

Supplemental Table 1: Clinical and Demographic Factors					
Variable	N	Overall	No WMI	Any WMI	P-Value
		N=67	N=31	N=36	
Pregnancy-Induced hypertension, n (%)	59	15 (25.4%)	10 (38.5%)	5 (15.2%)	0.04
Chronic hypertension, n (%)	52	9 (17.3%)	3 (13.6%)	6 (20.0%)	0.72
Chorioamnionitis, n (%)	58	8 (13.8%)	3 (12.0%)	5 (15.2%)	0.99
Antenatal Steroids, n (%)	57	45 (78.9%)	20 (83.3%)	25 (75.8%)	0.49
Gestational age (weeks)	59	26 (24.3, 27.5)	26.6 (25.2, 28.4)	25.0 (23.6, 26.4)	0.03
Birth Weight (grams)	59	740 (650, 990)	849.5 (650, 1010)	730.0 (650.0, 911.0)	0.49
Small for Gestational Age, n (%)	59	20 (33.9%)	12 (46.2%)	8 (24.2%)	0.08
Gender (Male), n (%)	59	20 (33.9%)	9 (34.6%)	11 (33.3%)	0.92
Ethnicity, n (%)	59				0.07
Caucasian		11 (18.6%)	2 (7.7%)	9 (27.3%)	
African American		44 (74.6%)	21 (80.8%)	23 (69.7%)	
Latino		2 (3.4%)	1 (3.8%)	1 (3.0%)	
Other		2 (3.4%)	2 (7.7%)	0 (0.00%)	
Mode of Delivery, n (%)					0.60
C-section		41 (69.5%)	19 (73.1%)	22 (66.7%)	
Vaginal	59	18 (30.5%)	7 (26.9%)	11 (33.3%)	
Apgar Score <6 at 5 Minutes, n (%)	59	19 (32.2%)	6 (23.1%)	13 (39.4%)	0.18
Out born, n (%)	59	34 (57.6%)	13 (50.0%)	21 (63.6%)	0.29
Patent Ductus Arteriosus, n (%)	59	38 (64.4%)	16 (61.5%)	22 (66.7%)	0.68
Patent Ductus Arteriosus, Indomethacin Treated, n (%)	59	9 (15.3%)	4 (15.4%)	5 (15.2%)	0.99
Patent Ductus Arteriosus, Surgically Ligated, n (%)	59	5 (8.5%)	2 (7.7%)	3 (9.1%)	0.99
Central Line Present (days)	58	49.5 (30, 93)	66.5 (32, 93)	46.0 (29.5, 81.5)	0.32
Positive Blood Culture Sepsis, n (%)	59	19 (32.2%)	9 (34.6%)	10 (30.3%)	0.73
CRP on Day of NEC Onset	51	3.2 (1.2, 8.2)	4 (1.4, 7.4)	3.1 (1.1, 13.8)	0.75

CRP at 24 Hours after NEC Onset	46	7.8 (3, 19)	7.7 (2.2, 13.6)	9 (3.2, 19)	0.41
CRP at 48 Hours after NEC Onset	37	9 (2.4, 21.9)	6.7 (1.3, 19.8)	15.4 (3.3, 22.0)	0.17
CRP at 96 Hours after NEC Onset					
CRP at 1 Week after NEC Onset	42	6.4 (4.2, 15.1)	6 (4.4, 15.1)	6.5 (3.7, 12.15)	0.78
CRP at 2 Week after NEC Onset	41	5.2 (2.5, 7.5)	6.8 (3.5, 7.6)	3.8 (1.3, 7.3)	0.34
Cholestasis at NEC Onset, n (%)	43	2.6 (1.4, 5.3)	2.4 (1.4, 5.5)	3 (1.7, 5.2)	0.84
AKI by Serum Creatinine	59	38 (64.4%)	15 (57.7%)	23 (69.7%)	0.34
No AKI	59				0.001
Stage 1		27 (45.8%)	18 (69.2%)	9 (27.3%)	
Stage 2		12 (20.3%)	6 (23.1%)	6 (18.2%)	
Stage 3		9 (15.3%)	1 (3.8%)	8 (24.2%)	
AKI by Urine Output		11 (18.6%)	1 (3.8%)	10 (30.3%)	
No AKI	59				0.02
Stage 1		34 (57.6%)	14 (53.8%)	20 (60.6%)	
Stage 2		2 (3.4%)	1 (3.8%)	1 (3.0%)	
Stage 3		17 (28.8%)	11 (42.3%)	6 (18.2%)	
Severe AKI		6 (10.2%)	0 (0.00%)	6 (18.2%)	
Severe AKI	67	42 (62.7%)	18 (58.1%)	24 (66.7%)	0.47

Supplemental Table 2: NEC features					
Variable	N	Overall	No WMI	Any WMI	P-Value
		N=67	N=31	N=36	
Clinical presentation, n (%)					0.79
Abdominal Distension	59	54 (91.5%)	23 (88.5%)	31 (93.9%)	
Bloody Stools		3 (5.1%)	2 (7.7%)	1 (3.0%)	
Feeding Intolerance		2 (3.4%)	1 (3.8%)	1 (3.0%)	
Pneumatosis	59	22 (37.3%)	7 (26.9%)	15 (45.5%)	0.14
Pneumoperitoneum	59	35 (59.3%)	13 (50.0%)	22 (66.7%)	0.20
Portal Venous Gas	59	2 (3.4%)	1 (3.8%)	1 (3.0%)	0.99
Age of NEC Onset (days), median (IQR)	25	8 (6, 23)	10.0 (6.5, 25.0)	7 (5, 8)	0.46
Fulminant NEC, n (%)	59	4 (6.8%)	2 (7.7%)	2 (6.1%)	0.99
Present of Penrose Drain, n (%)	57	25 (43.9%)	10 (40.0%)	15 (46.9%)	0.60
Surgery < 48 Hours, n (%)	59	40 (67.8%)	17 (65.4%)	23 (69.7%)	0.73
Length of Bowel Resected (cm), median (IQR)	59	12.7 (3.7, 28.8)	9.3 (3.7, 24.9)	14.4 (8, 29.6)	0.40
Region of Bowel Resected, n (%)	54				0.13
Small Bowel Resected		35 (64.8%)	17 (70.8%)	18 (60.0%)	
Large bowel resected		2 (3.7%)	2 (8.3%)	0 (0.00%)	
Combined large and Small Bowel Resected		17 (31.5%)	5 (20.8%)	12 (40.0%)	
Presence of Ileocecal Valve, n (%)	58	45 (77.6%)	24 (92.3%)	21 (65.6%)	0.015
Surgical Morbidity (Infection, Adhesions, Strictures, Dehiscence), n (%)	67	23 (34.3%)	11 (35.5%)	12 (33.3%)	0.85
Single Surgical Morbidity (Infection, Adhesions, Strictures, Dehiscence), n (%)	67	15 (22.4%)	7 (22.6%)	8 (22.2%)	0.97
More than One Surgical Morbidity (Infection, Adhesions, Strictures, Dehiscence), n (%)	67	7 (10.4%)	3 (9.7%)	4 (11.1%)	0.99
Adhesions, n (%)	67	9 (13.4%)	5 (16.1%)	4 (11.1%)	0.72
Wound Dehiscence, n (%)	67	8 (11.9%)	2 (6.5%)	6 (16.7%)	0.27

Wound Infection, n (%)	67	3 (4.5%)	1 (3.2%)	2 (5.6%)	0.99
Stricture, n (%)	67	5 (7.5%)	4 (12.9%)	1 (2.8%)	0.17
Fistula, n (%)	67	3 (4.5%)	1 (3.2%)	2 (5.6%)	0.99
Compartment Syndrome, n (%)	67	1 (1.5%)	1 (3.2%)	0 (0.00%)	0.46
Short Bowel Syndrome, n (%)	50	29 (58.0%)	10 (47.6%)	19 (65.5%)	0.21

Supplemental Table 3: Analgesics/Sedatives/steroids before, during and after NEC Onset					
Variable	N	Overall	No WMI	Any WMI	P-Value
		N=67	N=31	N=36	
From Birth Until NEC onset					
Morphine mg/kg, mean (\pm SD)	61	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.99
Fentanyl mg/kg, mean (\pm SD)	67	0.0 (0.1)	0.0 (0.1)	0.0 (0.0)	0.99
Fentanyl (mcg /kg) median (IQR)		0 (0, 0.6)	0 (0, 0.5)	0 (0, 0.6)	0.99
Midazolam, mg/kg, mean (\pm SD)	67	0.0 (0.1)	0.0 (0.1)	0.0 (0.0)	0.99
Methadone, mg/kg, mean (\pm SD)	67	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.99
Dexamethasone, mg/kg, mean (\pm SD)	63	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.99
Hydrocortisone, mg/kg, mean (\pm SD)	67	1.1 (5.1)	0.3 (1.4)	1.8 (6.8)	0.99
From NEC onset +2 weeks					
Morphine mg/kg, mean (\pm SD)	67	0.0 (0.1)	0.0 (0.1)	0.0 (0.1)	0.69
Fentanyl mg/kg, mean (\pm SD)	67	0.3 (0.3)	0.3 (0.3)	0.4 (0.4)	0.11
Fentanyl (mcg /kg) median (IQR)		237.2 (85.5, 574.8)	236.4 (64.8, 698.8)	238 (133.4, 560.2)	0.76
Midazolam, mg/kg, mean (\pm SD)	67	0.2 (1.0)	0.3 (1.4)	0.1 (0.2)	0.99
Methadone, mg/kg, mean (\pm SD)	67	0.0 (0.0)	0.0 (0.1)	0.0 (0.0)	0.99
Dexamethasone, mg/kg, mean (\pm SD)	67	0.0 (0.1)	0.0 (0.0)	0.0 (0.2)	0.99
Hydrocortisone, mg/kg, mean (\pm SD)	67	7.9 (11.2)	4.5 (8.0)	10.9 (12.8)	0.09
From end of 2 weeks to MRI					
Morphine mg/kg, mean (\pm SD)	67	2.0 (12.0)	0.9 (4.6)	3.0 (15.8)	0.80
Fentanyl mg/kg, mean (\pm SD)	67	381.8 (1051.4)	217.2 (645.1)	523.5 (1297.4)	0.29
Fentanyl (mcg /kg) median (IQR)		162.5 (41.3, 592)	120.7 (30, 346.57)	168.9 (51.2, 699.7)	0.90
Midazolam, mg/kg, mean (\pm SD)	67	2.1 (11.2)	1.0 (3.3)	3.0 (15.1)	0.99
Methadone, mg/kg, mean (\pm SD)	67	2.0 (10.3)	1.0 (5.4)	2.9 (13.2)	0.99
Dexamethasone, mg/kg, mean (\pm SD)	67	0.5 (1.7)	0.4 (1.7)	0.5 (1.7)	0.88
Hydrocortisone, mg/kg, mean (\pm SD)	67	7.8 (22.6)	2.8 (7.8)	12.2 (29.4)	0.28
Corrected Gestational Age At MRI	59	41.1	40.9	41.1	0.46

Supplemental Table 4: Peri-operative Hemodynamic information

	N	Overall	No -WMI	Any WMI	P-Value
		N=67	N=31	N=36	
Number of surgical procedures receiving sedative/analgesics	66	4 (2, 7)	3 (2, 4)	5 (3, 8)	0.002
Primary Surgery					
Duration of Primary Surgery in minutes, median (IQR)	60	97 (78, 123)	102 (82.5, 121.0)	94.5 (72.5, 125)	0.92
Duration of Hypotension in hours, median (IQR)	59	36 (11, 48)	15.5 (6, 48)	48 (26.0, 48.0)	0.009
Duration of Dopamine in hours, median (IQR)	56	46 (0, 48)	0 (0, 48)	48 (26.0, 48.0)	0.07
Duration of Hydrocortisone in days, median (IQR)	56	0 (0, 10)	0 (0, 9)	5 (0, 10)	0.84
Total Number of Fluid Boluses median (IQR)	61	2 (0, 3)	1 (0, 3)	2 (0, 3)	0.80
Secondary Surgery					
Duration of Secondary Surgery in minutes, median (IQR)	61	103 (77, 145)	105 (88.0, 146.0)	100 (74.0, 135.0)	0.45
Duration of Hypotension in hours, median (IQR)	58	9 (0, 48)	0(0, 22)	20 (0, 48. 0)	0.017
Duration of Dopamine in hours, median (IQR)	58	0 (0, 43)	0 (0, 0)	0 (0, 48)	0.04
Duration of Hydrocortisone in days, median (IQR)	57	0 (0, 3)	0 (0, 0)	0 (0, 5)	0.09
Total Number of Fluid Boluses median (IQR)	60	1 (0, 2)	0 (0, 1.5)	1 (0, 2)	0.34

Supplemental Table 5: Primary Surgery Variables					
	N	Overall	No WMI	Any WMI	P-Value
		N=67	N=31	N=36	
Spontaneous Intestinal Perforation	62	19 (30.6%)	9 (32.1%)	10 (29.4%)	0.82
Primary Surgery Indication Penrose Drain	65	37 (56.9%)	19 (63.3%)	18 (51.4%)	0.33
Primary Intervention Penrose	67	56 (83.6%)	27 (87.1%)	29 (80.6%)	0.47
Primary Intervention Laparotomy		11 (16.4%)	4 (12.9%)	7 (19.4%)	
Type of Anesthetic Agent Used	67				
Isoflurane/Sevoflurane/Desflurane		5 (7.5%)	1 (3.2%)	4 (11.1%)	0.36
Fentanyl		54 (80.6%)	24 (77.4%)	30 (83.3%)	0.54
Propofol		11 (16.4%)	7 (22.6%)	4 (11.1%)	0.21
Paralytic used During Surgery	60	51 (85.0%)	23 (82.1%)	28 (87.5%)	0.72
Type of Paralytic Used	51				
Rocuronium		49 (96.1%)	22 (95.7%)	27 (96.4%)	0.99
Other		2 (3.9%)	1 (4.3%)	1 (3.6%)	
Hemodynamics	60				
Normothermia		39 (65.0%)	21 (75.0%)	18 (56.3%)	0.13
Hypotension		21 (35.0%)	7 (25.0%)	14 (43.8%)	
Fluids Used	67				
Normal Saline		14 (20.9%)	8 (25.8%)	6 (16.7%)	0.36
Albumin		41 (61.2%)	18 (58.1%)	23 (63.9%)	0.63
Blood		22 (32.8%)	11 (35.5%)	11 (30.6%)	0.67
Platelets		10 (14.9%)	4 (12.9%)	6 (16.7%)	0.74
Other		25 (37.3%)	14 (45.2%)	11 (30.6%)	0.22
Number of Fluid Boluses Administered	61	6 (9.8%)	2 (7.1%)	4 (12.1%)	0.68
Use of Inotropes	61	18 (29.5%)	5 (17.9%)	13 (39.4%)	0.07
Type of Inotrope Used	67				
Dopamine		11 (16.4%)	2 (6.5%)	9 (25.0%)	0.04
Temperature Before Surgery	60				
Hypothermia		5 (8.3%)	2 (7.7%)	3 (8.8%)	0.99
Normothermia		55 (91.7%)	24 (92.3%)	31 (91.2%)	
Temperature After Surgery	61				
Hypothermia		8 (13.1%)	3 (11.1%)	5 (14.7%)	0.99
Normothermia		53 (86.9%)	24 (88.9%)	29 (85.3%)	

Hydrocortisone Administration	62	36 (58.1%)	19 (70.4%)	17 (48.6%)	0.09
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Supplemental Table 6: Secondary surgery variables					
	N	Overall	No WMI	Any WMI	P-Value
		N=67	N=31	N=36	
Indication for Secondary Surgery					
Retinopathy Surgery	65	2 (3.1%)	0 (0.00%)	2 (5.7%)	0.03
Inguinal Surgery		25 (38.5%)	16 (53.3%)	9 (25.7%)	
Abdominal Surgery		38 (58.5%)	14 (46.7%)	24 (68.6%)	
Indication for Secondary Abdominal Surgery					
Re anastomosis	67	17 (25.4%)	7 (22.6%)	10 (27.8%)	0.62
Management Complication		7 (10.4%)	1 (3.2%)	6 (16.7%)	0.11
Type of Anesthetic Agent Used					
Isoflurane/Sevoflurane/Desflurane	67				0.47
Fentanyl		56 *83.6%	27 (87.1%)	29 (80.6%)	
Paralytic used During Surgery	60	57 (95.0%)	27 (100.0%)	30 (90.9%)	0.24
Type of Paralytic Used					
Rocuronium	57	57 (100.0%)	27 (100.0%)	30 (100.0%)	-
Hemodynamics					
Normothermia	60	47 (78.3%)	23 (85.2%)	24 (72.7%)	0.24
Hypotension		13 (21.7%)	4 (14.8%)	9 (27.3%)	
Fluid Bolus Administered	60	6 (10.0%)	3 (11.1%)	3 (9.1%)	0.99
Fluids Used					
Normal Saline	67	14 (20.9%)	8 (25.8%)	6 (16.7%)	0.35
Albumin		38 (56.7%)	20 (64.5%)	18 (50.0%)	0.23
Blood		8 (11.9%)	5 (16.1%)	3 (8.3%)	0.45
Other		39 (58.2%)	18 (58.1%)	21 (58.3%)	0.98
Inotropes used	60	13 (21.7%)	3 (11.1%)	10 (30.3%)	0.07
Types of Inotropes used					
Dopamine	67	15 (22.4%)	3 (9.7%)	12 (33.3%)	0.02
Hydrocortisone Administration	64	16 (25.0%)	4 (13.3%)	12 (35.3%)	0.04
Temperature Before Surgery					
Hypothermia	64	3 (4.7%)	1 (3.3%)	2 (5.9%)	0.99
Normothermia		61 (95.3%)	29 (96.7%)	32 (94.1%)	
Temperature during Secondary Surgery					
Hypothermia	60	16 (26.7%)	9 (33.3%)	7 (21.2%)	0.29

Normothermia		44 (73.3%)	18 (66.7%)	26 (78.8%)	
Temperature After Surgery	64				
Hypothermia		6 (9.4%)	3 (10.0%)	3 (8.8%)	0.99
Normothermia		58 (90.6%)	27 (90.0%)	31 (91.2%)	

Supplemental Table 7: Postoperative and Clinical features					
Variable	N	Overall	No WMI	Any WMI	P-Value
		N=67	N=31	N=36	
Postoperative Ileus Days (days), median (IQR)	56	13 (9.5, 17)	11.0 (9.0, 14.0)	14.0 (11.0, 20.0)	0.23
Postoperative Day at Starting Enteral Feedings (days), median (IQR)	55	14 (10, 18)	12.0 (10.0, 15.0)	15.5 (13, 21)	0.10
Day of Attainment of Full Enteral Feedings (120 mL/kg), median (IQR)	51	69 (30, 89)	57.0 (27.0, 76.0)	78.0 (34.0, 109.0)	0.034
Duration of Parenteral Nutrition (days), median (IQR)	59	108 (69, 147)	87.0 (57.0, 118.0)	121.0 (81.0, 159.0)	0.035
Breast Milk, n (%)	59	12 (20.3%)	5 (19.2%)	7 (21.2%)	0.85
Donor Milk, n (%)	59	13 (22.0%)	6 (23.1%)	7 (21.2%)	0.86
Formula Feeds, n (%)	59	36 (61.0%)	15 (57.7%)	21 (63.6%)	0.64
Breast Milk and Formula Feeds, n (%)	59	14 (23.7%)	5 (19.2%)	9 (27.3%)	0.47
Assisted Ventilation (intubated), n (%)	57				0.37
Intubated		50 (87.7%)	21 (84.0%)	29 (90.6%)	
High Flow Nasal Cannula		5 (8.8%)	2 (8.0%)	3 (9.4%)	
Room Air		2 (3.5%)	2 (8.0%)	0 (0.00%)	
24h Presser Support, n (%)	59	44 (74.6%)	15 (57.7%)	29 (87.9%)	0.008
Postnatal Use of Steroids, n (%)	59	36 (61.0%)	13 (50.0%)	23 (69.7%)	0.12
Length of Stay (days), median (IQR)	59	161 (108, 184)	113.0 (85.0, 171.0)	175.0 (136.0, 200.0)	0.005
Death, n (%)	59	53 (89.8%)	24 (92.3%)	29 (87.9%)	0.68