Appendix 1 Characteristics of a hospital’s first ward-based bronchiolitis high-flow nasal cannula protocol

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| **Hospital**\* | **Initiation criteria** | **Age criteria** | **Exclusions** | **Max flow rate (LPM)** | **Other criteria to consider ICU transfer** | **Weaning criteria** |
| 1  | unspecified | unspecified | Apnea, weight <5 kg, history of chronic lung disease or severe gastroesophageal reflux  | 8 | FiO2>50%, HFNC duration 12-24 hours without improvement | Wean flow 1-2 LPM every 2-4 hours as tolerated  |
| 2  | unspecified | 0-2 years | Any chronic comorbidity  | 6 | FiO2 >50% with moderate to severe respiratory distress | unspecified |
| 3  | unspecified | ≥ 3 months | unspecified | 4 | FIO2 >40% | unspecified |
| 6  | unspecified | 1 month-2 years | unspecified | 10 | FiO2 >70% for ≥ 2 hours | When FiO2 <35%, wean flow as tolerated |
| 7  | Elevated respiratory score, significantly increased work of breathing, significant hypoxia, orhypercarbia. | 44 weeks corrected gestational age-2 years | Cardiac disease requiring baseline medication, anatomic airway defect, neurologic disease, immunodeficiency, chronic lung disease, history of intubation, apnea requiring intervention, blood gas pH<7.3 or pCO2 >55 | 6 | FiO2>50%, altered mental status, poor perfusion | When FiO2<30%, wean flow 1 LPM every 4 hours as tolerated  |
| 8  | Elevated respiratory score | 3 months-2 years | Cardiac disease requiring baseline medication, chronic lung disease, gestational age <37 weeks | 10 | FiO2>60% | When FiO2 ≤ 40%, wean flow by 1 LPMevery 2-4 hours as tolerated |
| 10  | Severe respiratory distress or significant hypoxia | 0-2 years | Apnea, severe gastroesophageal reflux disease | 6 | FiO2>50%, HFNC duration >72 hours  | When FiO2<40%, wean flow as tolerated |
| 11  | unspecified | 0-2 years | unspecified | 6 | FiO2>40% | unspecified |
| 12  | unspecified | 3 months-2 years | Gestational age<36 weeks, not previously healthy, blood gas pH<7.3 or pCO2 >55, infiltrate on chest x-ray with more than small effusion | 6 | FiO2>40%, worsening vital sign trend, HFNC duration >24 hours | Wean flow by 1 LPM as tolerated  |
|  |  |  |  |  |  |  |

\*Hospital number correlates with hospital number in figure 2. Three of the 12 adopting hospitals are not displayed because their original ward-based high-flow nasal cannula protocols could not be located.
LPM- liters per minute
FiO2- fraction of inspired oxygen
ICU- intensive care unit

Appendix 2 Demographic characteristics before and after adoption of a ward-based high-flow nasal cannula protocol

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|  | Pre-adoptionN=12,495 | Post-adoptionN=13,758 |
| Age in months, mean (SD) | 9.5 (5.7) | 10.0 (5.8) |
| Female, No. (%) | 5,272 (42) | 5,604 (41) |
| Non-white race, No. (%) | 5,249 (42) | 5,110 (37) |
| Hispanic ethnicity, No. (%) | 2,270 (18) | 2,634 (19) |
| Government insurance, No. (%) | 8,114 (65) | 8,480 (62) |

Appendix 3 Immediate effect and change in slope for intensive care unit admission, by hospital

|  |  |  |
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| Hospital  | Immediate Intervention Effect (95% CI) | Change in slope (95% CI) |
|  2  | 8.8 (7.1 to 10.6)\* | 2.9 (2.2 to 3.7)\* |
|  7  | 8.6 (3.3 to 13.9)\* | 0.1 (-2.7 to 3.0) |
|  4  | 7.9 (3.5 to 12.3)\* | 1.3 (-2.3 to 5.0) |
|  6  | 5.4 (-0.8 to 11.6) | 4.4 (1.4 to 7.3)\* |
|  12  | 4.5 (-1.1 to 10.1) | -1.8 (-6.3 to 2.7) |
|  1  | 4.4 (1.0 to 7.8)\* | 1.9 (0.3 to 3.6)\* |
|  5  | 3.9 (-0.5 to 8.3) | 4.8 (2.8 to 6.8)\* |
|  3  | 2.2 (-1.4 to 5.8) | 0.1 (-2.6 to 2.7) |
|  9  | -0.3 (-6.4 to 5.8) | 3.4 (0.0 to 6.8)\* |
|  10  | -0.7 (-5.3 to 3.8) | 0.3 (-2.3 to 3.0) |
|  11  | -2.0 (-5.5 to 1.5) | -8.8 (-10.6 to -7.1)\* |
|  8  | -2.3 (-5.2 to 0.4) | 0.8 (-0.5 to 2.1) |

Estimates obtained by interrupted time series, comparing intensive care unit admission three seasons before and three seasons after ward-based high-flow nasal cannula protocol adoption. Immediate intervention effects and changes in slope are expressed as the absolute percentage difference before and after high-flow nasal cannula protocol adoption.
Hospital number correlates with hospital number in figure 2.