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Participating NRN sites collected data and transmitted it to RTI International, the data coordinating center (DCC) for the network, which stored, managed and analyzed the data for this study. On behalf of the NRN, RTI International had full access to all of the data in the study, and with the NRN Center Principal Investigators, takes responsibility for the integrity of the data and accuracy of the data analysis.

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Supplemental Table 1. Participating sites and associated IRB numbers

Site	IRB Number
Case Western Reserve University	09-00-59
University of Texas at Dallas	102010-163
Wayne State University	Protocol #: 0506002145
C.S. Mott Children's Hospital	HUM00041442
Emory University	IRB00045877
Grady Memorial Hospital	IRB000-45877(105-91)
Egleston Children's Hospital	000-45877(105-91)
Children's Hospital Medical Center	2012-4016
Good Samaritan Hospital	11078-11-049
Indiana University	1011003360
Brown University	WIH 00-0074
Stanford University	12282
El Camino Hospital	ECH-05-08
University of Alabama Hospital	X000330023
University of Texas at Houston	
Duke Hospital	Pro00016405
UNC-Chapel Hill	08-1176
Wake Med	00016405
ECU	19-000094
University of Iowa	200602748
Mercy Medical Center	MMC2009-54
Sanford Health	CR00001687
University of Utah Medical Center	IRB_00017524
Intermountain	1000349
University of NM	HRRC#: 06-075
Virtua Hospital	G17019
University of Pennsylvania	813326
Children's Hospital of Philadelphia	IRB-11-008082
Rochester	00000288
University of Buffalo	00004097
UCLA	11-000930
Olive View UCLA Medical Center	232301
Nationwide Children's Hospital	IRB13-00089
Children's Mercy Hospital	11120559
Yale University	304025158
Tufts University	7680

Supplemental Table 2. Respiratory support and mean maximum fraction of inspired oxygen for each outcome by postnatal day

Day	Respiratory support	No BPD	Grade 1 BPD	Grade 2 BPD	Grade 3 BPD	Death prior to 36 weeks
		N=3257	N=2795	N=1526	N=551	N=1052
1	HFV, %	4%	12%	20%	19%	28%
	CV, %	38%	52%	58%	64%	56%
	Nasal ventilation or CPAP, %	50%	33%	21%	16%	15%
	Nasal cannula or hood, %	4%	2%	1%	1%	1%
	No support, %	4%	0%	0%	0%	1%
	Mean FIO ₂ , %	0.28 ± 0.13	0.33 ± 0.17	0.35 ± 0.18	0.38 ± 0.21	0.44 ± 0.26
3	HFV, %	5%	17%	32%	33%	44%
	CV, %	25%	40%	42%	49%	40%
	Nasal ventilation or CPAP, %	59%	39%	25%	17%	15%
	Nasal cannula or hood, %	7%	3%	1%	1%	1%
	No support, %	5%	0%	0%	0%	0%
	Mean FIO ₂ , %	0.30 ± 0.14	0.37 ± 0.18	0.41 ± 0.20	0.43 ± 0.21	0.55 ± 0.29
7	HFV, %	3%	15%	31%	35%	40%
	CV, %	13%	33%	40%	45%	39%
	Nasal ventilation or CPAP, %	53%	43%	26%	17%	17%
	Nasal cannula or hood, %	18%	8%	3%	3%	2%
	No support, %	14%	1%	1%	0%	1%
	Mean FIO ₂ , %	0.26 ± 0.10	0.33 ± 0.15	0.39 ± 0.19	0.44 ± 0.23	0.50 ± 0.27
14	HFV, %	2%	13%	31%	37%	39%
	CV, %	9%	31%	39%	47%	37%
	Nasal ventilation or CPAP, %	46%	43%	26%	13%	21%
	Nasal cannula or hood, %	27%	11%	3%	3%	3%
	No support, %	16%	1%	0%	0%	1%
	Mean FIO ₂ , %	0.28 ± 0.12	0.38 ± 0.18	0.46 ± 0.21	0.53 ± 0.25	0.54 ± 0.27
28	HFV, %	1%	6%	23%	28%	41%
	CV, %	5%	26%	40%	56%	37%
	Nasal ventilation or CPAP, %	33%	47%	32%	12%	17%
	Nasal cannula or hood, %	36%	19%	5%	4%	3%
	No support, %	26%	1%	0%	0%	2%
	Mean FIO ₂ , %	0.26 ± 0.11	0.36 ± 0.16	0.44 ± 0.19	0.52 ± 0.23	0.58 ± 0.29

Definition of abbreviations: BPD = bronchopulmonary dysplasia; CV = conventional mechanical ventilation; CPAP = continuous positive airway pressure; FIO₂ = fraction of inspired oxygen; HFV = high-frequency mechanical ventilation

Supplemental Table 3. Multinomial regression model for Grade of BPD or death: postnatal day 1

	Grade of BPD or Death	Odds ratios (95% CI)	p-value	
Birth weight (per 100g increase)	Grade 1	0.80 (0.77-0.83)	<0.0001	
	Grade 2	0.65 (0.62-0.69)	<0.0001	
	Grade 3	0.64 (0.59-0.69)	<0.0001	
	Death	0.60 (0.56-0.64)	<0.0001	
Respiratory support at 24 hours (reference: room air):	HFV	Grade 1	20.9 (10.2-42.8)	<0.0001
		Grade 2	34.0 (12.1-95.7)	<0.0001
		Grade 3	28.2 (3.81-208.1)	0.001
		Death	7.34 (2.80-19.2)	<0.0001
	CV	Grade 1	9.31 (4.68-18.5)	<0.0001
		Grade 2	10.1 (3.66-27.7)	<0.0001
		Grade 3	11.2 (1.54-81.0)	0.02
		Death	2.03 (0.80-5.18)	0.14
	NIPPV	Grade 1	5.22 (2.57-10.6)	<0.0001
		Grade 2	3.96 (1.39-11.3)	0.01
		Grade 3	2.63 (0.34-20.4)	0.36
		Death	0.96 (0.36-2.61)	0.94
	CPAP	Grade 1	7.20 (3.63-14.3)	<0.0001
		Grade 2	5.00 (1.81-13.8)	0.002
		Grade 3	5.30 (0.73-38.7)	0.10
		Death	1.22 (0.47-3.13)	0.69
	NC	Grade 1	9.88 (4.54-21.5)	<0.0001
		Grade 2	3.49 (0.97-12.5)	0.06
		Grade 3	7.55 (0.82-69.6)	0.07
		Death	1.91 (0.52-7.11)	0.33
Hood	Grade 1	1.69 (0.60-4.74)	0.32	
	Grade 2	0.38 (0.04-3.52)	0.39	
	Grade 3	2.27 (0.20-26.4)	0.51	
	Death	0.34 (0.06-1.96)	0.23	
Gestational age (per 1 week increase)	Grade 1	0.81 (0.77-0.85)	<0.0001	
	Grade 2	0.83 (0.78-0.88)	<0.0001	
	Grade 3	0.74 (0.68-0.80)	<0.0001	
	Death	0.64 (0.59-0.69)	<0.0001	
FIO2 at 24 hours (per increase by 20%)	Grade 1	1.23 (1.14-1.33)	<0.0001	
	Grade 2	1.25 (1.14-1.36)	<0.0001	
	Grade 3	1.51 (1.36-1.68)	<0.0001	
	Death	1.72 (1.57-1.88)	<0.0001	
Male (reference: female)	Grade 1	1.41 (1.26-1.58)	<0.0001	
	Grade 2	2.10 (1.83-2.42)	<0.0001	
	Grade 3	2.01 (1.65-2.45)	<0.0001	
	Death	2.11 (1.78-2.50)	<0.0001	
Antenatal steroids (reference: no antenatal steroids)	Grade 1	1.04 (0.86-1.27)	0.68	
	Grade 2	1.01 (0.79-1.27)	0.96	
	Grade 3	1.63 (1.12-2.39)	0.01	
	Death	0.78 (0.60-1.01)	0.06	

HFV=high-frequency ventilation; CV=conventional mechanical ventilation; NIPPV=non-invasive positive pressure ventilation; CPAP=continuous positive airway pressure; FIO₂=fraction of inspired oxygen; BPD=bronchopulmonary dysplasia

Supplemental Table 4. Multinomial regression model for Grade of BPD or death: postnatal day 3

	Grade of BPD or Death	Odds ratios (95% CI)	p-value	
Respiratory support at Day 3 (reference: room air):	HFV	Grade 1	17.5 (9.10-33.6)	
		Grade 2	*	
		Grade 3	*	
		Death	6.81 (2.06-22.4)	0.002
	CV	Grade 1	9.45 (5.05-17.7)	<0.0001
		Grade 2	46.0 (6.39-331.8)	0.0001
		Grade 3	*	
		Death	2.39 (0.74-7.74)	0.15
	NIPPV	Grade 1	5.91 (3.13-11.2)	<0.0001
		Grade 2	19.4 (2.67-141.2)	0.003
		Grade 3	*	
		Death	0.94 (0.28-3.18)	0.92
	CPAP	Grade 1	6.21 (3.34-11.6)	<0.0001
		Grade 2	21.4 (2.97-153.9)	0.002
		Grade 3	*	
		Death	1.41 (0.43-4.58)	0.57
NC	Grade 1	6.85 (3.50-13.4)	<0.0001	
	Grade 2	8.74 (1.10-69.5)	0.04	
	Grade 3	*		
	Death	1.35 (0.33-5.62)	0.68	
Hood	Grade 1	1.68 (0.64-4.46)	0.30	
	Grade 2	4.11 (0.36-46.7)	0.25	
	Grade 3	*		
	Death	2.09 (0.46-9.42)	0.34	
Birth weight (per 100g increase)	Grade 1	0.82 (0.79-0.86)	<0.0001	
	Grade 2	0.69 (0.66-0.73)	<0.0001	
	Grade 3	0.68 (0.63-0.74)	<0.0001	
	Death	0.65 (0.61-0.70)	<0.0001	
FIO2 at Day 3 (per increase by 20%)	Grade 1	1.28 (1.18-1.39)	<0.0001	
	Grade 2	1.27 (1.16-1.39)	<0.0001	
	Grade 3	1.41 (1.26-1.57)	<0.0001	
	Death	2.07 (1.88-2.28)	<0.0001	
Gestational age (per 1 week increase)	Grade 1	0.81 (0.77-0.85)	<0.0001	
	Grade 2	0.82 (0.78-0.88)	<0.0001	
	Grade 3	0.75 (0.69-0.81)	<0.0001	
	Death	0.62 (0.58-0.67)	<0.0001	
Male (reference: female)	Grade 1	1.39 (1.24-1.55)	<0.0001	
	Grade 2	2.06 (1.79-2.37)	<0.0001	
	Grade 3	1.96 (1.61-2.39)	<0.0001	
	Death	1.87 (1.56-2.23)	<0.0001	
* Estimate is unstable due to sparse data. HFV=high-frequency ventilation; CV=conventional mechanical ventilation; NIPPV=non-invasive positive pressure ventilation; CPAP=continuous positive airway pressure; FIO2=Fraction of inspired oxygen; BPD=bronchopulmonary dysplasia.				

Supplemental Table 5. Multinomial regression model for Grade of BPD or death: postnatal day 7

Variables, in order of entry	Grade of BPD or Death	Odds ratios (95% CI)	p-value	
Respiratory support at Day 7 (reference: room air):	HFV	Grade 1	20.2 (13.2-30.7)	<0.0001
		Grade 2	77.7 (36.7-164.5)	<0.0001
		Grade 3	*	
		Death	12.1 (5.58-26.3)	<0.0001
	CV	Grade 1	12.7 (8.79-18.3)	<0.0001
		Grade 2	31.9 (15.5-65.7)	<0.0001
		Grade 3	75.0 (10.4-539.2)	<0.0001
		Death	5.49 (2.62-11.5)	<0.0001
	NIPPV	Grade 1	7.57 (5.21-11.0)	<0.0001
		Grade 2	11.3 (5.43-23.7)	<0.0001
		Grade 3	17.7 (2.39-130.3)	0.005
		Death	2.17 (0.99-4.76)	0.055
	CPAP	Grade 1	6.19 (4.37-8.78)	<0.0001
		Grade 2	8.75 (4.28-17.9)	<0.0001
		Grade 3	15.2 (2.10-109.4)	0.007
		Death	1.60 (0.76-3.39)	0.22
NC	Grade 1	4.90 (3.36-7.14)	<0.0001	
	Grade 2	4.27 (1.96-9.32)	0.0003	
	Grade 3	11.3 (1.47-86.4)	0.02	
	Death	0.94 (0.36-2.48)	0.90	
Hood	Grade 1	2.38 (1.34-4.23)	0.003	
	Grade 2	1.23 (0.32-4.77)	0.76	
	Grade 3	5.57 (0.50-62.3)	0.16	
	Death	1.83 (0.63-5.33)	0.26	
Birth weight (per 100g increase)	Grade 1	0.83 (0.80-0.86)	<0.0001	
	Grade 2	0.72 (0.68-0.76)	<0.0001	
	Grade 3	0.71 (0.66-0.77)	<0.0001	
	Death	0.67 (0.62-0.73)	<0.0001	
FIO2 at Day 7 (per increase by 20%)	Grade 1	1.58 (1.40-1.79)	<0.0001	
	Grade 2	1.78 (1.57-2.02)	<0.0001	
	Grade 3	2.19 (1.90-2.52)	<0.0001	
	Death	2.53 (2.21-2.91)	<0.0001	
Male (reference: female)	Grade 1	1.39 (1.24-1.56)	<0.0001	
	Grade 2	2.03 (1.76-2.34)	<0.0001	
	Grade 3	1.95 (1.59-2.38)	<0.0001	
	Death	1.84 (1.51-2.24)	<0.0001	
Gestational age (per 1 week increase)	Grade 1	0.91 (0.87-0.96)	0.0008	
	Grade 2	0.98 (0.92-1.04)	0.49	
	Grade 3	0.92 (0.84-0.999)	0.049	
	Death	0.78 (0.72-0.86)	<0.0001	
HFV=high-frequency ventilation; CV=conventional mechanical ventilation; NIPPV=non-invasive positive pressure ventilation; CPAP=continuous positive airway pressure; FIO2=Fraction of inspired oxygen; BPD=bronchopulmonary dysplasia.				

Supplemental Table 6. Multinomial regression model for Grade of BPD or death: postnatal day 14

Variables, in order of entry	Grade of BPD or Death	Odds ratios (95% CI)	p-value	
Respiratory support at Day 14 (reference: room air):	HFV	Grade 1	23.7 (14.9-37.6)	<0.0001
		Grade 2	191.2 (74.4-491.0)	<0.0001
		Grade 3	119.1 (28.0-505.6)	<0.0001
		Death	21.5 (7.30-63.5)	<0.0001
	CV	Grade 1	18.2 (12.5-26.5)	<0.0001
		Grade 2	86.6 (35.0-213.9)	<0.0001
		Grade 3	65.7 (16.0-270.2)	<0.0001
		Death	10.3 (3.65-28.9)	<0.0001
	NIPPV	Grade 1	9.78 (6.73-14.2)	<0.0001
		Grade 2	21.5 (8.64-53.6)	<0.0001
		Grade 3	8.95 (2.09-38.3)	0.003
		Death	4.35 (1.51-12.5)	0.007
	CPAP	Grade 1	7.20 (5.07-10.2)	<0.0001
		Grade 2	17.8 (7.29-43.6)	<0.0001
		Grade 3	6.31 (1.52-26.2)	0.01
		Death	2.55 (0.91-7.18)	0.08
	NC	Grade 1	4.15 (2.88-5.97)	<0.0001
		Grade 2	4.60 (1.81-11.7)	0.001
		Grade 3	3.27 (0.74-14.4)	0.12
		Death	0.73 (0.21-2.52)	0.62
Hood	Grade 1	2.20 (1.27-3.81)	0.005	
	Grade 2	1.17 (0.22-6.11)	0.86	
	Grade 3	*		
	Death	1.93 (0.47-7.94)	0.36	
FIO2 at Day 14 (per increase by 20%)	Grade 1	1.75 (1.58-1.95)	<0.0001	
	Grade 2	1.93 (1.72-2.17)	<0.0001	
	Grade 3	2.36 (2.07-2.69)	<0.0001	
	Death	2.41 (2.09-2.78)	<0.0001	
Birth weight (per 100g increase)	Grade 1	0.84 (0.81-0.87)	<0.0001	
	Grade 2	0.73 (0.69-0.77)	<0.0001	
	Grade 3	0.73 (0.67-0.79)	<0.0001	
	Death	0.68 (0.62-0.75)	<0.0001	
Male (reference: female)	Grade 1	1.37 (1.22-1.53)	<0.0001	
	Grade 2	2.00 (1.72-2.31)	<0.0001	
	Grade 3	1.88 (1.53-2.32)	<0.0001	
	Death	1.66 (1.32-2.09)	<0.0001	
Surgical NEC by Day 14 (reference: no surgical NEC)	Grade 1	0.81 (0.43-1.52)	0.51	
	Grade 2	0.68 (0.33-1.41)	0.30	
	Grade 3	3.14 (1.60-6.15)	0.0008	
	Death	1.46 (0.62-3.41)	0.39	
Gestational age (per 1 week increase)	Grade 1	1.04 (0.98-1.10)	0.23	
	Grade 2	1.20 (1.12-1.28)	<0.0001	
	Grade 3	1.16 (1.06-1.28)	0.001	
	Death	0.95 (0.85-1.05)	0.32	

* Estimate is unstable due to sparse data.

HFV=high-frequency ventilation; CV=conventional mechanical ventilation; NIPPV=non-invasive positive pressure ventilation; CPAP=continuous positive airway pressure; FIO₂=Fraction of inspired oxygen; BPD=bronchopulmonary dysplasia; NEC=necrotizing enterocolitis.

Supplemental Table 7. Multinomial regression model for Grade of BPD or death: postnatal day 28

	Grade of BPD or Death	Odds ratios (95% CI)	p-value	
Respiratory support at Day 28 (reference: room air):	HFV	Grade 1	76.0 (40.6-142.0)	
		Grade 2	*	
		Grade 3	*	
		Death	44.1 (11.6-167.7)	<0.0001
	CV	Grade 1	55.2 (36.5-83.5)	<0.0001
		Grade 2	*	
		Grade 3	215.8 (52.1-893.8)	<0.0001
		Death	12.2 (3.55-41.9)	<0.0001
	NIPPV	Grade 1	25.2 (17.0-37.4)	<0.0001
		Grade 2	158.1 (38.8-644.2)	<0.0001
		Grade 3	17.2 (4.01-73.8)	0.0001
		Death	3.14 (0.87-11.4)	0.08
	CPAP	Grade 1	20.1 (13.9-29.0)	<0.0001
		Grade 2	109.7 (27.2-442.8)	<0.0001
		Grade 3	11.6 (2.76-48.4)	0.0008
		Death	2.29 (0.66-7.97)	0.19
NC	Grade 1	8.85 (6.13-12.8)	<0.0001	
	Grade 2	18.0 (4.41-73.9)	<0.0001	
	Grade 3	3.70 (0.86-16.0)	0.08	
	Death	0.36 (0.08-1.57)	0.17	
Hood	Grade 1	5.69 (3.32-9.76)	<0.0001	
	Grade 2	8.11 (1.33-49.3)	0.02	
	Grade 3	4.70 (0.65-34.0)	0.12	
	Death	1.00 (0.10-9.85)	0.999	
FIO ₂ at Day 28 (per increase by 20%)	Grade 1	1.99 (1.77-2.23)	<0.0001	
	Grade 2	2.44 (2.14-2.77)	<0.0001	
	Grade 3	3.11 (2.70-3.59)	<0.0001	
	Death	3.92 (3.29-4.66)	<0.0001	
Birth weight (per 100g increase)	Grade 1	0.87 (0.83-0.90)	<0.0001	
	Grade 2	0.76 (0.72-0.80)	<0.0001	
	Grade 3	0.76 (0.70-0.82)	<0.0001	
	Death	0.72 (0.63-0.82)	<0.0001	
Surgical NEC by Day 28 (reference: no surgical NEC)	Grade 1	0.80 (0.48-1.34)	0.39	
	Grade 2	0.85 (0.48-1.52)	0.59	
	Grade 3	2.48 (1.38-4.46)	0.003	
	Death	4.70 (2.41-9.19)	<0.0001	
Male (reference: female)	Grade 1	1.26 (1.12-1.42)	0.0002	
	Grade 2	1.75 (1.50-2.04)	<0.0001	
	Grade 3	1.60 (1.29-2.00)	<0.0001	
	Death	1.41 (1.02-1.94)	0.04	
Gestational age (per 1 week increase)	Grade 1	1.07 (1.01-1.13)	0.02	
	Grade 2	1.27 (1.18-1.36)	<0.0001	
	Grade 3	1.24 (1.13-1.37)	<0.0001	
	Death	1.02 (0.88-1.18)	0.81	

* Estimate is unstable due to sparse data.

HFV=high-frequency ventilation; CV=conventional mechanical ventilation; NIPPV=non-invasive positive pressure ventilation; CPAP=continuous positive airway pressure; FIO₂=Fraction of inspired oxygen; BPD=bronchopulmonary dysplasia; NEC=necrotizing enterocolitis.

Supplemental Figure 1. Respiratory support by day and year of birth

Over time, there were trends toward increased use of high-frequency ventilation and nasal ventilation or CPAP.

Definition of abbreviations: CPAP = continuous positive airway pressure

