IV Antibiotic Audit

June 2014-July2014

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Background

- “Suspected sepsis”
- One of the most common diagnoses made in the NICU
- Early-onset sepsis (EOS) a major cause of neonatal mortality and morbidity, particularly among preterm/very low-birth weight infants
- Low-incidence, high-consequence disease
- Clinical signs may be non-specific/absent in the immediate postnatal period.

Objectives

- To identify whether antibiotic use follows current antibiotic protocol
- To determine if antibiotic exposure has decreased following the implementation of the current antibiotic protocol
- Was maternal antibiotic cover appropriate according to current CWH guidelines
- Differentiate between well infants at risk of sepsis vs symptomatic babies with presumed sepsis

Policy: Early Onset Sepsis

- EOS defined: Infection within the first 72 hours following birth
- Treated with empiric antibiotics until sepsis is excluded
- Group B streptococcus (GBS) – most common cause alongside Escherichia coli.
- Maternal and infant clinical characteristics
- Infant laboratory values are utilised to determine newborns at risk

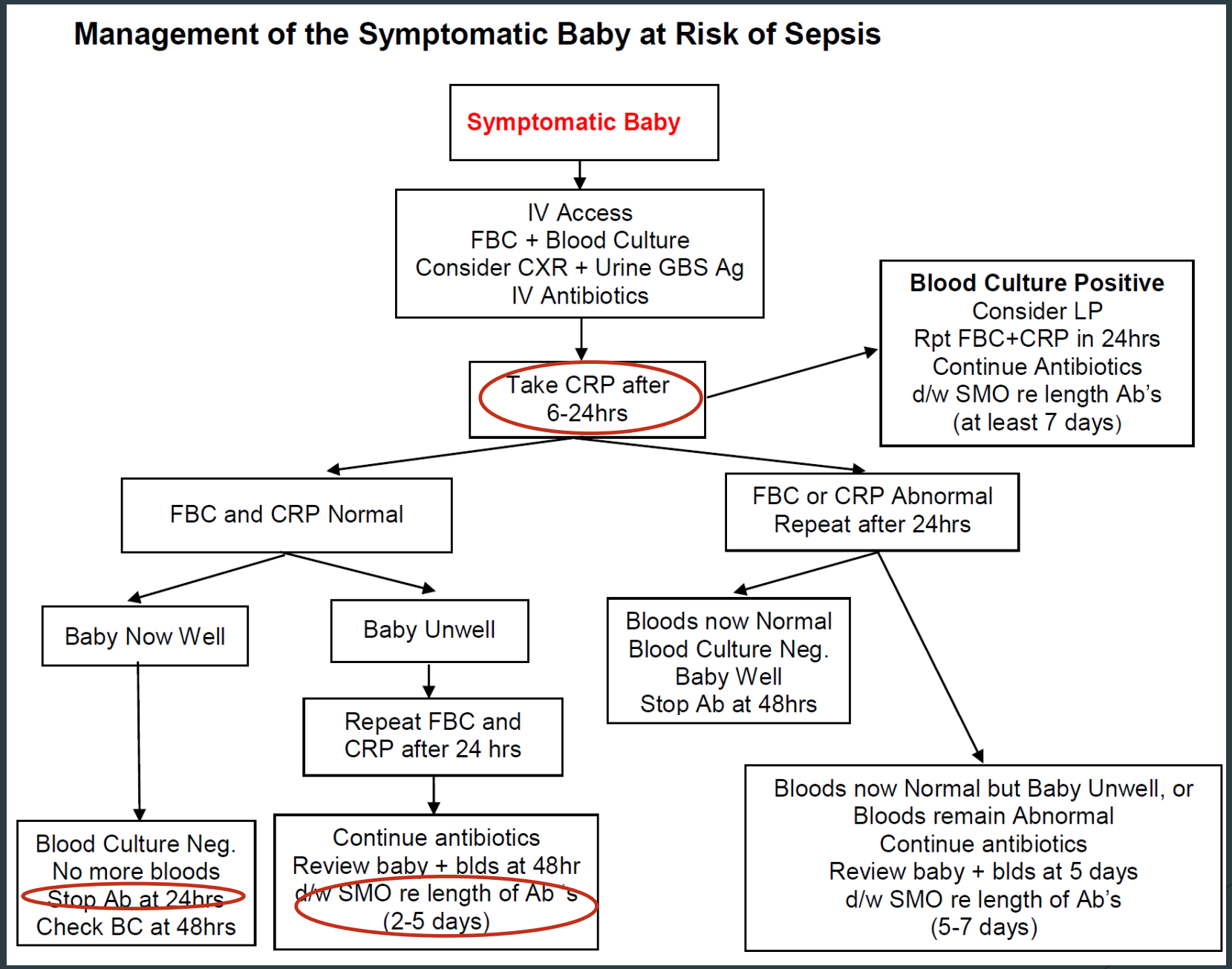
Risk Factors for EOS

- Prolonged rupture of membranes
- Maternal illness - eg. pyrexia >38.0, raised CRP
- Pathogens (e.g. GBS, E. coli) present in maternal urine or high vaginal swab
- Prematurity < 37 weeks
- Fetal distress, tachycardia >160bpm or neonatal depression
- Twin gestation

Criteria for Commencing Antibiotics

- All newborn infants with early respiratory distress
  - No infant should be untreated after 4 hrs of age
- Temperature instability
- Apnoea, especially new onset or increased frequency or severity in a premature infant
- Listlessness, lethargy, pallor, mottling and irritability
- Jaundice if it develops unusually rapidly
- Ileus (abdominal distension or bilious vomiting/nasogastric aspirate)
- Previously healthy baby who refuses to feed

Management of the Symptomatic Baby at Risk of Sepsis



Method

- A retrospective audit of clinical records for all infants admitted to the CWH NICU (established from the NICU database), requiring antibiotic treatment during the first 72hrs of life between June 2014 & July 2014.

Results

Clinical records for 58 babies were reviewed

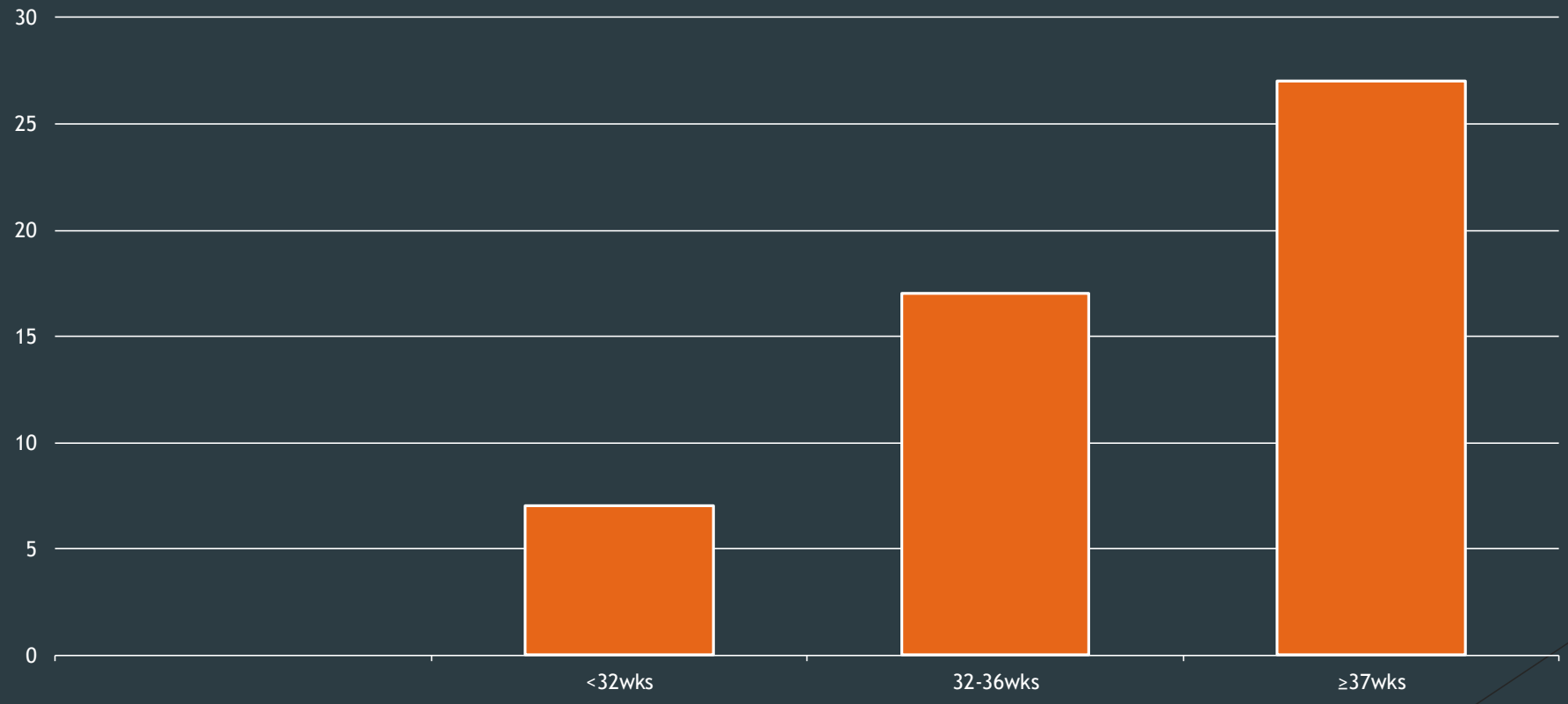
- 7 excluded leaving 51 babies
  - 4 Surgical
  - 1 Day 5 admission excluded
  - 1 Day 10 Rhinovirus from paediatrics excluded
  - 1 Transfer from Dunedin at 2wks of age

- Median birth weight was 2910g (Quartiles 2255-3840g).

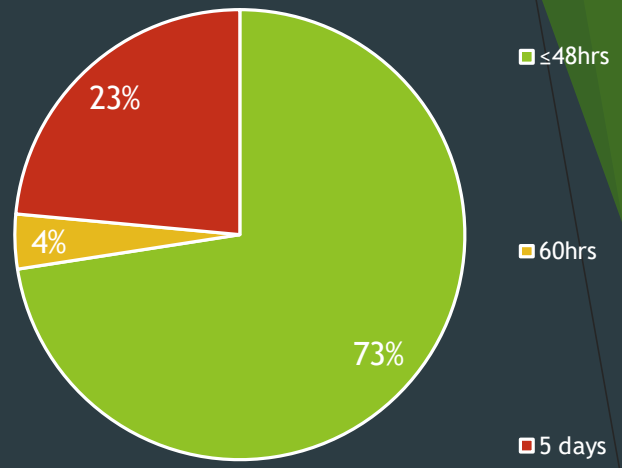
Results

	<32wks	32-36wks	>37wks
Received Antibiotics (51)	7	10	34
Admitted No Antibiotics (30)	1	16	13
Maternal Abs in labour	5	6	15
Confirmed Maternal Chorioamnionitis	2	0	4

Gestational Age of Babies Requiring Antibiotics: Mean Gestational 37wks

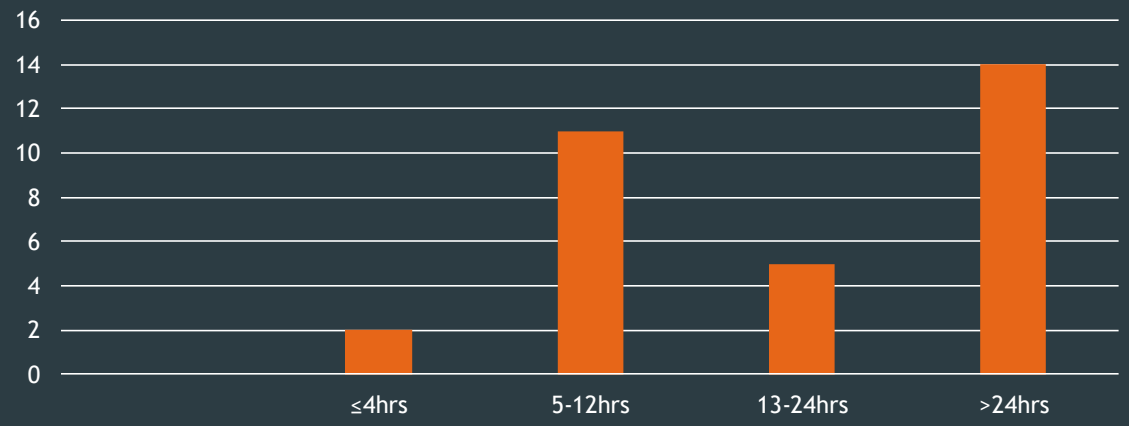


Neonatal Antibiotic Exposure



Duration of Antibiotics	<32wks	32-36wks	≥37wks
24 hrs	5	5	8
36 hrs		4	5
48 hrs	2	6	2 + x2 5doses
3-5 days		2	10

Duration of Respiratory Support
(Ventilation, CPAP, Oxygen)



All <32wk infants required respiratory support

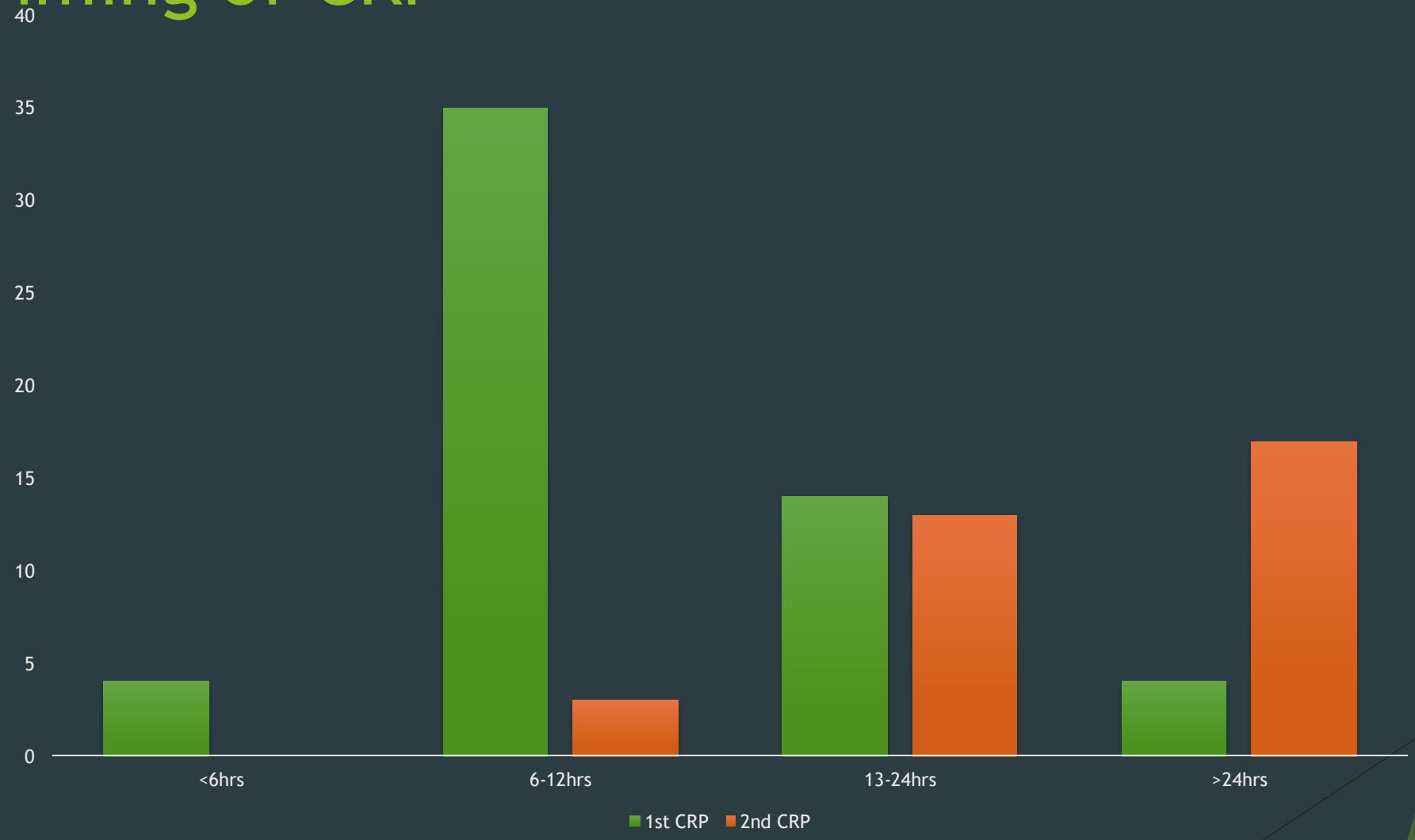
80% <37wk infants

63 % ≥37wk infants

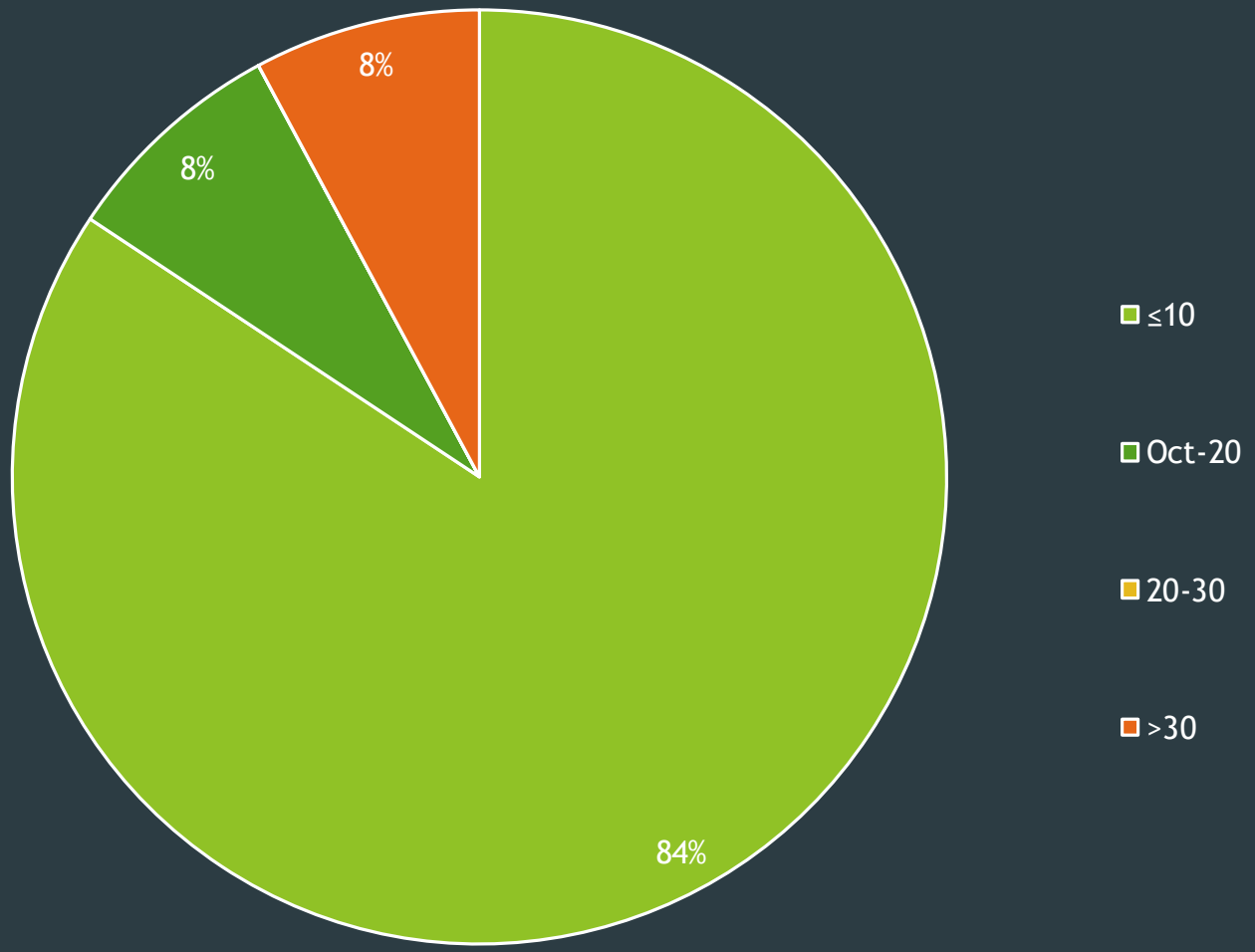
Other Reasons:

Tachypnoea, meconium exposure, thrombocytopenia, dehydration, CXR changes

Timing of CRP



1st CRP Result

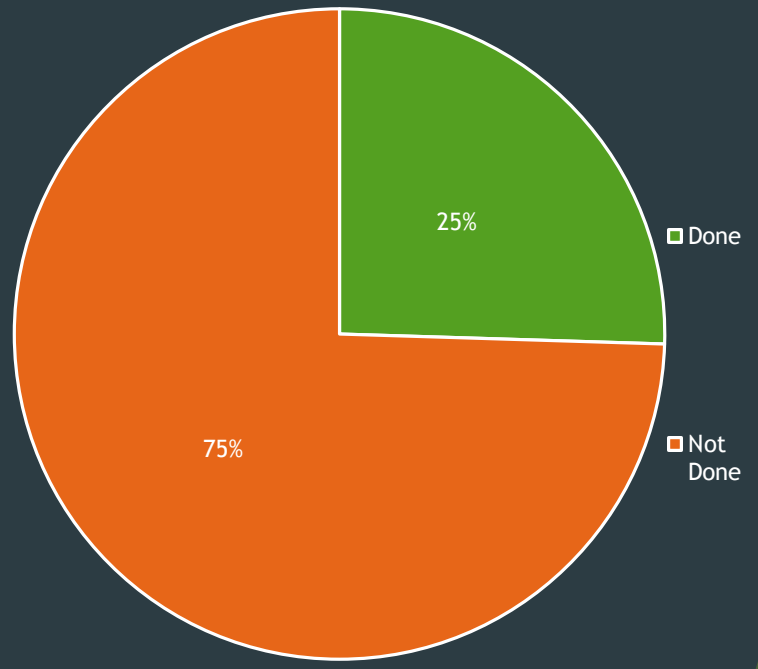


CRP Considerations

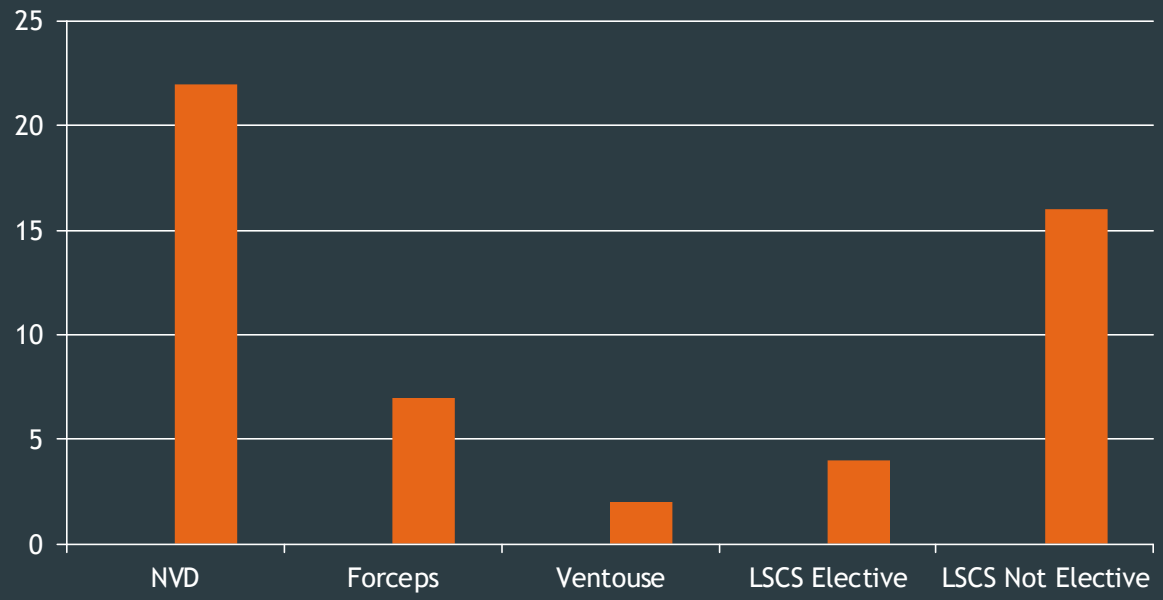
- An acute phase reactant synthesised within 6-8 hours in response to tissue injury
- Non-infectious processes can also elevate the CRP
- Levels peak at 24-48 hours
- A normal CRP at the start of an illness/at birth lacks the sensitivity to rule out sepsis
- If taken at >6hrs the sensitivity improves to >90%
- A level of <10mg/L is considered normal and has a negative predictive value of 99% for EOS

GBS Antigen Protocol

- A urine should be sent for GBS antigen - indicates systemic GBS infection
- If antibiotics are stopped after 24-48hrs and the baby is on the postnatal ward then it can be omitted



Delivery Type



Non Elective LSCS

- X2 Abruption
- X2 Breech
- X1 set twins bulging membranes,
- x1 transverse, thinning scar
- X1 FTP
- X1 Post dates not in labour

Electives LSCS

- X1 GDM on insulin
- X1 severe IUGR 32wks
- X2 39wks

Summary: Clinical Implications

- Early antibiotics for many are correct response
- Overall clinical picture important factor
- Reduced antibiotic exposure without compromising safety
- Appropriate and safe antibiotic treatment
- Decreased unnecessary intervention and antibiotic resistance.
- Joint responsibility for ensuring antibiotic review
- Decrease cost without increased risk to neonates.
- Reduce staff workload.

Future Recommendations

- Capture postnatal babies requiring antibiotics
- Reduce antibiotics exposure further
- Protocol review
- Determine Nationwide practices
- Stop antibiotics in timely manner
- Determine urine GBS antigen requirement
- Utilise evidence from this audit to further review current practice

International Data

- 36hrs minimum cover
- Use of Sepsis Calculators
- Limited research and supporting evidence determining appropriate

  IV antibiotic course duration
- NICE guidelines recommend treating neonates with risk factors but clinically well for 36hrs

Conclusion

- Clinical notes of 58 infants were reviewed of which 51 meet the required criteria
- Essentially antibiotics were given according to the new protocol
- Improvements can be made
- There is an ability to decrease antibiotic exposure while maintaining safety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