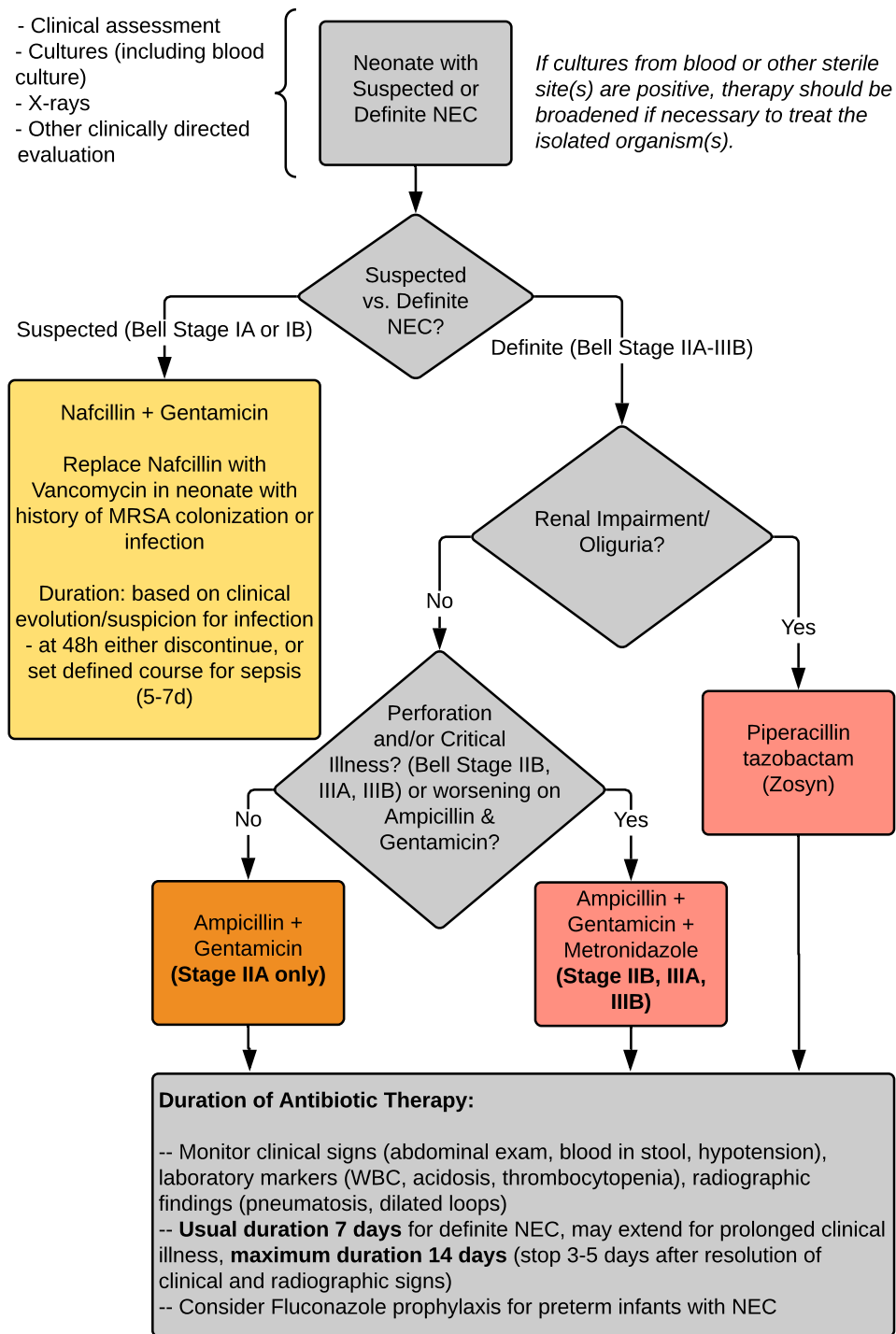# Necrotizing Enterocolitis: Antibiotic Selection and Duration of Therapy
UCSF Benioff Children's Hospital San Francisco ICN

- Clinical assessment
- Cultures (including blood culture)
- X-rays
- Other clinically directed evaluation

Neonate with Suspected or Definite NEC

If cultures from blood or other sterile site(s) are positive, therapy should be broadened if necessary to treat the isolated organism(s).

Suspected vs. Definite NEC?

→ Suspected (Bell Stage IA or IB)

Nafcillin + Gentamicin

Replace Nafcillin with Vancomycin in neonate with history of MRSA colonization or infection

Duration: based on clinical evolution/suspicion for infection - at 48h either discontinue, or set defined course for sepsis (5-7d)

→ Definite (Bell Stage IIA-IIIB)

Renal Impairment/ Oliguria?

No →

Perforation and/or Critical Illness? (Bell Stage IIB, IIIA, IIIB) or worsening on Ampicillin & Gentamicin?

No →

Ampicillin + Gentamicin (Stage IIA only)

Yes →

Ampicillin + Gentamicin + Metronidazole (Stage IIB, IIIA, IIIB)

Yes →

Piperacillin tazobactam (Zosyn)

Duration of Antibiotic Therapy:

-- Monitor clinical signs (abdominal exam, blood in stool, hypotension), laboratory markers (WBC, acidosis, thrombocytopenia), radiographic findings (pneumatosis, dilated loops)
-- **Usual duration 7 days** for definite NEC, may extend for prolonged clinical illness, **maximum duration 14 days** (stop 3-5 days after resolution of clinical and radiographic signs)
-- Consider Fluconazole prophylaxis for preterm infants with NEC

Modified Bell Staging Criteria. Adapted from Neu J. Pediatr Clin North Am 1996; 43:409

Stage	Classification	Systemic Signs	Abdominal Signs	Radiographic Signs
IA	Suspected	Temperature instability, apnea, bradycardia, lethargy	Gastric retention, abdominal distension, emesis, heme-positive stool	Normal or intestinal dilation, mild ileus
IB	Suspected	Same as above	Grossly bloody stool	Same as above
IIA	Definite, Mildly Ill	Same as above	Same as above + absent bowel sounds, +/- abdominal tendernesss	Intestinal dilation, ileus, pneumatosis intestinalis
IIB	Definite, Moderately Ill	Above + mild metabolic acidosis and thrombocytopenia	Same as above + absent bowel sounds, definite tenderness +/- abdominal cellulitis or RLQ mass	Same as IIA, + ascites
IIIA	Advanced, Severely Ill, Intact Bowel	Same as IIB + hypotension, bradycardia, severe apnea, combined respiratory and metabolic acidosis, DIC, neutropenia	Same as above + signs of peritonitis, marked tenderness, and abdominal distension	Same as IIA, + ascites
IIIB	Advanced, Severely Ill, Perforated Bowel	Same as IIIA	Same as IIIA	Same as above + pneumoperitoneum

Spontaneous Intestinal Perforation:

-- This is a distinct entity from necrotizing enterocolitis
-- Antibiotic therapy including anaerobic activity (Ampicillin + Gentamicin + Metronidazole)
-- Duration of therapy 7 days for most, unless clinical illness is prolonged

Duration of Bowel Rest:

-- NPO for duration of antibiotic therapy
-- **Duration of bowel rest may be longer than duration of antibiotic therapy** depending on clinical assessment of patient's readiness to feed, as evaluated by Neonatology and Pediatric Surgery teams

These guidelines reflect consensus of Neonatology, Pediatric Surgery and Antimicrobial Stewardship services based on available evidence. Refer to Neonatal Dosing Guidelines for antibiotic doses. Approved by UCSF Pharmacy and Therapeutics Committee 06/2016, reviewed 05/14/2019, Primary Content Owner: Rachel Wattier (Pediatric Antimicrobial Stewardship Program)