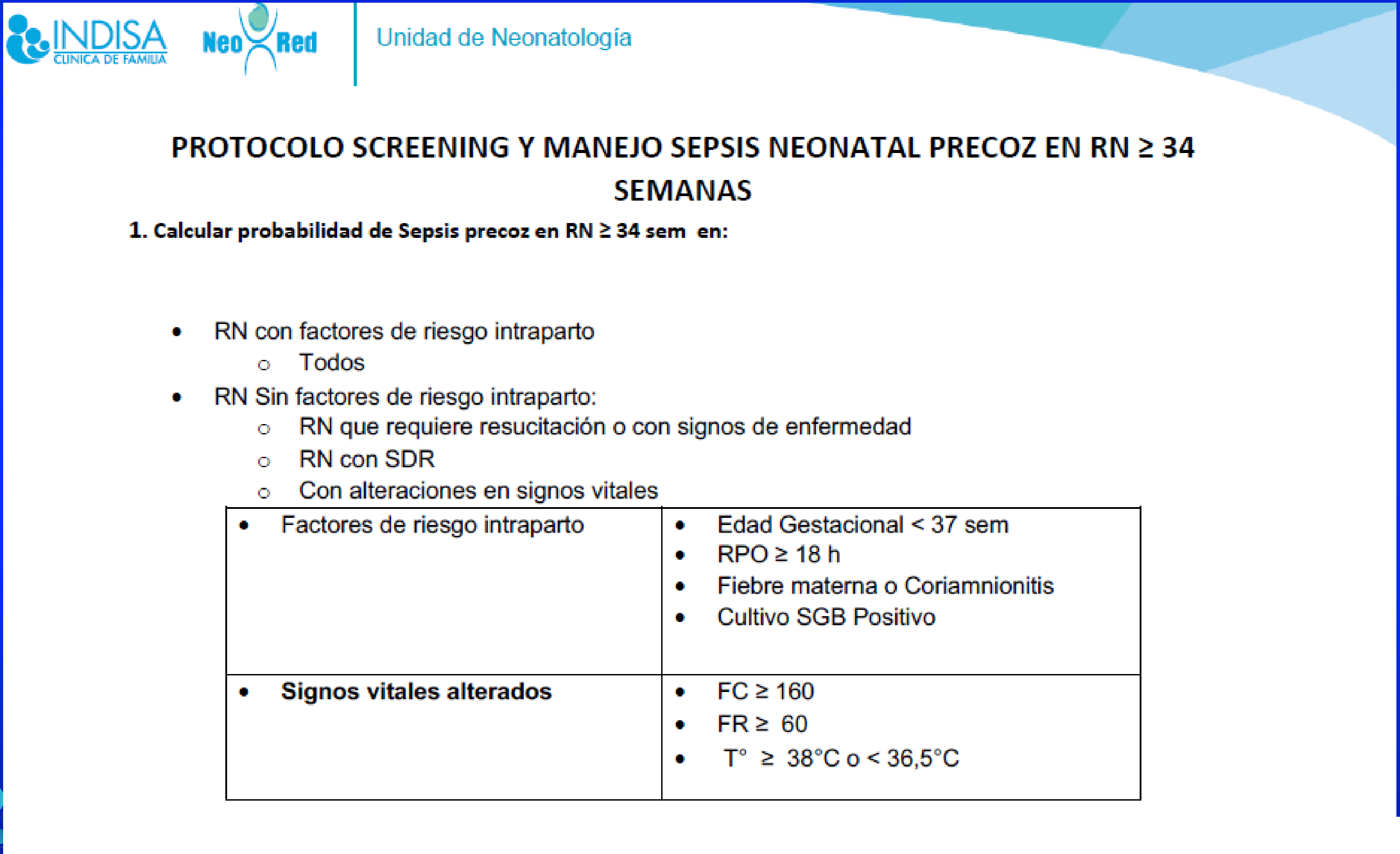
Period	Organism	Blood culture age (hrs)	Antibiotic age (hrs)	Clinical Classification at Birth	EOS risk (per 1000 infants)	GA* (wks)	Highest Maternal Temp.(°C)	GBS†	ROM (hrs)	Maternal Antibiotics & Timing‡	Clinical Symptoms
EOS calc	Escherichia coli	0.8	1.6	ill	6.74	38	38.1	neg	2.5	none or <2hrs	At birth
EOS calc	Group B streptococcus	4.9	5.8	well	0.03	39	37.2	neg	3.0	none or <2hrs	5 hrs
EOS calc	Escherichia coli	16.1	16.5	well	0.07	39	37.8	pos	9.5	GBS abx >2hrs	12 hrs
EOS calc	Listeria monocytogenes	17.0	18.0	well	0.02	36	36.6	unk	0.0	none or <2hrs	15 hrs
EOS calc	Escherichia coli	39.9	101.0	well	0.15	40	38	neg	7.1	none or <2hrs	36 hrs
EOS calc	Streptococcus Viridans	1.3	2.0	ill	4.85	35	37.5	unk	0.0	none or <2hrs	At birth

* GA = gestational age at birth

† GBS – maternal Group B streptococcus screening status

‡ Maternal Antibiotics & Timing: GBS abx - Group B streptococcus specific antibiotics; Broad abx - Broad spectrum antibiotics

Protoco Riesgo Sepsis precoz RN ≥ 35 semanas



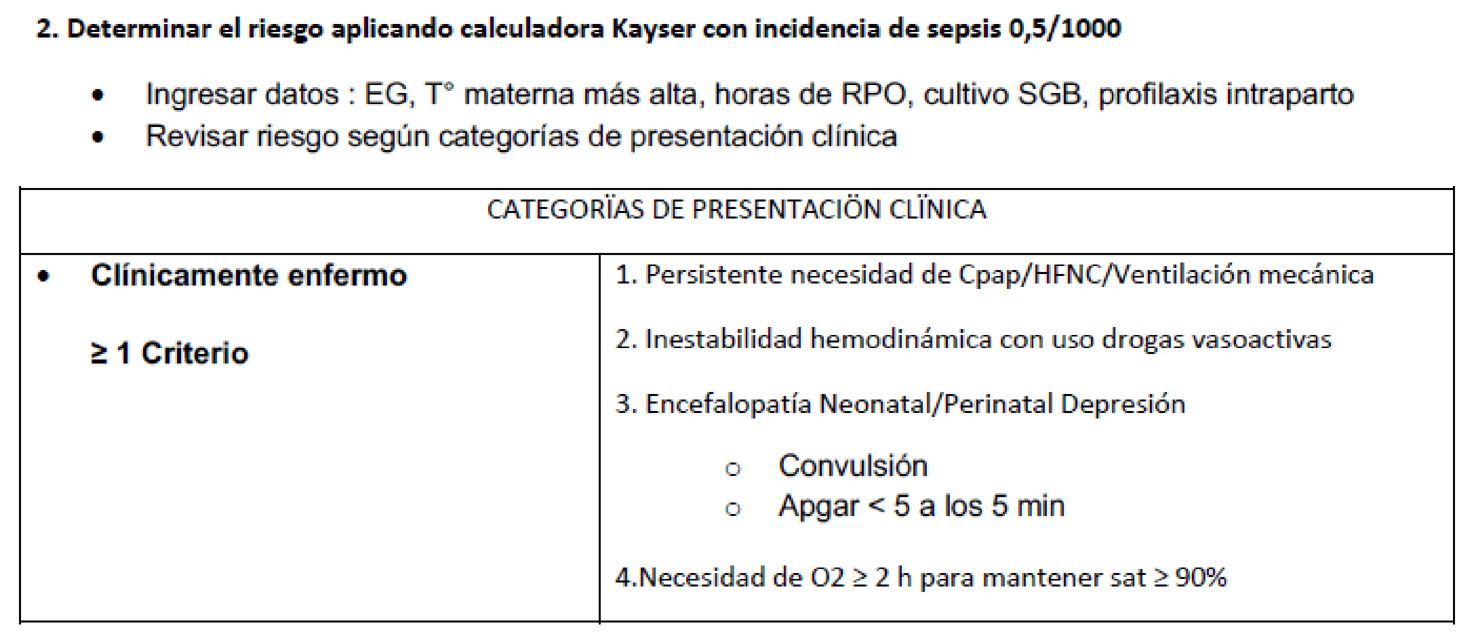
Unidad de Neonatología

PROTOCOLO SCREENING Y MANEJO SEPSIS NEONATAL PRECOZ EN RN ≥ 34 SEMANAS

1. Calcular probabilidad de Sepsis precoz en RN ≥ 34 sem en:

- RN con factores de riesgo intraparto
  - Todos
- RN Sin factores de riesgo intraparto:
  - RN que requiere resucitación o con signos de enfermedad
  - RN con SDR
  - Con alteraciones en signos vitales

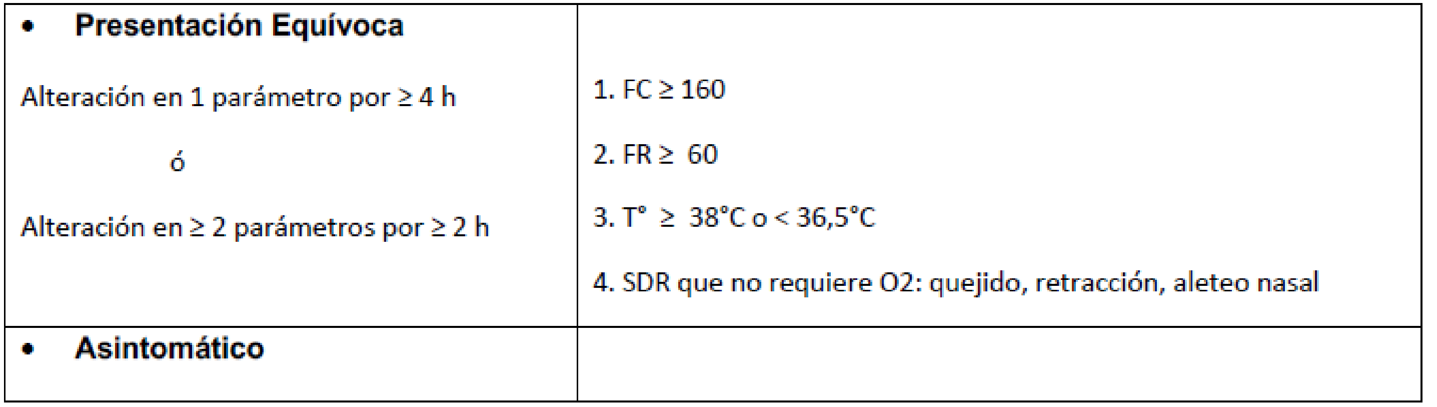
• Factores de riesgo intraparto	• Edad Gestacional < 37 sem • RPO ≥ 18 h • Fiebre materna o Coriamnionitis • Cultivo SGB Positivo
• **Signos vitales alterados**	• FC ≥ 160 • FR ≥ 60 • T° ≥ 38°C o < 36,5°C



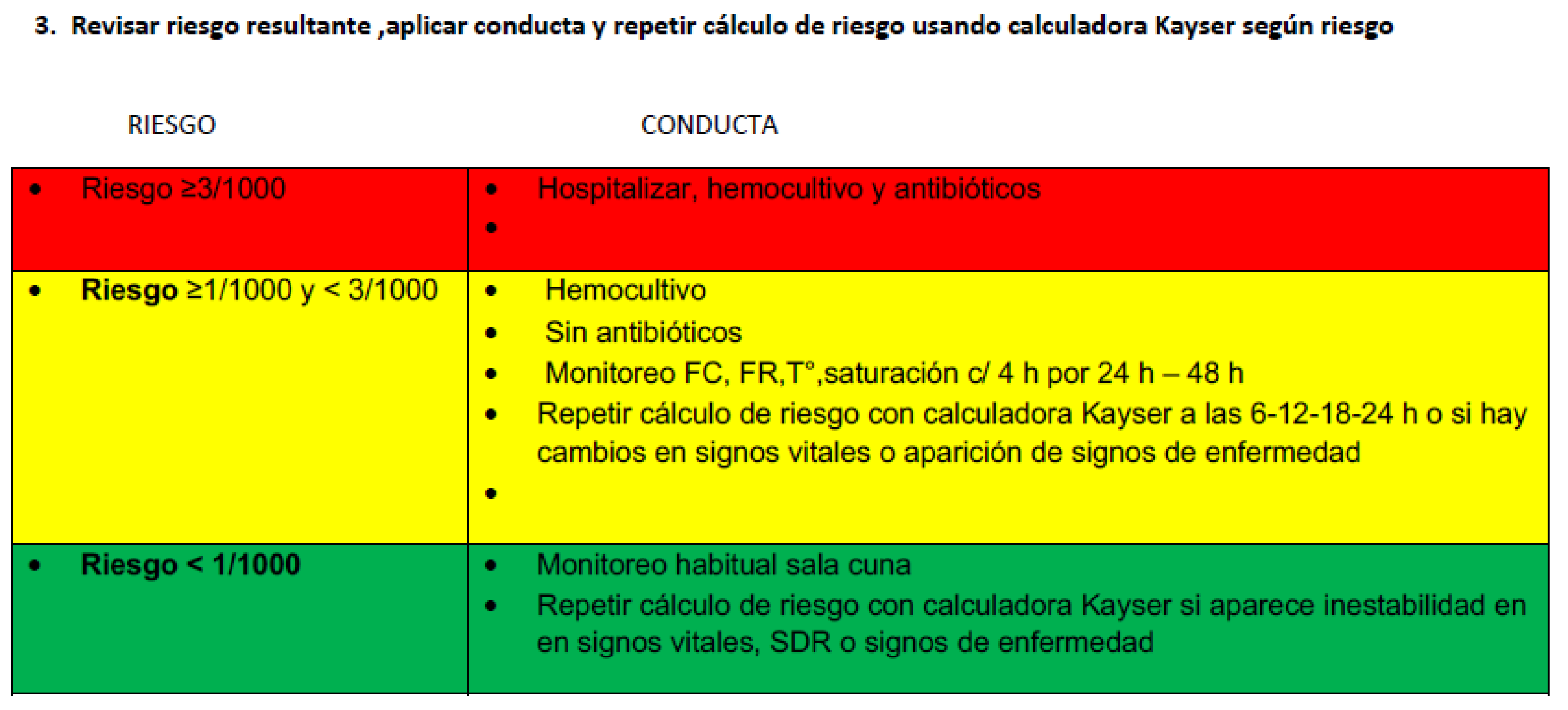
2. Determinar el riesgo aplicando calculadora Kayser con incidencia de sepsis 0,5/1000

- Ingresar datos : EG, T° materna más alta, horas de RPO, cultivo SGB, profilaxis intraparto
- Revisar riesgo según categorías de presentación clínica

CATEGORÏAS DE PRESENTACIÖN CLÏNICA	
• **Clínicamente enfermo** **≥ 1 Criterio**	1. Persistente necesidad de Cpap/HFNC/Ventilación mecánica 2. Inestabilidad hemodinámica con uso drogas vasoactivas 3. Encefalopatía Neonatal/Perinatal Depresión ○ Convulsión ○ Apgar < 5 a los 5 min 4.Necesidad de O2 ≥ 2 h para mantener sat ≥ 90%



• **Presentación Equívoca** Alteración en 1 parámetro por ≥ 4 h ó Alteración en ≥ 2 parámetros por ≥ 2 h	1. FC ≥ 160 2. FR ≥ 60 3. T° ≥ 38°C o < 36,5°C 4. SDR que no requiere O2: quejido, retracción, aleteo nasal
• **Asintomático**	



3. Revisar riesgo resultante ,aplicar conducta y repetir cálculo de riesgo usando calculadora Kayser según riesgo

RIESGO	CONDUCTA
• Riesgo ≥3/1000	• Hospitalizar, hemocultivo y antibióticos •
• **Riesgo** ≥1/1000 y < 3/1000	• Hemocultivo • Sin antibióticos • Monitoreo FC, FR,T°,saturación c/ 4 h por 24 h – 48 h • Repetir cálculo de riesgo con calculadora Kayser a las 6-12-18-24 h o si hay cambios en signos vitales o aparición de signos de enfermedad •
• **Riesgo < 1/1000**	• Monitoreo habitual sala cuna • Repetir cálculo de riesgo con calculadora Kayser si aparece inestabilidad en en signos vitales, SDR o signos de enfermedad

Implementación uso calculadora en Indisa

- En últimos meses se ha utilizado en algunos RN con fiebre al nacer o ingreso a UPC por SDR
- No se ha realizado seguimiento calculando y registrando score cada x horas
- Se sugiere entrenar a todas las matronas y que cálculo de score en seguimiento lo efectúe matrona de sala cuna(como las escalas de dolor)
- Con que frecuencia calcular y registrar riesgo
- Calcular al nacer a todos o sólo los que tienen riesgo o síntomas/alteración signos vitales. En trabajo de Jama se observan RN con sepsis por E Coli sin factores de riesgo y asintomáticos al nacer
- Calcular a todos los RN es una logística poco practicable