PERINATAL QUALITY COLLABORATIVE OF NORTH CAROLINA

Antibiotic Stewardship/Neonatal Sepsis Action Plan

ASNS Action Plan

GLOBAL AIM:
Antibiotic Stewardship Perinatal Quality Improvement Teams (PQITs) will share strategies and lessons learned to develop potentially better practices and employ QI methodologies to establish a standard of care in North Carolina hospitals including: (1) providing the education and support necessary to develop standards of care for identification and management of infants at risk for early onset sepsis; (2) engaging families to further provide education on the necessity and appropriate use of antibiotics.

Specific Goal:
By January 2018, PQITs in NC hospitals will utilized defined best practices for evaluating risk for sepsis to demonstrate a decrease of 20% in the number of patients exposed to antibiotics and a decrease of 20% in duration of antibiotic administration past the first 48 hours of life with negative blood or CSF cultures.

Measures/Goals:

- Define at-risk criteria for neonatal early onset sepsis
- Optimize selection and timing of laboratory tests for identification of early onset sepsis
- Define evidence based practices for selection and duration of antibiotics to treat suspected or confirmed neonatal sepsis
- Decrease by 20% the number of patients exposed to any antibiotic by utilizing best practices for evaluating risk of sepsis
- Decrease by 20% the number of patients treated for sepsis beyond the first 48 hours of life in the absence of positive blood or CSF cultures

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Outcome/Goal	Key Drivers	Interventions
Define evidence based practices for selection and duration of antibiotics to treat suspected or confirmed neonatal sepsis	1. Promote a culture of optimal antibiotic use within the unit.	1.1 Engage a physician champion and core team to enhance the focus of antimicrobial stewardship into the current process of care. 1.2 Bring disciplines together to improve communication and collaboration about improving antibiotic use, including as appropriate: Infection preventionists Neonatologists Microbiologists Pharmacists Nurses Respiratory Therapists Nurse Technicians/Patient Care Associates 1.3 Consider having the multidisciplinary group perform a gap analysis of antimicrobial use at the facility to identify priority areas for improvement.

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Define at-risk criteria for neonatal early onset sepsis	2. Promptly identify patients who require antibiotics.	2.1 Develop standardized diagnostic criteria for identifying patients with signs and symptoms suggesting infection. 2.2 Consider a computerized decision support system to enable physicians to identify which patients require antibiotics.
Optimize selection and timing of laboratory tests for identification of early onset sepsis	3. Obtain cultures prior to starting antibiotics.	3.1 Develop processes to ensure cultures are properly and consistently obtained that include: • Consider protocols empowering nursing staff to obtain cultures if other providers fail to order them when starting antibiotics. • Guidance on appropriate volume of blood required for specimen. • Consider visual cues in locations near antibiotic storage areas reminding staff to ensure cultures have been obtained. • Consider flags or other signal in the EMR to make it apparent if cultures have not yet been obtained and checkboxes indicating that cultures have been obtained.

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Decrease by 20% the number of patients exposed to any antibiotic by utilizing best practices for evaluating risk of sepsis	4. Start treatment promptly.	4.1 Develop standard order sets/pathways for common infections that clearly specify appropriate time from ordering to administration and monitor adherence to these standards. • Consider signage in the chart or room to specify the time by which antibiotics must be given. 4.2 Identify patients experiencing delays in antibiotic ordering and administration and assess and address delay-prone aspects of the system. 4.3 Define a process to expedite decision making when attending physician is not immediately available to order therapy.

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Decrease by 20% the number of patients treated for sepsis beyond the first 48 hours of life in the absence of positive blood or CSF cultures.	5. Specify expected duration of therapy based on evidence and national and hospital guidelines	5.1 Develop evidence based clinical pathways that standardize the duration of treatment. 5.2 Permit physicians to opt out of the standard duration of treatment but require documentation of the rationale. 5.3 Consider a system for automatically discontinuing antibiotics based on national and facility guidelines. 5.4 Consider requiring re-ordering of antibiotics after a specified time period. 5.5 Utilize the EMR with clinical decision support functionality to establish appropriate duration. 5.6 Reassess the need for and prescribed duration of antibiotics daily and at all transitions in care.

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Decrease by 20% the number of patients treated for sepsis beyond the first 48 hours of life in the absence of positive blood or CSF cultures.	6. Make antibiotics patient is receiving and start dates visible at point of care and in EMR, as applicable.	6.1 Definite prominent location in EMR and at bedside for antibiotic therapy to be documented (eg. “this is day X of Y”) – this may require modifications to the MAR. 6.2 Build a check-in on start/stop dates into the process of care. 6.3 Use reminders in the EMR if this information is not complete. 6.4 Make sure start dates, stop dates and duration are also available in the pharmacy EMR and available for review. 6.5 Develop a system to ensure that antibiotic days are counted correctly – does the first day of therapy count as day zero or as day 1? 6.6 When modifying antibiotics, establish system/mechanism to prevent a new start date when first regimen of antibiotic is modified. EMR may require specific programming to do this properly.

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Decrease by 20% the number of patients treated for sepsis beyond the first 48 hours of life in the absence of positive blood or CSF cultures.	7. Give antibiotics at the right dose and interval.	7.1 Imbed dose and interval in guidelines, clinical pathways and order sets. 7.2 Customize the administration based on individual patient, pathogen, toxicity and pharmacokinetic and pharmacodynamics characteristics of the drug. 7.3 Ensure guidelines, pathways and order sets include alerts on when dose adjustments might be indicated. 7.4 Utilize EMR with clinical decision support functionality to establish right dose and interval. 7.5 Establish a mechanism for pharmacy to review cases where dose adjustments might be indicated. Include a reminder system to pharmacy to identify appropriate patients.

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Decrease by 20% the number of patients treated for sepsis beyond the first 48 hours of life in the absence of positive blood or CSF cultures.	8. Stop or de-escalate therapy promptly based on the culture and sensitivity results	8.1 Standardize the notification process by setting a time frame within which culture results must be reported and to whom. 8.2 Leverage the EMR system with clinical decision support functionality to facilitate notification. 8.3 Develop a list of "critical results"/positive cultures to report to the physician via page or automated means. 8.3.1. Ensure the reporting system includes mechanisms to alert responsible clinical staff when the attending physician is unavailable. 8.3.2. Develop and monitor a standard timeframe for reporting and receiving critical results. 8.4 Standardize the process for discontinuing antibiotics: • When positive cultures most likely represent colonization rather than infection. • If cultures are negative or alternative non-infectious agent is identified in the first 48 hours. Permit physicians to opt out of discontinuation of antibiotics but require documentation of the rationale. 8.5 If indication for antibiotics is clearly identified, de-escalate therapy to target the susceptibilities of the pathogen. 8.6 Standardize all hand offs to include review of culture results or pending culture results, antibiotic duration and current plans for discontinuing antibiotics. 8.7 Include de-escalation guidelines in pharmacy training.

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Decrease by 20% the number of patients treated for sepsis beyond the first 48 hours of life in the absence of positive blood or CSF cultures.	9. Reconcile and adjust antibiotics at all transitions and changes in patient's condition	9.1 Utilize every multi-disciplinary round and transition in care to ensure: • Antibiotic matches pathogen and sensitivity • The dose and dose interval are correct given current clinical status • Appropriate toxicity monitoring is occurring • Duration is clearly specified and there is an end date for the therapy • Opportunities for discontinuation or de-escalation in therapy are considered • Whether patient can be converted from IV to oral antibiotics 9.2 Consider an "antibiotic time out" to support reconciling and adjusting antibiotics. 9.3 Pay special attention to antibiotic duplication on conversion day.
Decrease by 20% the number of patients treated for sepsis beyond the first 48 hours of life in the absence of positive blood or CSF cultures.	10. Monitor toxicity reliably and adjust agent and dose promptly.	10.1 Ensure a reliable process to monitor for antibiotic toxicity and promptly adjust agent and dose. • Facility antibiotic guidelines, order sets and pathways should include information on what toxicity monitoring should occur for the recommended antibiotics. 10.2 Select antibiotics that maximize therapeutic impact while minimizing toxicity.

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Defines evidence based best practices for selection and duration of antibiotics to treat suspected or confirmed neonatal sepsis.	11. Monitor feedback and make visible data regarding antibiotic utilization, antibiotic resistance, adverse drug events, cost and adherence to the organization's recommended culturing and prescribing practices	11.1 Develop a process for ongoing monitoring and measurement of: • Antibiotic utilization and resistance patterns • Costs associated with antibiotic use • Process measures for timely and appropriate initiation of antibiotics • Process measures for appropriate administration and de-escalation 11.2 Using these measures, report a "family of measures" for antibiotic stewardship to senior leadership on a monthly basis: • Include measure of cost • Present data in time series chart to show trends • Annotate charts with information on the stewardship program 11.3 Develop a way to communicate local and hospital data on antibiotic susceptibility patterns. • Inform antibiotic formulary selections based on local and hospital susceptibility patterns.

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		11.4 Develop a mechanism for systematically reviewing antibiotic selection and administration influencing physician choice based on behavior science principles, to include: • Prospective audit and feedback of adherence to hospital standards with peer benchmarking • "academic detailing" • education targeted at continuing medical education and maintenance certification requirements • mobilization of local opinion leaders and change agents • one-on-one mentoring of non-adherent physicians about antibiotic use and evidence based care 11.5 Develop a mechanism to provide visible and ongoing feedback: • Prominently post data on adverse drug events, antibiotic utilization, and resistance patterns where all unit staff can see • Provide direct feedback data to prescribers on their antibiotic use including cost: • Provide staff with feedback about antibiotic compliance using posters, email, newsletters, etc. • Consider making data on utilization, resistance and adverse drug events available in public areas to inform and educate patients and families about the importance of antibiotic usage.

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		12.1 Improve antibiotic knowledge of clinical staff, including hospitalists, nurses, physician assistants, nurse practitioners, etc. 12.2 Develop and make available expertise in pharmacology (ie. Pharmacokinetics and pharmacodynamics) and antibiotic spectrum and activity, and ensure that such expertise is available to clinicians at the point of care. 12.3 Consider developing short, targeted educational messages ideally based on local issues, that can be disseminated on a regular basis. 12.4 Develop and disseminate key antibiotic use messages to facility staff using a variety of mechanisms. 12.5 Designate a group to make decisions about the facility antimicrobial formulary (eg. P&T committee, antimicrobial committee). 12.6 Develop formal criteria for use of defined antibiotics as a guide for use by pharmacists on the floor. 12.7 Consider developing criteria for use or requiring prior approval for the use of certain antibiotics, eg. Those that are considered “last line of defense”, highly toxic or very expensive. 12.8 If not already done, consider closing the antimicrobial formulary.

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Defines evidence based best practices for selection and duration of antibiotics to treat suspected or confirmed neonatal sepsis.	13. Ensure expertise is available to clinicians at the point of care.	13.1 In hospitals with extensive clinical pharmacist support, develop protocols for pharmacists to directly intervene at the point of care to improve selection and administration of antibiotics. • Consider antibiotic alerts in clinical decision support systems with guidance on defined antibiotics. 13.2 In hospitals without extensive clinical pharmacist and infectious disease specialist support: • Develop a system to have access to clinical pharmacist and infectious disease experts for consultations in complex situations; • Consider shared or virtual expertise in settings where infectious disease and/or clinical pharmacists are not available in house; • Develop training for staff pharmacists to enhance their ability to support antibiotic therapy at the point of care. 13.3 In academic centers, ensure that infectious disease fellows are fully trained and competent to provide advice at the point of care or virtually, including nights and weekends. 13.4 In facilitates where ID consultation is available, consider developing criteria for situations where ID consultation is strongly recommended. 13.5 Develop a process for real time decision making at the point of care. 13.6 Create a structure for validating competency across disciplines and roles.