Online Table S3.1: Initiation criteria and location for CPAP or NIV initiation

Author	Country	Journal	Type of study	Number of patients	Ages	Initiation scenario/criteria	Location of CPAP/NIV initiation
Padman et al. [1]	USA	Pediatr Pulmonol	Retrospective study	15 children: 4 CF and 11 NMD	4 – 21 yrs	ARF in children with CRF: avoidance of intubation (1 failure in one patient with NMD) Duration of BPAP: 1 day to 21 mo	BPAP initiated in the ICU in all patients
Fauroux et al. [2]	France	Pediatr Pulmonol	Cross sectional national study in 1999 (questionnaire)	102 patients	< 18 yrs	Criteria (not exclusive, no details): 67% SDB symptoms 28% nocturnal hypoventilation 21% failure to thrive 18% other symptoms 82% nocturnal SpO_2 9% $PtcO_2$/$PtcCO_2$ 88% ABG 63% sleep study 56% lung function data 31% echocardiography data	All during a hospitalisation
Oktem et al. [3]	Turkey	Respiration	Retrospective study at 1 center 2001-2006	34	4 m-17 yrs	Criteria: 1) hypoventilation: hypoxemia + hypercapnia: daytime hypoxemia < 3 SD, nocturnal hypoxemia SpO_2 < 90% for >5% night, PHT, hypercapnia $PaCO_2$ > 45 mmHg. Indications for NIV: Symptoms of SDB or other symptoms (dyspnea, right heart failure, PHT, transition from tracheotomy) No details for the patients in the study	All during a hospitalisation, median duration 64 (3-180) days (due to delay to have the equipment)

McDougall et al. [4]	Canada	Arch Dis Child	Prospective longitudinal study in 1 center 1995-2009	144 children	< 18 yrs	28 failure to wean from ventilation 31 ARF 40 sleep study results (not specified) 23 SDB symptoms 9 vital capacity < 20% 10 other	Not specified
Amin et al. [5]	Canada	Pediatr Pulmonol	Retrospective study at 1 center 1991-2011	313 treated with NIV			27% in pediatric ICU 70% in sleep lab 3% in-patient ward
Rose et al. [6]	Canada	Respir Care	Web based questionnaire to home care providers 2012-2013	4334 adults & children	425 < 18 yrs	Considerable variation in criteria (adults + children): 57% nocturnal hypoventilation on PSG 38% daytime hypercapnia 32% nocturnal hypercapnia 31% never used daytime hypercapnia 11% never had PSG	All in hospital: sleep lab (38%), ICU (27%), in-patient units (21%)
Chatwin et al. [7]	UK	PlosOne	Retrospective study at 1 center 1993-2011	496 children started on NIV	< 17 yrs	NIV initiated if 1) chronic daytime $PaCO_2$ > 6.5 kPa (alone), 2) PSG: nocturnal $PtcCO_2$ > 6.5 kPa for > 50% night time CPAP initiated when normal PCO_2 with elevated AHI (not specified) 340 (76%) started as in-patients with 67 (15%) started in the pediatric ICU	340 (71%) started as in-patients with 67 (15%) being started in the pediatric ICU
Edwards et al. [8]	USA	Pediatr Crit Care Med	Retrospective cross-sectional analysis among 73 pediatric ICU 2009-2011	115437 PICU patients	?	381 (0.3%) initiated on long term NIV (16% on CPAP), 16% were discharged to a chronic care Disorders: 11% endocrinologic, 15% gastroenterologic, 11% metabolic, 31% epilepsy, 23% cerebral palsy, 34% NMD, 22% encephalopathy, 34%	

						scoliosis, 27% OSA	
Amaddeo et al. [9]	France	Pediatr Pulmonol	Retrospective study	76 children started on CPAP (64) or NIV 12) / 1 yr	0.3 -19.5 yrs	3 scenarios: acute (CPAP/NIV weaning failure in pediatric ICU, n=15), subacute on abnormal overnight gas exchange (n=18) or chronic on a sleep study (n=43)	5 Criteria: 1) min SpO_2 < 90%, 2) max $PtcCO_2$ > 50 mmHg, 3) time with SpO_2 < 90% ≥ 2%, 4) time with $PtcCO_2$ > 50 mmHg ≥ 2%, 5) ODI > 1.4/h, 6) AHI > 10/h. Subacute: most patients had ≥ 3 criteria, Chronic: most patients had ≥ 4 criteria
Weiss et al. [10]	Austria	Klin Padiatr	Cross-sectional survey by questionnaire on 2013	95 children CPAP 9/143 Other NIV		Signs and symptoms before onset: 68% nocturnal hypoxemia 70% nocturnal hypercapnia 29% ARF 28% recurrent pneumonias 17% failure to thrive 37% other symptoms	Not specified
Nathan et al. [11]	Malaysia	Pediatr Pulmonol	Retrospective study at 1 center 2001-2014	30 CPAP 30 BPAP 10 IV		Indications: 54% increase in work of breathing 31% hypoventilation 6% hypoxemia 9% heart failure 29/70 with additional oxygen	In hospital, median stay before discharge 59 (30-114) days
Ikeda et al. [12]	Japan	Brain & Development	Retrospective study at 1 center 2001-2015	53 children treated with NIV	< 20 yrs	Initiation criteria: Min SpO_2 < 92% or max $PtcCO_2$ > 50 mmHg (not specified day or night) 66% in an acute setting (= failure to withdraw NIV after an ARF) 34 % planned initiation (without details)	

						Especially in NMD 94% NIV only nocturnal 60% with additional oxygen (40% of NMD)	
Amaddeo et al. [13]	France	Pediatr Pulmonol	Retrospective study	31 children All on CPAP	0.8- 17.5 yrs	Outpatient program with setting criteria: OSA, age > 6 m, stable condition, living in the hospital area, agreement with regular follow up No pressures reported	All patients were started in an out-patient setting 4/31 non compliant (3 Down syndrome) Median compliance 8h21min/night, 25 nights/mo 3 pts weaned from CPAP
Castro-Codesal et al. [14]	Canada	PlosOne	Retrospective study in Alberta 2005-2014	622 children CPAP (75%) and BPAP (22%)	0-18 yrs	initiation 83% started electively after on PSG 16% acute illness 1%: vital capacity < 30% or transition from IV or palliative care	18% started in hospital 82% started at home
Kapur et al. [15]	Australia	Pediatr Pulmonol	Cross-sectional study	3 SMA type I, 15 SMA type II, 7 SMA type III	0-18 yrs	10/25 (40%) required NIV: 5 for SDB, 5 started during lower RTI (pediatric ICU)	Children requiring NIV were older (10.52 vs 5.67yrs), had a lower vital capacity and higher AHI (3.65 vs 0.08), 2/10 pts had a $PtcCO_2$ > 50mmHg > 2% of sleep time Initiation during RTI an indication? 3/5 had

							normal subsequent PSG
Leske et al. [16]	Argentina	Pediatr Pulmonol	Retrospective study at 1 center 2007-2018	244 children, mixed cohort NIV 210/244 (86%) IV 34/244 (14%) CPAP 51 patients of NIV group	0-18y	244 patients: initiation 48 (20%) acute illness 80 (33%) subacute 116 (48%) elective (without details) Initiation criteria: 79/244 (33%) on clinical status (71 without sleep study) 165/244 (67%) abnormal sleep study + SDB Where: General ward 204/244 (84%) Referral hospital 18/244 (7%) ICU 22/244 (9%) Modes: Pressure control 182/244 (74%) CPAP 51/244 (21%) BPAP 9/244 (4%)	All started in hospital

Abbreviations: m: months, yrs: years, OSA: obstructive sleep apnea, BPAP: bilevel positive airway pressure, NIV: noninvasive ventilation, ICU: intensive care unit, CF: cystic fibrosis, NMD: neuromuscular disease, SMA: spinal muscular atrophy, BPD: bronchopulmonary dysplasia, ARF: acute respiratory failure, CRF: chronic respiratory failure, RTI: respiratory tract infection, SDB: sleep disordered breathing, SpO_2 : pulse oximetry, $PtcO_2$: transcutaneous oxygen pressure, $PtcCO_2$: transcutaneous carbon dioxide pressure, ABG: arterial blood gases, PHT: pulmonary hypertension, PSG: polysomnography, AHI: apnea-hypopnea index, ODI: oxygen desaturation index, CNS: central nervous system.

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