

Supplementary Table E1: PRISMA checklist

	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	4
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	6
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	7
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	7
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	8
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	7
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	7, Supplementary materials
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	8
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	9
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	8
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	9

Supplementary Table E1: PRISMA checklist

Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	9
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	9

Supplementary Table E2a: Risk of bias for RCTs for outcome of mortality

Study	Randomization process	Deviations from intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported result	Overall Bias for the outcome of Mortality
Adi, 2019	Some concerns	High	Low	Low	Some concerns	High
Gurbuz, 2015	Some concerns	High	Low	Low	Some concerns	High
Grieco, 2021	Low	Low	Low	Low	Low	Low
Liu 2020	Some concerns	Low	Low	Low	Some concerns	High
Patel 2016	Low	Low	Low	Low	Low	Low
Liu 2020 (2)	Low	Low	Low	Low	Low	Low
Yang 2015	Low	Low	Low	Low	Some concerns	Some concerns

Supplementary Table E2b: Risk of bias for observational studies

Study	Selection	Comparability	Outcome/Exposure
Alharthy, 2020	****	-	***
Antonelli, 2002	****	**	***
Antonelli, 2004	****	**	***
Conti, 2007	****	**	***
Gaulton, 2020	***	-	***
Giovini, 2019	****	**	***
Principi, 2004	****	**	***
Rocco, 2004	****	**	***

Supplementary Table E2c: Risk of bias for RCTs for outcome of intubation

Study	Randomization process	Deviations from intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported result	Overall Bias for the outcome of Intubation
Adi, 2019	Some concerns	High	Low	Low	Some concerns	High
Ali, 2011	Some concerns	High	Low	Low	Some concerns	High
Antogalia, 2010	Low	Low	Low	Low	Some concerns	Some concerns
Gurbuz, 2015	Some concerns	High	Low	Low	Some concerns	High
Fasano, 2012	Some concerns	High	Low	Low	Some concerns	High

Grieco, 2021	Low	Low	Low	Low	Low	Low
Liu 2020	Some concerns	Low	Low	Low	Some concerns	High
Patel 2016	Low	Low	Low	Low	Low	Low
Pisani 2015	Low	Low	Low	Low	Low	Low
Liu 2020 (2)	Low	Low	Low	Low	Low	Low
Yang 2015	Some concerns	Low	Low	Low	Some concerns	High


Supplementary Table E3: GRADE Summary of Findings Table

Question: Helmet NIV compared to oronasal NIV for respiratory failure


Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Helmet NIV	oronasal NIV	Relative (95% CI)	Absolute (95% CI)		
Mortality (RCT)												
5	randomised trials	not serious	not serious	not serious	very serious ^a	none	16/131 (12.2%)	26/125 (20.8%)	RR 0.56 (0.33 to 0.95)	92 fewer per 1,000 (from 139 fewer to 10 fewer)	⊕⊕○○ LOW	CRITICAL
Intubation (RCT)												
9	randomised trials	serious ^b	not serious	not serious	serious ^a	none	20/220 (9.1%)	55/217 (25.3%)	RR 0.35 (0.22 to 0.56)	165 fewer per 1,000 (from 198 fewer to 112 fewer)	⊕⊕○○ LOW	CRITICAL
ICU LOS (RCT)												
6	randomised trials	serious ^b	serious ^c	not serious	serious ^a	none	153	147	-	MD 0.29 lower (2.31 lower to 1.74 higher)	⊕○○○ VERY LOW	IMPORTANT
Duration of NIV (RCT)												
4	randomised trials	serious ^b	not serious	not serious	serious ^a	none	94	93	-	MD 0.02 lower (0.15 lower to 0.11 higher)	⊕⊕○○ LOW	IMPORTANT
Pressure sores (RCT)												
5	randomised trials	serious ^b	not serious	not serious	very serious ^{a,d}	none	8/121 (6.6%)	19/117 (16.2%)	RR 0.50 (0.19 to 1.37)	81 fewer per 1,000 (from 132 fewer to 60 more)	⊕○○○ VERY LOW	IMPORTANT
Intubation (observational studies)												
5	observational studies	not serious	not serious	not serious	serious ^a	none	30/127 (23.6%)	63/160 (39.4%)	RR 0.65 (0.44 to 0.95)	138 fewer per 1,000 (from 221 fewer to 20 fewer)	⊕○○○ VERY LOW	CRITICAL
Mortality (observational studies)												
5	observational studies	not serious	not serious	not serious	serious ^a	none	27/127 (21.3%)	55/160 (34.4%)	RR 0.59 (0.40 to 0.88)	141 fewer per 1,000 (from 206 fewer to 41 fewer)	⊕○○○ VERY LOW	CRITICAL

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Helmet NIV	oronasal NIV	Relative (95% CI)	Absolute (95% CI)		

ICU LOS (observational studies)

4	observational studies	not serious	not serious	not serious	very serious ^{a,d}	none	110	143	-	MD 1.15 lower (3.93 lower to 1.63 higher)	 VERY LOW	IMPORTANT
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Duration of NIV (Observational studies)

5	observational studies	not serious	not serious	not serious	serious ^a	none	127	160	-	MD 0.22 higher (0.12 higher to 0.32 higher)	 VERY LOW	IMPORTANT
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CI: Confidence interval; RR: Risk ratio; MD: Mean difference


Explanations

- a. very low event numbers which are far below optimal information size
- b. high proportion of the included studies have high ROB
- c. High I squared with variable effects across studies
- d. wide confidence intervals that don't exclude serious benefit or harm


Question: Helmet NIV compared to HFNC for respiratory failure

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Helmet NIV	HFNC	Relative (95% CI)	Absolute (95% CI)		


Mortality (RCTs)

2	randomised trials	serious ^a	not serious	not serious	very serious ^{b,c}	none	17/148 (11.5%)	24/149 (16.1%)	RR 0.72 (0.40 to 1.28)	45 fewer per 1,000 (from 97 fewer to 45 more)	 VERY LOW	CRITICAL
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Intubation (RCTs)


2	randomised trials	serious ^a	not serious	not serious	serious ^c	none	23/148 (15.5%)	39/149 (26.2%)	RR 0.59 (0.39 to 0.91)	107 fewer per 1,000 (from 160 fewer to 24 fewer6)	 LOW	CRITICAL
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Mortality (Observational studies)

2	observational studies	not serious	not serious	not serious	serious ^{b,c}	none	4/27 (14.8%)	10/52 (19.2%)	RR 0.77 (0.16 to 3.75)	44 fewer per 1,000 (from 162 fewer to 529 more)	 VERY LOW	CRITICAL
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Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Helmet NIV	HFNC	Relative (95% CI)	Absolute (95% CI)		

Intubation (Observational studies)

3	observational studies	not serious	not serious	not serious	serious ^b	none	9/42 (21.4%)	27/67 (40.3%)	RR 0.69 (0.27 to 1.73)	125 fewer per 1,000 (from 294 fewer to 294 more)	 VERY LOW	CRITICAL
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CI: Confidence interval; RR: Risk ratio

Explanations

- a. One out of two included studies have high ROB
- b. wide confidence intervals that do not exclude serious benefit or harm
- c. very low event numbers which are far below optimal information size as only two small studies are included.

Supplementary Table E4: Characteristics of Included Cohort and Case Series Studies

Author	Year	Country	Type of Helmet	Settings Used for Helmet	Comparator	Settings Used for Comparator	Total (n)	Select Inclusion Criteria	Outcomes
Alharthy et al.	2020	Saudi Arabia	H-CPAP	CPAP at high flow rates to prevent rebreathing (median flow rate 45 L/min) with a median fraction of inspired oxygen of 40%.	High Flow Nasal Canula	Adjusted at a median flow rate of 60 L/min and median fraction of inspired oxygen of 40%.	30	Adult patients with confirmed COVID-19 requiring higher support than standard oxygen	Intubation Rate
Antonelli et al.	2002	Italy	H-NIV (CaStar)	Once the helmet was positioned, pressure support was increased in increments of 2–3 cm H ₂ O to obtain the patient comfort, a respiratory rate lower than 25 breaths/min, and the disappearance of accessory muscle activity (as evaluated by palpating the sternocleidomastoid muscle). PEEP was increased in increments of 2–3 cm H ₂ O up to 10–12 cm H ₂ O to assure a peripheral oxygen saturation of at least 92% with the lowest FIO ₂ possible.	Facemask NIV	Not Described	99	Non-COPD patients with acute respiratory failure as defined by study protocol	Intubation Rate, Mortality, ICU Length of Stay, Duration of Mechanical Ventilation, Complications
Antonelli et al.	2004	Italy	H-NIV (CaStar)	After the mask was secured, the initial level of 10 cmH ₂ O pressure support was gradually increased in increments of 2–3 cmH ₂ O to obtain a respiratory rate of less than 25 breaths/min, disappearance of accessory muscle activity (evaluated by palpating the sternocleidomastoid muscle), 12 and patient comfort. PEEP was set at 5–7 cmH ₂ O to counterbalance the intrinsic PEEP level.	Facemask NIV	Not Described	66	Patients with acute decompensation of COPD eligible for treatment with NPPV admitted to ICU	Intubation Rate, Mortality, ICU Length of Stay, Duration of Mechanical Ventilation, Complications
Conti et al.	2007	Italy	H-NIV (CaStar)	Started with 10 cm H ₂ O of pressure support, with progressive stepwise increase of 2–3 cm H ₂ O, according to patient comfort, to obtain a respiratory rate 25 breaths/min and the disappearance of accessory muscle activity or paradoxical abdominal motion. Positive end-expiratory pressure (PEEP) was increased in steps of 2–3 cm H ₂ O, up to a maximum of 12 cm H ₂ O, to maintain the arterial oxygen saturation over 90% with the lowest possible FIO ₂ .	Facemask NIV	Not Described	50	Patients who developed post operative acute respiratory failure after abdominal surgery admitted to the ICU	Intubation Rate, Mortality, ICU Length of Stay, Duration of Mechanical Ventilation, Complications
Gaulton et al.	2020	USA	H-CPAP SeaLong	CPAP between 5 - 10 cm H ₂ O and FiO ₂ titrated to keep >92%.	High Flow Nasal Canula	HFNC was adjusted at a median flow rate of 60 L/min and median fraction of inspired oxygen of 40%.	59	Patients with body mass index greater than or equal to 25 kg/m ² and were candidates for non-invasive respiratory support as per study protocol	Intubation Rate, Mortality
Giovini et al.	2019	Italy	H-CPAP	Not Described	High Flow Nasal Canula	Not Described	20	Patients with moderate ARDS as defined by Berlin criteria	Intubation Rate, Mortality

Principi et al.	2004	Italy	H-CPAP (CaStar)	High-flow CPAP (Vital Signs, Brighton, UK) was set at 8 cmH ₂ O with FIO ₂ 0.6 controlled by means of an oximeter (Miniox II Oxygen Monitor, Catalyst Research Owings Mills, Md., USA).	Facemask CPAP	Facemask CPAP (same settings as helmet group)	34	Patients presenting with dyspnea, tachypnea, use of accessory muscles, and paradoxical abdominal motion, with infiltrates on chest radiography	intubation Rate, Mortality, Duration of Mechanical Ventilation, Complications
Rocco et al.	2004	Italy	H-NIV (CaStar)	The ventilator was set with pressure support of 10 cm H ₂ O, and the level of pressure support was progressively increased in increments of 2 to 3 cm H ₂ O to obtain patient comfort, an RR 25 breaths/min, and the disappearance of accessory muscle activity. Positive end-expiratory pressure (PEEP) was increased by 2 to 3 cm H ₂ O, up to a maximum level of 12 cm H ₂ O to maintain the arterial oxygen saturation 90% with the lowest Fio ₂ possible.	Facemask NIV	Facemask NIV (same settings as helmet group)	38	Immunocompromised patients with hypoxemic acute respiratory failure and pulmonary infiltrates admitted to ICU	Intubation Rate, Mortality, ICU Length of Stay, Duration of Mechanical Ventilation, Complications

Non-Invasive Ventilation (NIV) Helmet – SR – Literature Search

Research Question(s)

1. In all patients with acute respiratory failure, does the use of helmet NIV reduce mortality, intubation rate and days of MV compared to oro-nasal NIV and high flow nasal cannula (HFNC).
Patient – All adult patients acute with respiratory failure of any type or etiology
Intervention – NIV delivered by helmet interface
Control – Oro-nasal NIV or high flow nasal cannula
Outcome – mortality, intubation, invasive mechanical ventilator free days, duration of mechanical ventilation, duration of NIV, ICU length of stay, hospital length of stay, patient comfort and adverse events
-for mortality, we will capture closest to 30 days or if not available, hospital mortality
-for intubation, we will capture any need for intubation during index hospitalization

Seed Articles:

- Ferreyro BL, et al. Association of noninvasive oxygenation strategies with all-cause mortality in adults with acute hypoxemic respiratory failure: a systematic review and meta-analysis. JAMA. 2020 Jul 7;324(1):57-67. <https://pubmed.ncbi.nlm.nih.gov/32496521/>
- Patel BK, et al. Effect of noninvasive ventilation delivered by helmet vs face mask on the rate of endotracheal intubation in patients with acute respiratory distress syndrome: a randomized clinical trial. JAMA. 2016;315(22):2435-2441. <https://pubmed.ncbi.nlm.nih.gov/27179847/>

Search by: Kaitryn Campbell (kcampbel@stjosham.on.ca)

Requestor: Dipayan Chaudhuri (dipayan.chaudhuri@medportal.ca)

Date(s): 2020 Oct 23

Limits: NOT case reports; Human NOT Animal

Databases: Ovid Medline [ppez] & Embase [oomezd]; Web of Science; The Cochrane Library; International HTA database (<https://database.inahta.org/>); EBSCO CINAHL Complete; LILACS; WHO COVID-19 Global literature on coronavirus disease (<https://search.bvsalud.org/global-literature-on-novel-coronavirus-2019-ncov/>)

Filters: None

Output: RIS (931 results total after duplicates removed)

Concept #1: Noninvasive Ventilation, etc.

Noninvasive Ventilation/

Oxygen Inhalation Therapy/ use ppez

Oxygen Therapy/ use oomezd

((non-invasive* OR noninvasive*) ADJ3 (oxygen* OR O2 OR ventilat*)).tw,kf,kw.

Respiratory Insufficiency/ use ppez

Respiratory Distress Syndrome, Adult/ use ppez

Respiratory Failure/ use oomezd

Acute Respiratory Failure/ use oomezd

Adult Respiratory Distress Syndrome/ use oomezd

((lung? OR respiratory OR respiration OR pulmonary OR ventilator?) ADJ2 (depress* OR insufficien* OR fail* OR deficien* OR disturb* OR dysfunction* OR compromis*)).tw,kf,kw.

((acute OR adult*) ADJ respiratory distress) OR ARDS OR ARDSS).tw,kf,kw.

Continuous Positive Airway Pressure/ use ppez

Positive End Expiratory Pressure/ use oomezd

(continuous positive airway pressure OR CPAP OR nCPAP OR CPPB OR CPPV OR continuous positive pressure ventilation OR CPPV OR airway pressure release ventilation OR APRV OR ((bi-level OR bilevel) ADJ2 positive airway pressure) OR (hyperbaric ADJ (respiration OR ventilation)) OR

(positive pressure ADJ (breathing OR respiration OR ventilation)) OR positive endexpiratory pressure breathing OR PEEP).tw,kf,kw.

å

Concept #2: Helmet

Head Protective Devices/ use ppez

exp Helmet/ use oomezd

helmet*.tw,kf,kw.

exp animals/

exp animal experimentation/ OR exp animal experiment/

exp models animal/

nonhuman/

exp vertebrate/ OR exp vertebrates/

or/

exp humans/

exp human experimentation/ OR exp human experiment/

or/

25 not 28

(Case Reports.pt. OR *Case Report/) NOT (case series.ti. AND (Case Reports.pt. OR *Case Report/))

Ovid

Database(s): **Embase** 1974 to 2020 October 22, OVID Medline Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R) Daily and Ovid MEDLINE(R) 1946 to Present

Search Strategy:

#	Searches	Results
1	Noninvasive Ventilation/	12868
2	Oxygen Inhalation Therapy/ use ppez	14575
3	Oxygen Therapy/ use oomezd	30522
4	((non-invasive* or noninvasive*) adj3 (oxygen* or O2 or ventilat*)).tw,kf,kw.	25627
5	Respiratory Insufficiency/ use ppez	32369
6	Respiratory Distress Syndrome, Adult/ use ppez	19909
7	Respiratory Failure/ use oomezd	68775
8	Acute Respiratory Failure/ use oomezd	12805
9	Adult Respiratory Distress Syndrome/ use oomezd	39543
10	((lung? or respiratory or respiration or pulmonary or ventilator?) adj2 (depress* or insufficien* or fail* or deficien* or disturb* or dysfunction* or compromis*)).tw,kf,kw.	180943
11	((acute or adult*) adj respiratory distress) or ARDS or ARDSS).tw,kf,kw.	61262
12	Continuous Positive Airway Pressure/ use ppez	7288
13	Positive End Expiratory Pressure/ use oomezd	55218
14	(continuous positive airway pressure or CPAP or nCPAP or CPPB or CPPV or continuous positive pressure ventilation or CPPV or airway pressure release ventilation or APRV or ((bi-level or bilevel) adj2 positive airway pressure) or (hyperbaric adj (respiration or ventilation)) or (positive pressure adj (breathing or respiration or ventilation)) or positive endexpiratory pressure breathing or PEEP).tw,kf,kw.	64104
15	or/1-14 [Noninvasive Ventilation, etc. Concept]	408808
16	Head Protective Devices/ use ppez	3598
17	exp Helmet/ use oomezd	5703
18	helmet*.tw,kf,kw.	12414
19	or/16-18 [Helmet Concept]	14658
20	exp animals/	49787816
21	exp animal experimentation/ or exp animal experiment/	2630293
22	exp models animal/	2002835
23	nonhuman/	6362133
24	exp vertebrate/ or exp vertebrates/	48451569

25	or/20-24	51664560
26	exp humans/	40330743
27	exp human experimentation/ or exp human experiment/	534778
28	or/26-27	40333169
29	25 not 28	11333047
30	15 and 19 [Noninvasive Ventilation, etc.+ Helmet]	670
31	30 not 29 [Noninvasive Ventilation, etc.+ Helmet, Human NOT Animal Filter applied]	652
32	(Case Reports.pt. or *Case Report/) not (case series.ti. and (Case Reports.pt. or *Case Report/))	2144091
33	31 not 32 [Noninvasive Ventilation, etc.+ Helmet, Human NOT Animal Filter applied, Case Reports removed]	622
34	remove duplicates from 33 [Final results, Human NOT Animal, Case Reports & duplicates removed]	426

Set	Results	Search Terms
# 25	326	#24 AND #18 Indexes=SCI-EXPANDED, CPCI-S, ESCI Timespan=All years
# 24	9,501	#23 OR #22 OR #21 OR #20 OR #19
# 23	2,041	AK=helmet*
# 22	6,684	AB=helmet*
# 21	3,996	TI=helmet*
# 20	9,296	TS=helmet*
# 19	331	TS=Head Protective Devices
# 18	112,258	#17 OR #16 OR #15 OR #14 OR #13 OR #12 OR #11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1
# 17	5,966	AK=((continuous positive airway pressure OR CPAP OR nCPAP OR CPPB OR CPPV OR continuous positive pressure ventilation OR CPPV OR airway pressure release ventilation OR APRV OR ((bi-level OR bilevel) NEAR/2 positive airway pressure) OR (hyperbaric NEAR/1 (respiration OR ventilation)) OR (positive pressure NEAR/1 (breathing OR respiration OR ventilation)) OR positive endexpiratory pressure breathing OR PEEP)
# 16	17,782	AB=((continuous positive airway pressure OR CPAP OR nCPAP OR CPPB OR CPPV OR continuous positive pressure ventilation OR CPPV OR airway pressure release ventilation OR APRV OR ((bi-level OR bilevel) NEAR/2 positive airway pressure) OR (hyperbaric NEAR/1 (respiration OR ventilation)) OR (positive pressure NEAR/1 (breathing OR respiration OR ventilation)) OR positive endexpiratory pressure breathing OR PEEP)
# 15	12,327	TI=((continuous positive airway pressure OR CPAP OR nCPAP OR CPPB OR CPPV OR continuous positive pressure ventilation OR CPPV OR airway pressure release ventilation OR APRV OR ((bi-level OR bilevel) NEAR/2 positive airway pressure) OR (hyperbaric NEAR/1 (respiration OR ventilation)) OR (positive pressure NEAR/1 (breathing OR respiration OR ventilation)) OR positive endexpiratory pressure breathing OR PEEP)
# 14	10,459	TS=Continuous Positive Airway Pressure
# 13	8,234	AK=((((acute OR adult*) NEAR/1 respiratory distress) OR ARDS OR ARDSS)
# 12	16,163	AB=((((acute OR adult*) NEAR/1 respiratory distress) OR ARDS OR ARDSS)
# 11	12,237	TI=((((acute OR adult*) NEAR/1 respiratory distress) OR ARDS OR ARDSS)
# 10	7,119	AK=((lung? OR respiratory OR respiration OR pulmonary OR ventilator?) NEAR/2 (depress* OR insufficien* OR fail* OR deficien* OR disturb* OR dysfunction* OR compromis*))
# 9	44,619	AB=((lung? OR respiratory OR respiration OR pulmonary OR ventilator?) NEAR/2 (depress* OR insufficien* OR fail* OR deficien* OR disturb* OR dysfunction* OR compromis*))
# 8	15,389	TI=((lung? OR respiratory OR respiration OR pulmonary OR ventilator?) NEAR/2 (depress* OR insufficien* OR fail* OR deficien* OR disturb* OR dysfunction* OR compromis*))
# 7	7,886	TS=Respiratory Distress Syndrome, Adult
# 6	6,679	TS=Respiratory Insufficiency
# 5	3,255	AK=((non-invasive* OR noninvasive*) NEAR/3 (oxygen* OR O2 OR ventilat*))
# 4	6,556	AB=((non-invasive* OR noninvasive*) NEAR/3 (oxygen* OR O2 OR ventilat*))
# 3	5,713	TI=((non-invasive* OR noninvasive*) NEAR/3 (oxygen* OR O2 OR ventilat*))
# 2	1,211	TS=Oxygen Inhalation Therapy
# 1	8,419	TS=Noninvasive Ventilation

The Cochrane Library

ID	Search	Hits
#1	MeSH descriptor: [Noninvasive Ventilation] this term only	241
#2	MeSH descriptor: [Oxygen Inhalation Therapy] this term only	1157
#3	((non-invasive* OR noninvasive*) NEAR3 (oxygen* OR O2 OR ventilat*)):ti,ab,kw	0
#4	MeSH descriptor: [Respiratory Insufficiency] this term only	1577
#5	((lung? OR respiratory OR respiration OR pulmonary OR ventilator?) NEAR2 (depress* OR insufficien* OR fail* OR deficien* OR disturb* OR dysfunction* OR compromis*)):ti,ab,kw OR (((acute OR adult*) NEXT respiratory distress) OR ARDS OR ARDSS):ti,ab,kw	2826
#6	MeSH descriptor: [Continuous Positive Airway Pressure] this term only	1074
#7	(continuous positive airway pressure OR CPAP OR nCPAP OR CPPB OR CPPV OR continuous positive pressure ventilation OR CPPV OR airway pressure release ventilation OR APRV OR ((bi-level OR bilevel) NEAR2 positive airway pressure) OR (hyperbaric NEXT (respiration OR ventilation)) OR (positive pressure NEXT (breathing OR respiration OR ventilation)) OR positive endexpiratory pressure breathing OR PEEP):ti,ab,kw	9922
#8	#1 OR #2 OR #3 OR #4 OR #5 OR #6 OR #7	1694300
#9	MeSH descriptor: [Head Protective Devices] explode all trees	97
#10	(helmet*):ti,ab,kw	459
#11	#9 OR #10	476
#12	#8 AND #11 in Trials	468

EBSCO CINAHL Complete

#	Query	Results
S11	S7 AND S10	26
S10	S8 OR S9	2,980
S9	TI helmet* OR AB helmet*	2,157
S8	(MH "Head Protective Devices")	2,098
S7	S1 OR S2 OR S3 OR S4 OR S5 OR S6	41,268
	TI (continuous positive airway pressure OR CPAP OR nCPAP OR CPPB OR CPPV OR continuous positive pressure ventilation OR CPPV OR airway pressure release ventilation OR APRV OR ((bi-level OR bilevel) N2 positive airway pressure) OR (hyperbaric N1 (respiration OR ventilation)) OR (positive pressure N1 (breathing OR respiration OR ventilation)) OR positive endexpiratory pressure breathing OR PEEP) OR AB (continuous positive airway pressure OR CPAP OR nCPAP OR CPPB OR CPPV OR continuous positive pressure ventilation OR CPPV OR airway pressure release ventilation OR APRV OR ((bi-level OR bilevel) N2 positive airway pressure) OR (hyperbaric N1 (respiration OR ventilation)) OR (positive pressure N1 (breathing OR respiration OR ventilation)) OR positive endexpiratory pressure breathing OR PEEP)	8,111
S5	(MH "Continuous Positive Airway Pressure")	5,335
	TI ((lung? OR respiratory OR respiration OR pulmonary OR ventilator?) N2 (depress* OR insufficien* OR fail* OR deficien* OR disturb* OR dysfunction* OR compromis*) OR AB ((lung? OR respiratory OR respiration OR pulmonary OR ventilator?) N2 (depress* OR insufficien* OR fail* OR deficien* OR disturb* OR dysfunction* OR compromis*) OR TI (((acute OR adult*) N1 respiratory distress) OR ARDS OR ARDSS) OR AB (((acute OR adult*) N1 respiratory distress) OR ARDS OR ARDSS)	22,824
S3	(MH "Respiratory Failure") OR (MH "Respiratory Distress Syndrome+")	10,890
S2	TX (non-invasive* OR noninvasive*) N3 (oxygen* OR O2 OR ventilat*)	3,999
S1	(MH "Pressure Support Ventilation") OR (MH "Positive Pressure Ventilation+")	11,309

International HTA database (<https://database.inahta.org/>)

=0 relevant results

"Head Protective Devices"[mhe] OR (helmet*)

LILACS (<http://bases.bireme.br/cgi-bin/wxislind.exe/iah/online/?IisScript=iah/iah.xis&base=LILACS&lang=i&form=F>)

=0 relevant results

helmet* [all]

WHO COVID-19 Global literature on coronavirus disease (<https://search.bvsalud.org/global-literature-on-novel-coronavirus-2019-ncov/>)

=40 results

helmet* [all]