CURSO DE VMNI

NIPPON 2026

Avaliação do doente candidato a VMNI domiciliária Quais os critérios e o que devo avaliar

João Carlos Winck
Professor Catedrático Convidado
FMUP

NIPPON GASES Healthcare

Agenda

Introdução: causas de insuficiência ventilatória
Como avaliar
Indicações da VMNI domiciliária
Organização
Conclusões

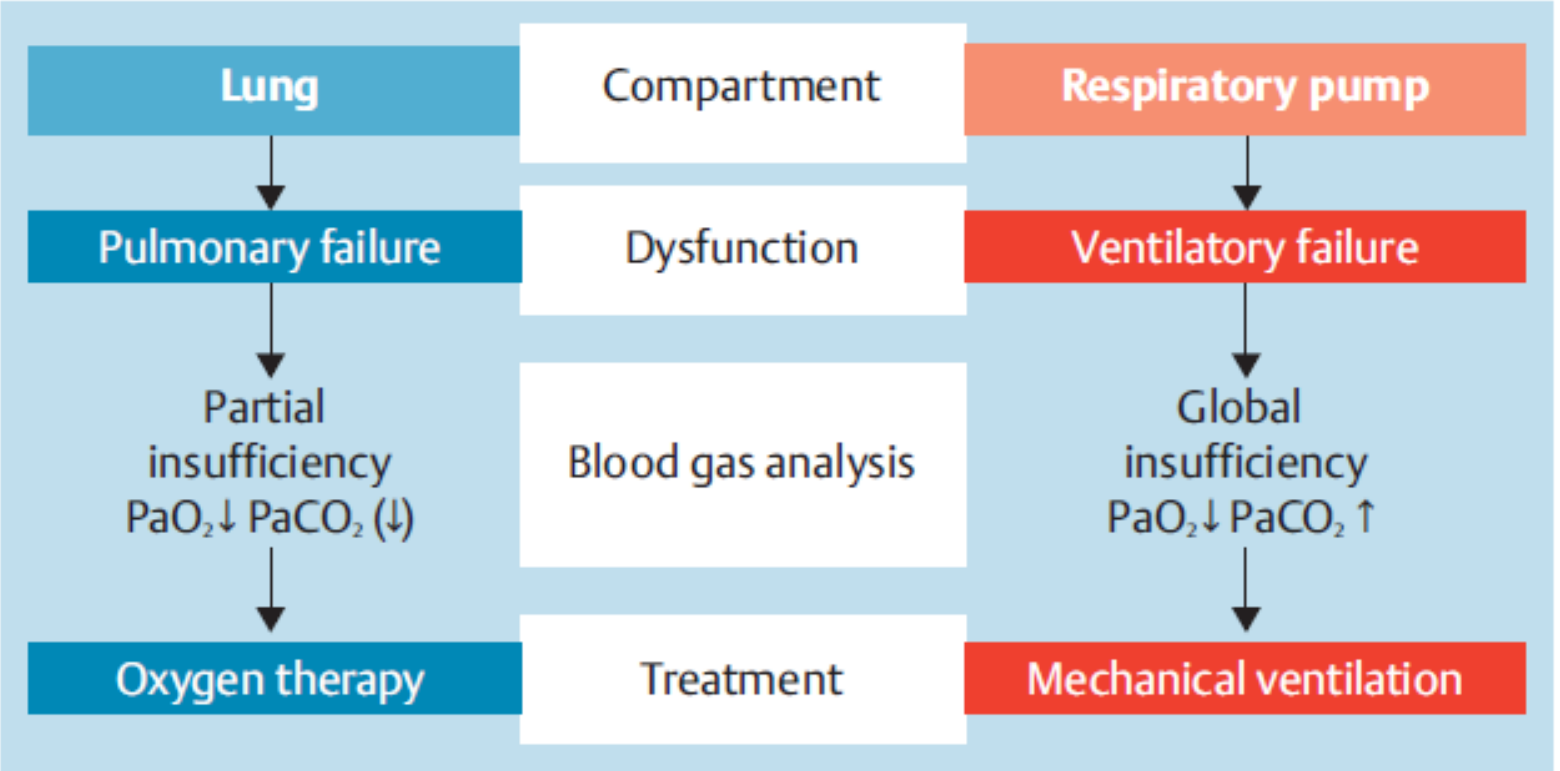


Fig. 1 The respiratory system.

CNS
breathing center
1. motor neuron

PNS
2. motor neuron

Motor endplate
neuromuscular junction

Inspiratory
respiratory muscles

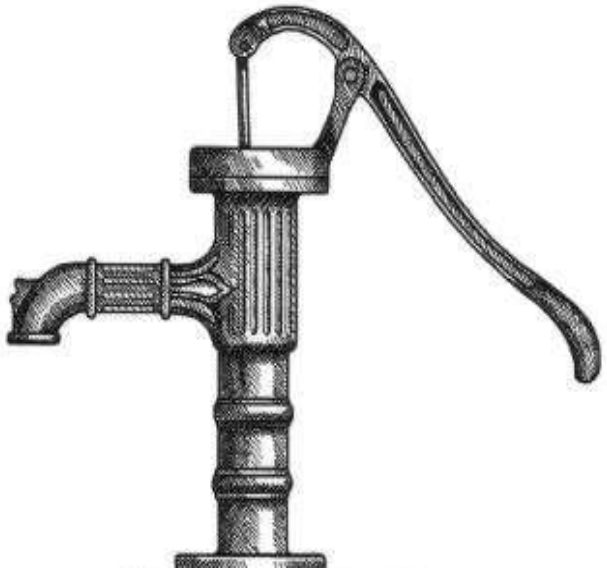
Rib cage

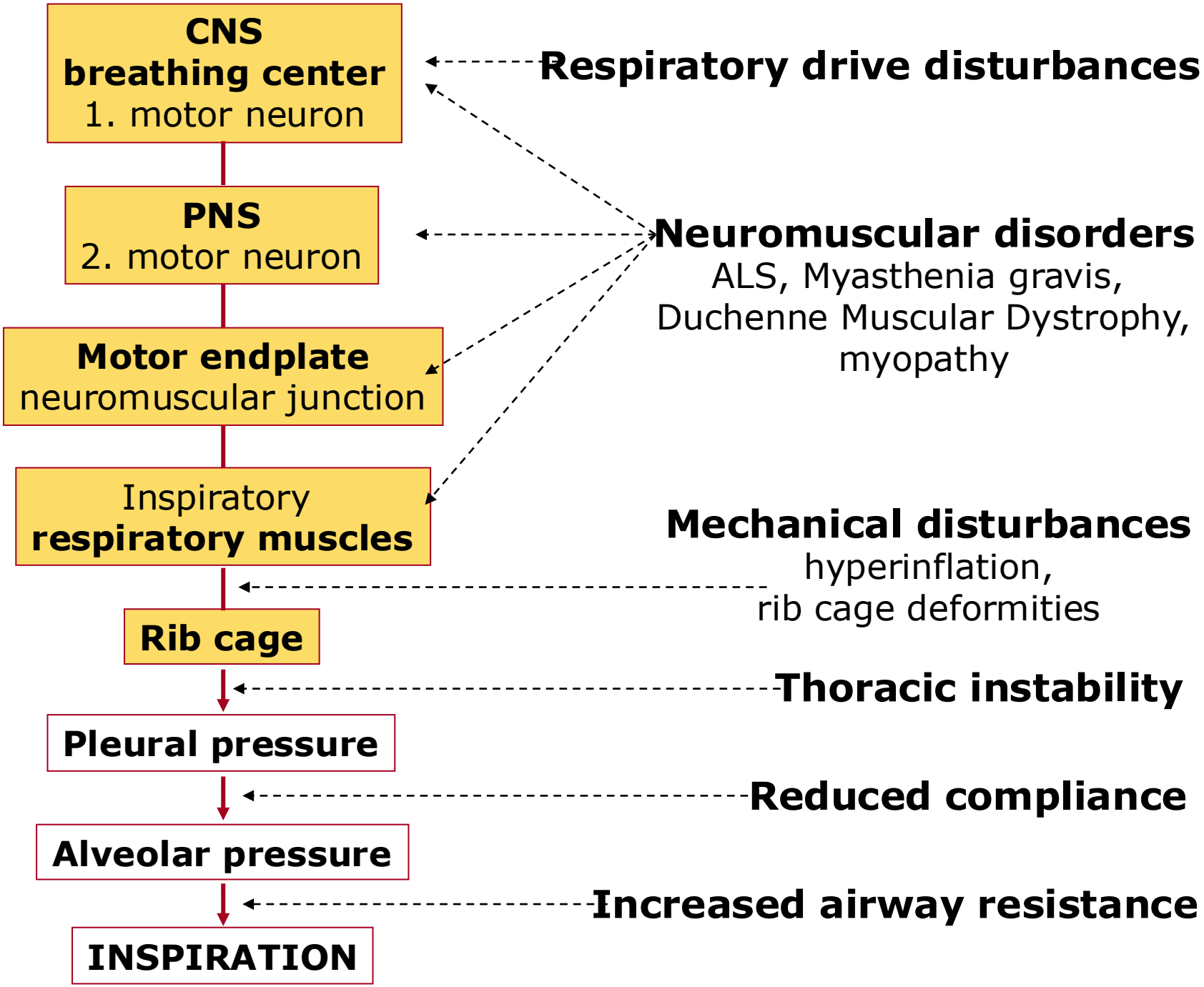
Pleural pressure

Alveolar pressure

INSPIRATION

Respiratory pump




CNS
breathing center
1. motor neuron
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Motor endplate
neuromuscular junction
Inspiratory
respiratory muscles
Rib cage
Pleural pressure
Alveolar pressure
INSPIRATION
Respiratory drive disturbances
Neuromuscular disorders
ALS, Myasthenia gravis,
Duchenne Muscular Dystrophy,
myopathy
Mechanical disturbances
hyperinflation,
rib cage deformities
Thoracic instability
Reduced compliance
Increased airway resistance

Medical Conditions That May Be Appropriate for Home Mechanical Ventilation

- **Central Nervous System Disorders**
  - Arnold-Chiari malformation
  - Central nervous system trauma
  - Cerebrovascular disorders
  - Congenital and acquired central control of breathing disorders
  - Myelomeningocele
  - Spinal cord traumatic injuries
- **Neuromuscular Disorders**
  - Amyotrophic lateral sclerosis
  - Guillain-Barré syndrome
  - Muscular dystrophies
  - Myasthenia gravis
  - Phrenic nerve paralysis
  - Polio and postpolio sequelae
  - Spinal muscle atrophy
  - Myotonic dystrophy

Medical Conditions That May Be Appropriate for Home Mechanical Ventilation (CONT)

- **Skeletal Disorders**
  - Kyphoscoliosis
  - Thoracic wall deformities
  - Thoracoplasty
  - Obesity-Hypoventilation Syndrome
- **Cardiovascular Disorders**

  Congenital and acquired heart disease
- **Upper Airway Disorders**
  - Pierre-Robin syndrome
  - Tracheomalacia
  - Vocal cord paralysis
- **Lower Airway Disorders**
  - Bronchopulmonary dysplasia
  - COPD
  - Cystic fibrosis
  - Complications of infectious pneumonias
  - Pulmonary fibrotic disease

Indications of HMV

- Does the patient have a disease known to cause ventilatory failure?
- Does the patient have symptoms suggesting hypoventilation?
- Does the patient have objective parameters suggesting hypoventilation/respiratory muscle weakness?

Indications of HMV

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Symptoms of Hypoventilation

Jackson CE et al, J Neurol Sci 2001: 75-8

How much of a problem have the following symptoms been for you over the past 4 weeks?

	Very large amount	Large amount	Moderate to large amount	Moderate amount	Small to moderate amount	Small amount	None
(1) Decreased energy	1	2	3	4	5	6	7
(2) Excessive fatigue	1	2	3	4	5	6	7
(3) Feeling that ordinary activities require an extra effort to perform or complete	1	2	3	4	5	6	7
(4) Difficulty with a dry or sore mouth/ throat upon awakening	1	2	3	4	5	6	7
(5) Waking up often (more than twice) during the night	1	2	3	4	5	6	7
(6) Difficulty returning to sleep if you wake up in the night	1	2	3	4	5	6	7
(7) Waking up at night feeling like you were choking	1	2	3	4	5	6	7
(8) Waking up in the morning with a headache	1	2	3	4	5	6	7
(9) Waking up in the morning feeling unrefreshed and/or tired	1	2	3	4	5	6	7
(10) A feeling that your sleep is restless or frequent nightmares	1	2	3	4	5	6	7
(11) Difficulty staying awake while during the day	1	2	3	4	5	6	7
(12) Feeling short of breath when lying flat in bed	1	2	3	4	5	6	7
(13) Difficulty concentrating	1	2	3	4	5	6	7
(14) Having nightmares	1	2	3	4	5	6	7

Symptoms of Nocturnal Hypoventilation

Early

- Poor Sleep
- Awakenings
- Nightmares
- Morning or continuous headaches
- Daytime Sleepiness

Late

- Dyspnea
- Tachypnea
- Fatigue while talking or eating
- Worsening of early symptoms

Screening for SDB in NMD

DISFUNÇÃO RESPIRATÓRIA
EM DOENÇAS NEUROMUSCULARES

ESCOLA DE PNEUMOLOGIA | COIMBRA
XX Curso de Pós-Graduação | 9 e 10 de Maio 2015

TABLE 1 The SiNQ-5, a self-administered questionnaire to screen for sleep-disordered breathing in neuromuscular disease

Dear Patient,

The following questions may help us to decide whether you may have disordered breathing during sleep related to muscle weakness. Please circle the most appropriate answer to each question.

Thank you for your cooperation.

Do you feel breathless, if			
you lie down? (*e.g.* on your bed)	Yes (2)	Sometimes (1)	No (0)
you bend forward? (*e.g.* to tie your shoelaces)	Yes (2)	Sometimes (1)	No (0)
you swim in water or lay in a bath?	Yes (2)	Sometimes (1)	No (0)
Have you changed your position when in bed?	Yes (2)	No (0)	
Have you noticed a change in your sleep (waking more, getting up, poor quality sleep)?	Yes (2)	No (0)	

Numbers in parentheses represent scores.

Steier J, ERJ 2011

SPP SOCIEDADE PORTUGUESA DE PNEUMOLOGIA

Screening for SDB in NMD

TABLE 7 Accuracy of the Sleep-Disordered Breathing in Neuromuscular Disease Questionnaire (SiNQ-5) to assess respiratory muscle weakness associated with sleep-disordered breathing for different questionnaire's scores

SinQ-5 score	Sensitivity	Specificity	PPV	NPV
⩾4 points	0.931	0.781	0.563	0.974
⩾5 points	0.862	0.885	0.694	0.955
⩾6 points	0.828	0.906	0.727	0.946

PPV: positive predictive value; NPV: negative predictive value.

Steier J, ERJ 2011

Indications of HMV

- Does the patient have a disease known to cause ventilatory failure?
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Methods for Assessing Respiratory involvement/hypoventilation

- Lung volumes (VC, TLC)
- Pimax/Pemax/SNIP
- ABG: PaCO2/ PaO2/pH/BE
- Cough strength, MIC
- Noninvasive blood gases(PETCO2/PTCCO2/Oximetry)
- Sleep studies (Oximetry/PETCO2/PTCCO2/Polysomnography)
- Non-volitional tests of muscle strength

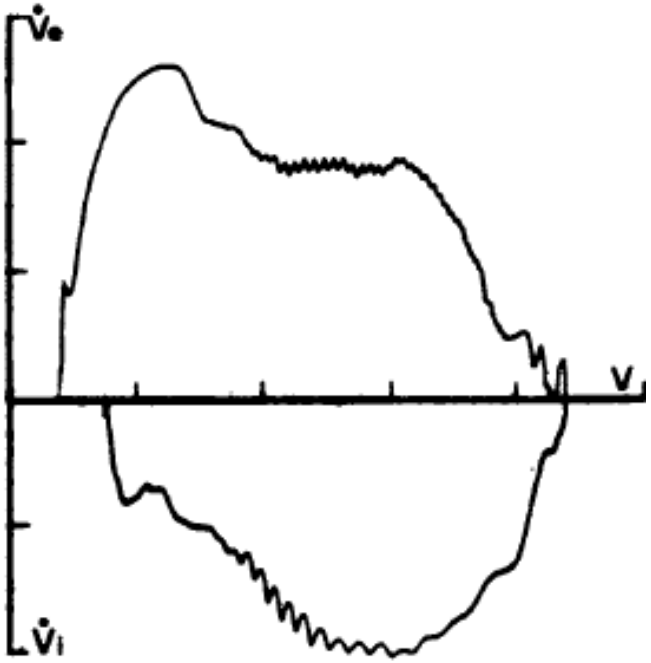
Detection of upper airway muscle involvement in neuromuscular disorders using the flow-volume loop.

W Vincken, G Elleker and M G Cosio

Chest 1986;90;52-57
DOI 10.1378/chest.90.1.52

Myastenia Gravis

ALS

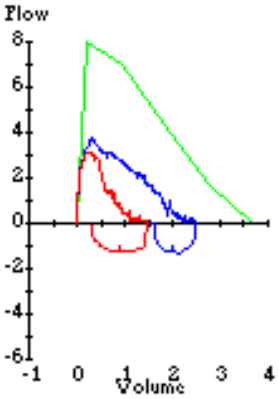


Postural change of FVC

Hospital de São João
Serviço de Pneumologia
Lab. Exploração Funcional Respiratória

Data: 14/02/2006
Id: 4040[redacted]
Nome: [redacted]
Altura: 164 cm Sexo: Male
Peso: 76.0 Kg Idade: 53

Estudo da Função Pulmonar

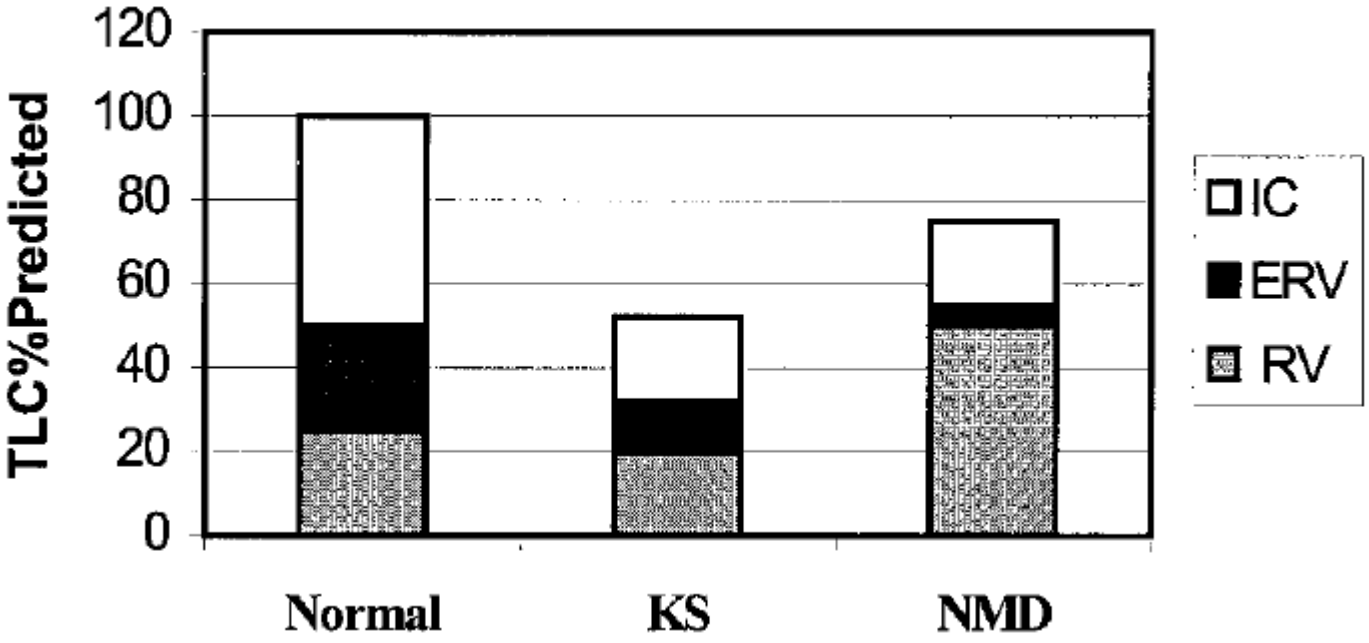


Espirometria

		Ref	Sitting Pre Meas	Sitting Pre % Ref	Supine Post Meas	Supine Post % Ref	Supine Post % Chg
FVC	Liters	3.73	(2.51)	(67)	(1.50)	(40)	-40
FEV1	Liters	3.02	(1.95)	(64)	(1.08)	(36)	-44
FEV1/FVC	%	78	78		72		
FEF25-75%	L/sec	3.60	(1.81)	(50)	(0.74)	(21)	-59
FEF25%	L/sec	6.95	(3.04)	(44)	(2.99)	(43)	-2
FEF50%	L/sec	4.22	2.17	51	(1.32)	(31)	-39
FEF75%	L/sec	1.56	0.55	35	0.29	19	-47
PEF	L/sec	7.94	(3.73)	(47)	(3.07)	(39)	-18
FIVC	Liters	3.73	(0.89)	(24)	(1.19)	(32)	34
FVL E Code			110000		111000		

A decrease in VC of > 25% suggests significant diaphragmatic weakness

Lung volumes



Maximum Mouth Pressures

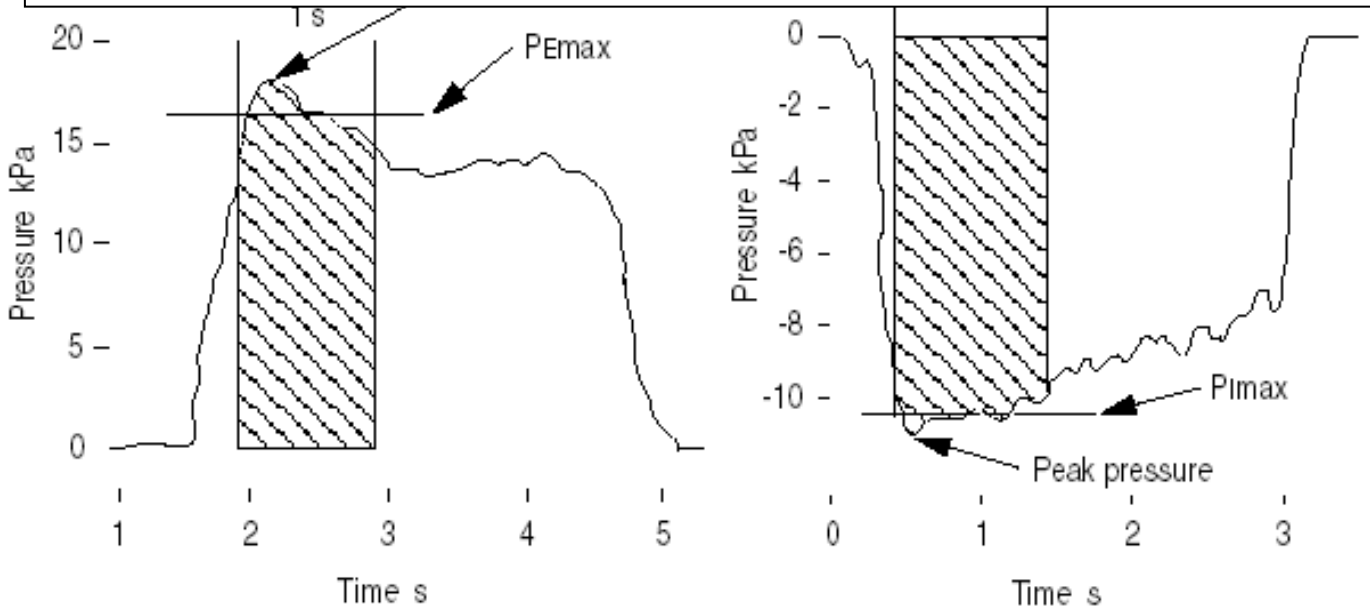
Eur Respir J, 1994, 7, 398–401
DOI: 10.1183/09031936.94.07020398
Printed in UK - all rights reserved

European Respiratory Journal
ISSN 0903 - 1936

TECHNICAL NOTE

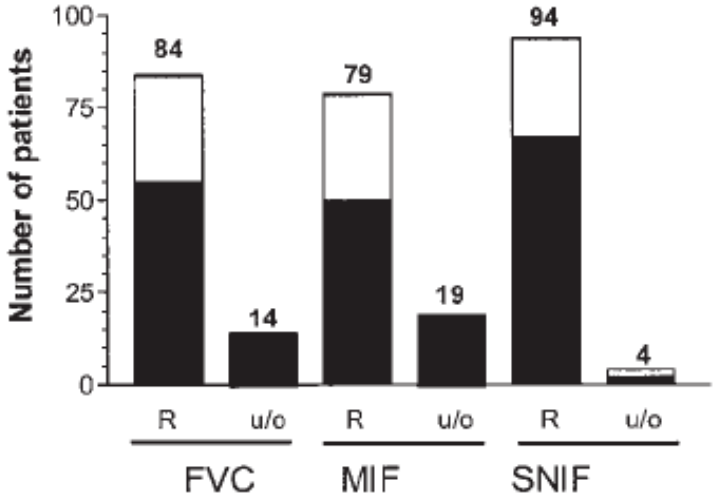
Portable measurement of maximum mouth pressures

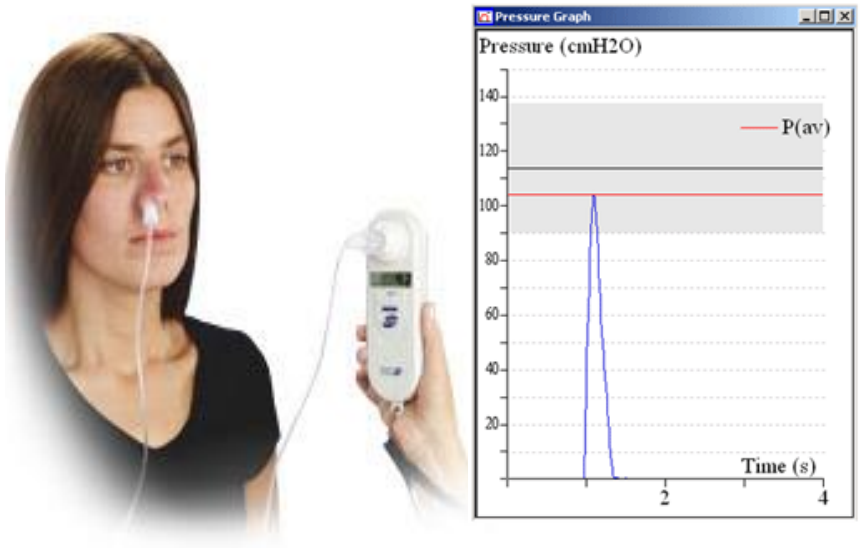
Pimax of -80cmH20 usually excludes clinically important inspiratory muscle weakness



Sniff nasal inspiratory pressure

More natural and easier to perform than MIP.
Values gratear than -70cmH20 (M) and -60cmH20 (F) exclude significant inspiratory muscle weakness

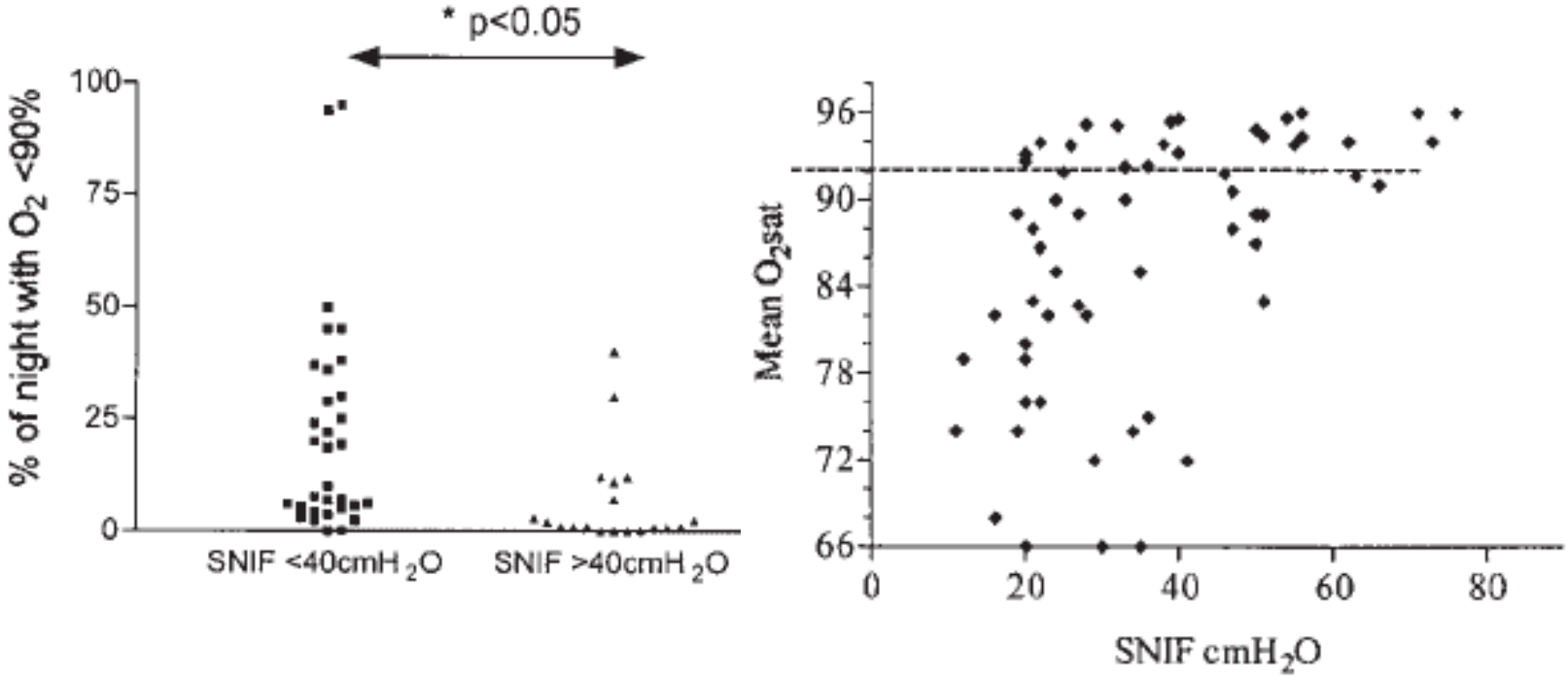




Morgan RK, Am J Respir Crit Care Med 2005: 269-74

Sniff nasal inspiratory pressure

SNIP< 40cmH20 was associated with dessaturation analysis and predicted median survival-6M



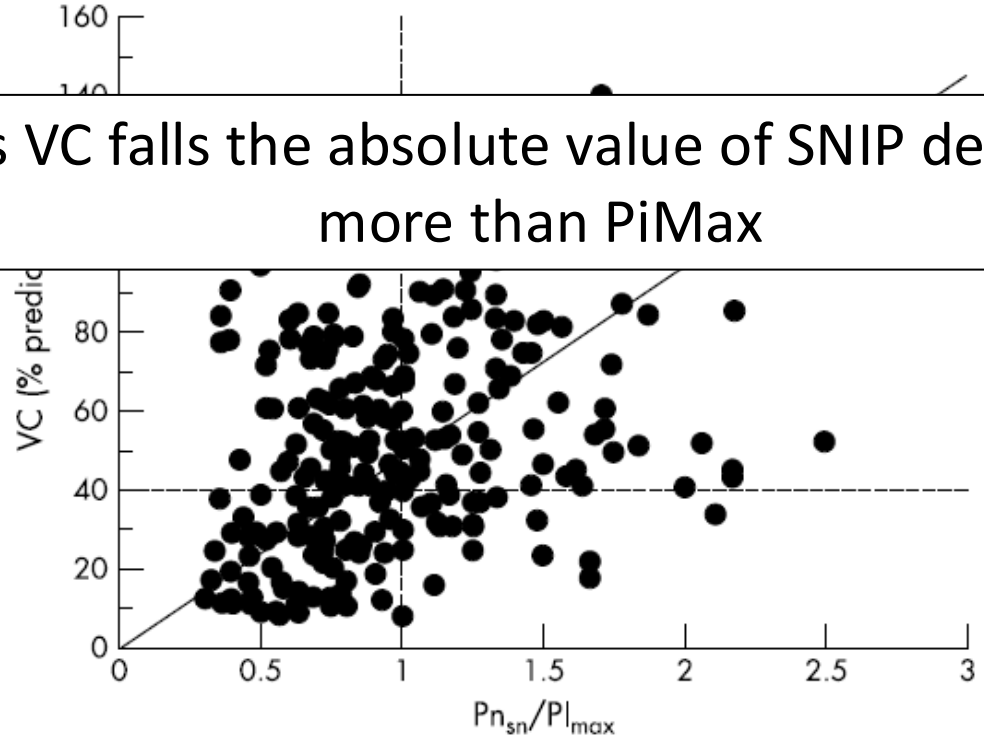
Morgan RK, Am J Respir Crit Care Med 2005: 269-74

Limitations of sniff nasal pressure in patients with severe neuromuscular weakness

N Hart, M I Polkey, T Sharshar, L Falaize, B Fauroux, J C Raphaël and F Lofaso

J. Neurol. Neurosurg. Psychiatry 2003;74;1685-1687
doi:10.1136/jnnp.74.12.1685

As VC falls the absolute value of SNIP declines more than PiMax

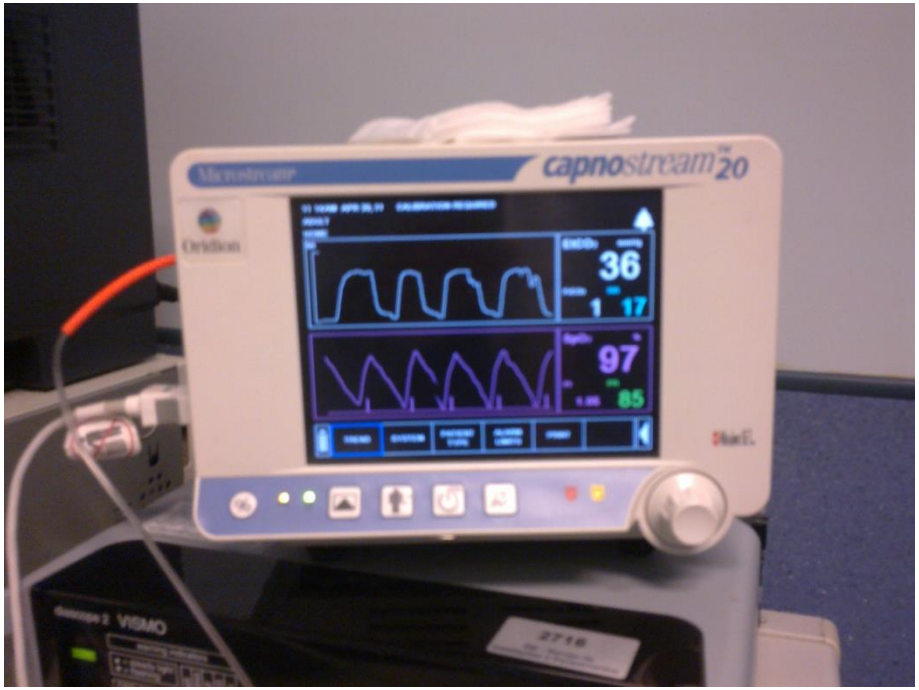


Arterial Blood Gases

Hyperventilation (Pain) may falsely lower $PaCO_2$

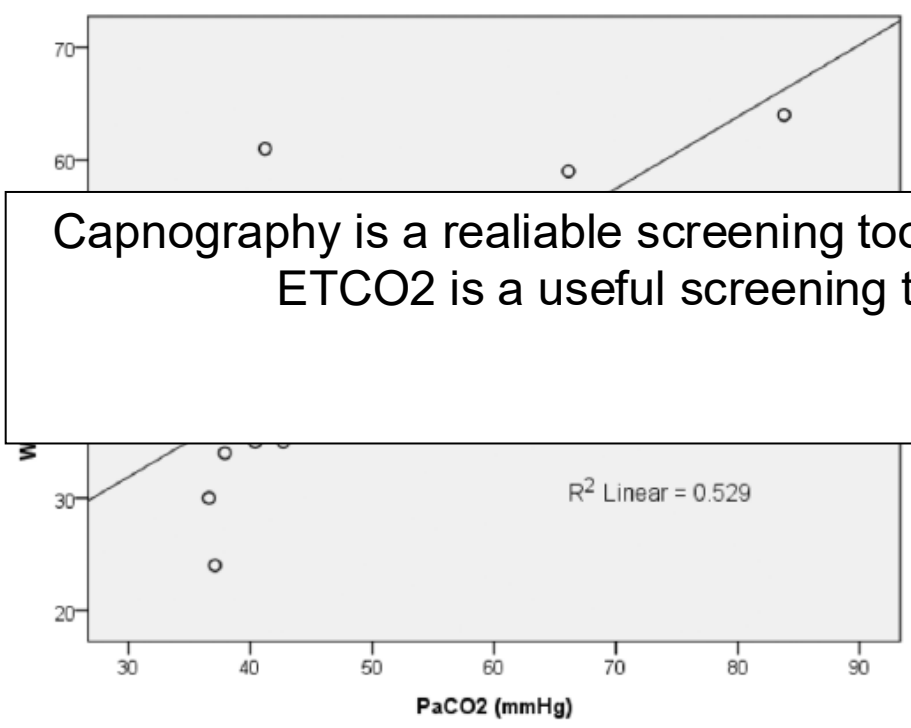
Cinel D, Am Rev Respir Dis 1991:217

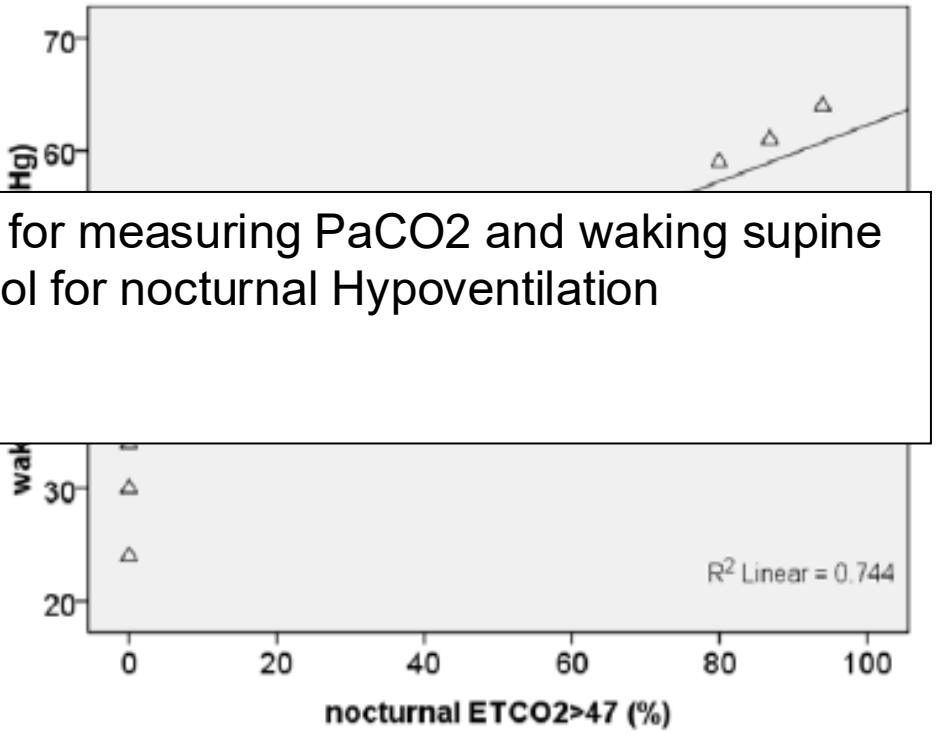
Capnography



Capnography for Assessing Nocturnal Hypoventilation and Predicting Compliance with Subsequent Noninvasive Ventilation in Patients with ALS

Sung-Min Kim[1,2], Kyung Seok Park[1,2], Hyunwoo Nam[3], Suk-Won Ahn[4], Suhyun Kim[5], Jung-Joon Sung[1*], Kwang-Woo Lee[1*]





Capnography is a realiable screening tool for measuring PaCO2 and waking supine ETCO2 is a useful screening tool for nocturnal Hypoventilation

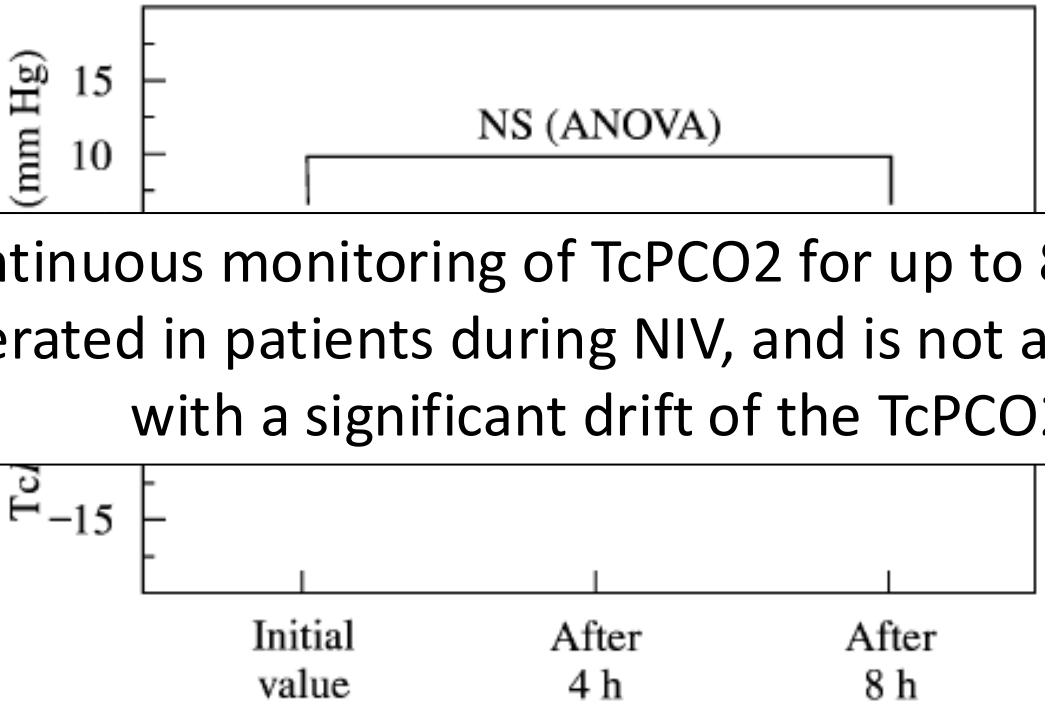
Kim S-M, PlosOne 2011; 6:e17893

Transcutaneous CO2

RESPIRATORY MEDICINE (2001) 95, 331–335
doi:10.1053/rmed.2001.1045, available online at http://www.idealibrary.com on IDEAL®

Is continuous transcutaneous monitoring of PCO_2 ($TcPCO_2$) over 8 h reliable in adults?

J. P. JANSSENS, E. PERRIN, I. BENNANI, B. DE MURALT, V. TITELION and C. PICAUD



Continuous monitoring of TcPCO2 for up to 8 h is well tolerated in patients during NIV, and is not associated with a significant drift of the TcPCO2

Transcutaneous monitoring as a replacement for arterial PCO_2 monitoring during nocturnal non-invasive ventilation☆

Jan Hendrik Storre*, Friederike Sophie Magnet, Michael Dreher, Wolfram Windisch

Modern PtcCO2-monitoring is reliable, accurate and robust. It should become the preferred technique for assessing alveolar ventilation during nocturnal NPPV.

Table 3 Continuous overnig), irrespective of the underlying disease.

			e (RM-ANOVA)
Technical Drift (mmHg)			
Mean of overnight $PtcCO_2$ (mmHg)	48.5 (42.4–50.6)	47.9 (43.6–59.0)	47.8 (42.9–49.8)	0.718
Standard deviation of overnight $PtcCO_2$ (mmHg)	2.5 (1.9–3.0)	3.2 (2.3–4.0)	2.4 (2.1–3.0)	0.121

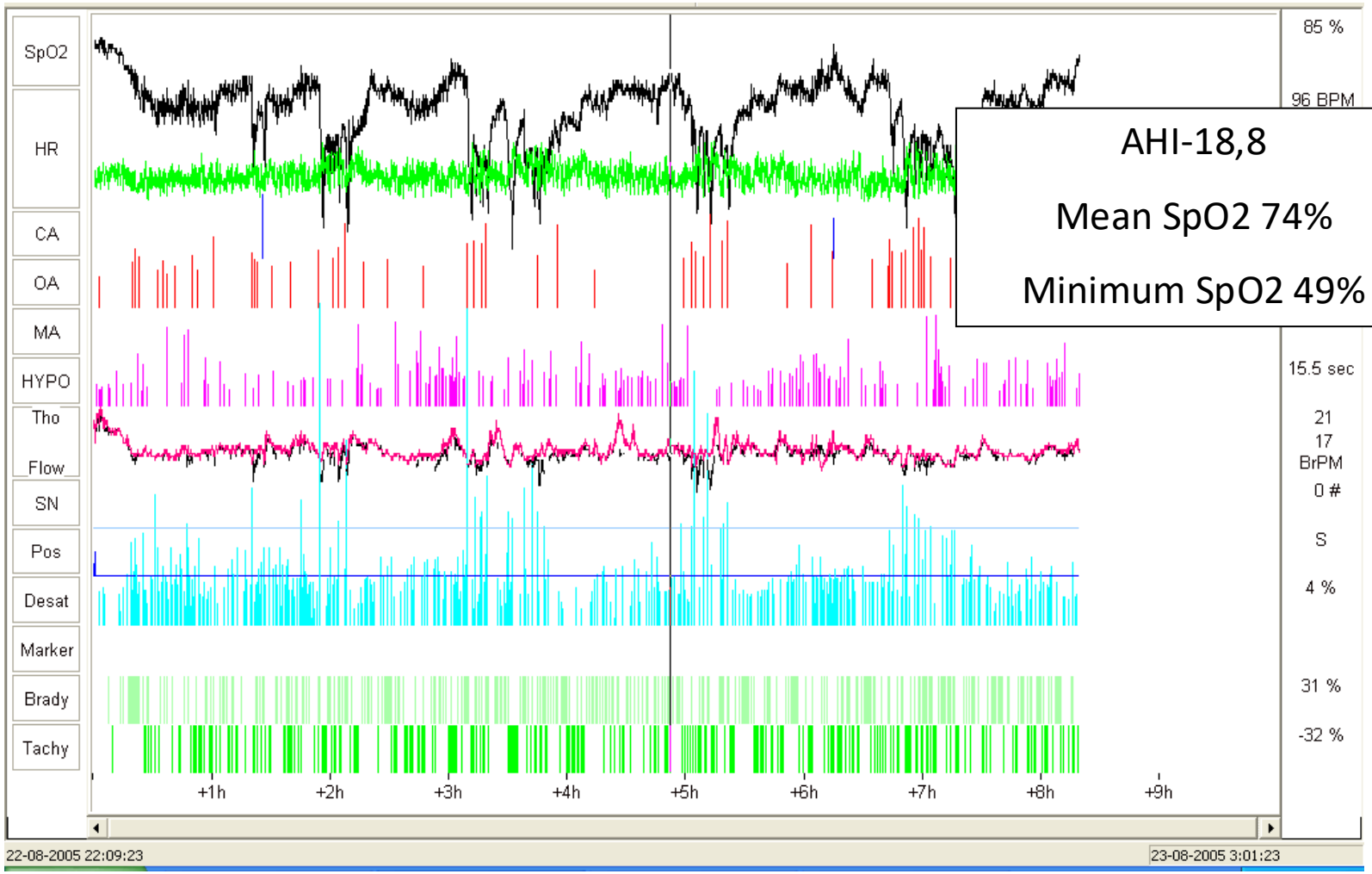
$PtcCO_2$ = transcutaneous partial pressure of carbon dioxide.

Respir Med. 2011 Jan;105(1):143-50

Cytoplasmatic bodies Myopathy

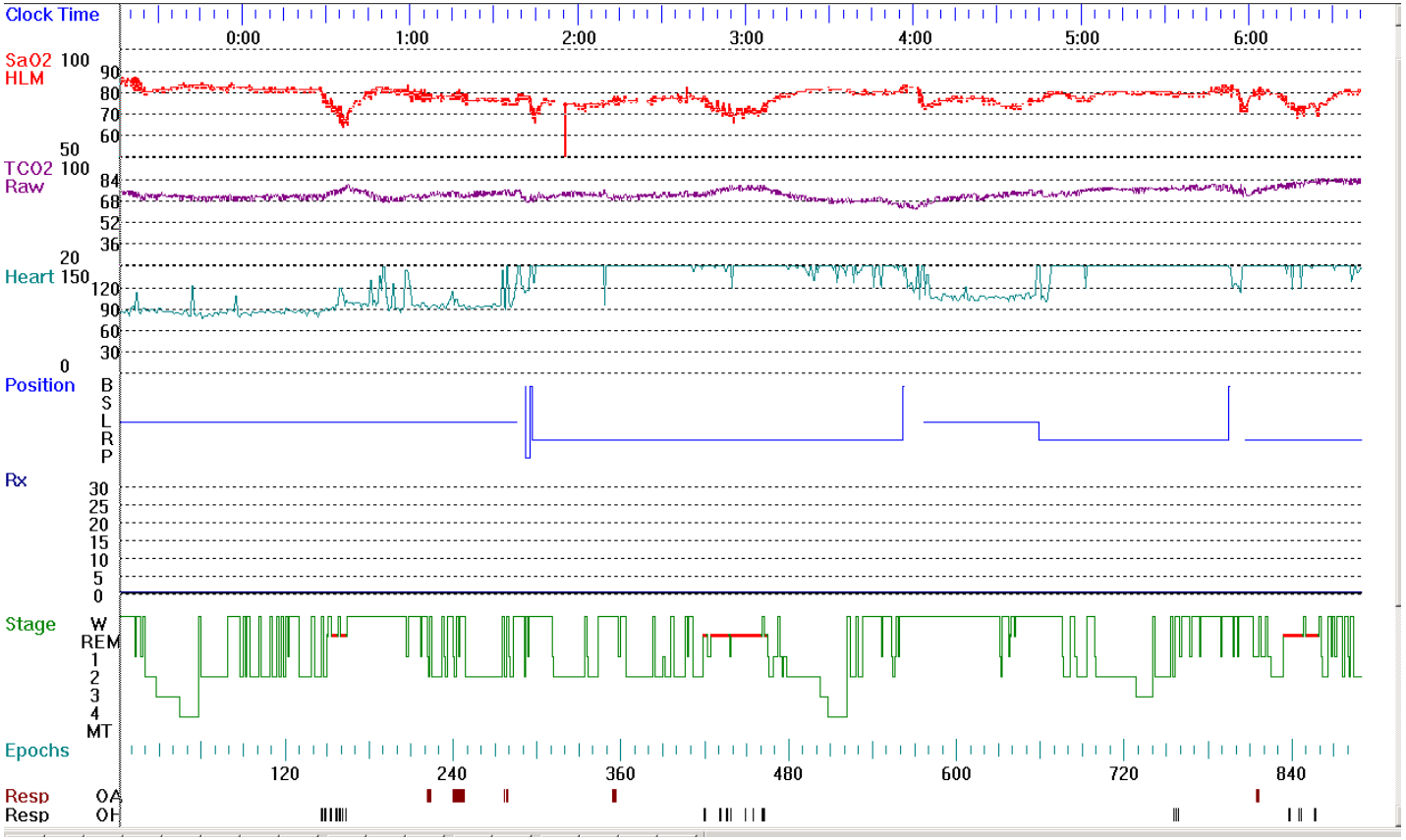
FVC 1,25(57%) FEV1 1,04 (57%) IT 83% PiMax 41,00 (58%) PeMax 76cmH20 (56%)

PaO2 76,10 PaCO2 54,50 ph 7,43



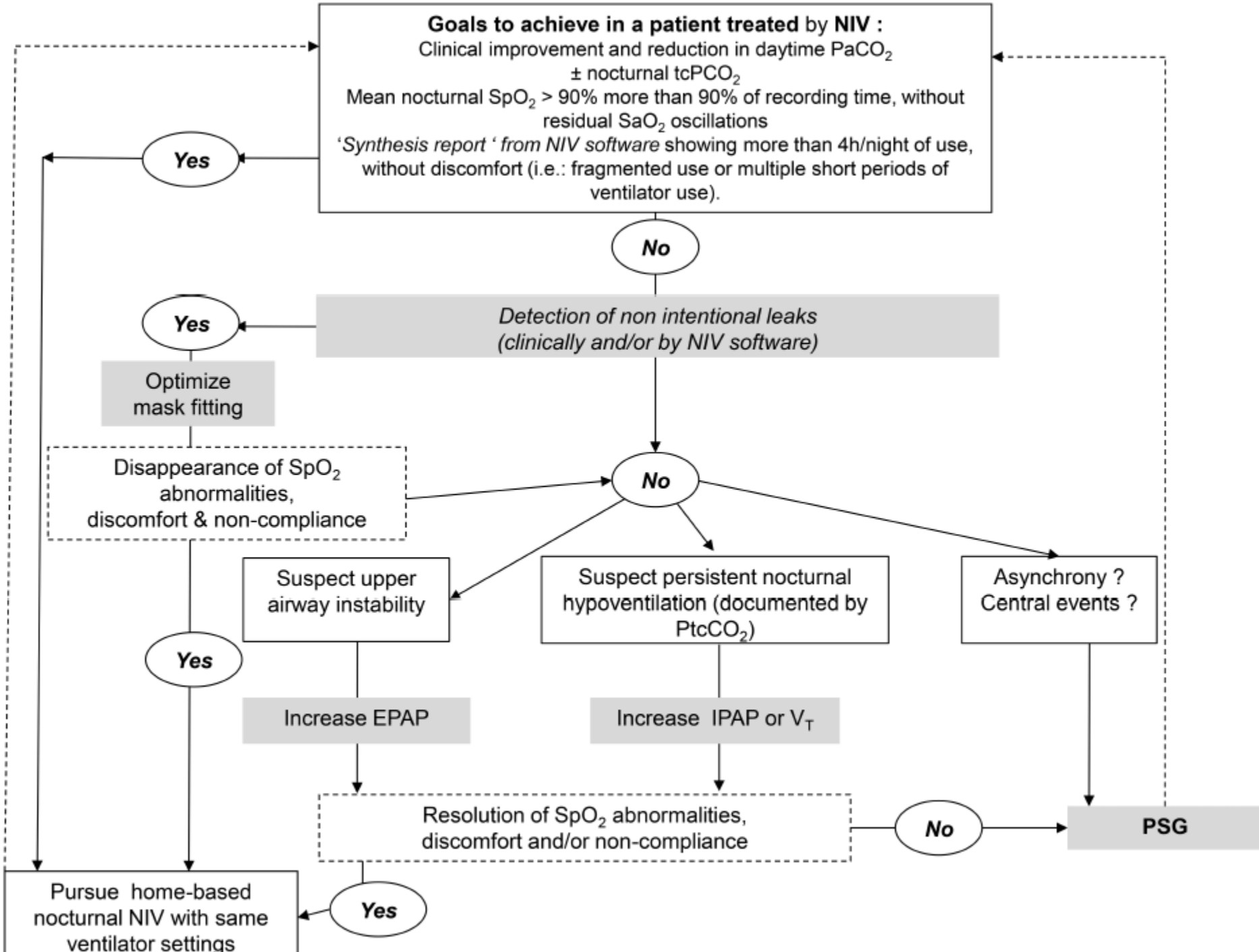
Goncalves MR et al, ERJ 2007:183s

PSG with TcCO2



Winck JC, Simonds, AK. Ambrosino & Goldstein Ed, **Ventilatory Support for Chronic Respiratory Failure, 2008**

Poligraphy including ventilator built-in sofware


Goals to achieve in a patient treated by **NIV :**
Clinical improvement and reduction in daytime $PaCO_2$
± nocturnal $tcPCO_2$
Mean nocturnal SpO_2 > 90% more than 90% of recording time, without residual SaO_2 oscillations
'*Synthesis report* ' *from NIV software* showing more than 4h/night of use, without discomfort (i.e.: fragmented use or multiple short periods of ventilator use).
Yes
No
Detection of non intentional leaks (clinically and/or by NIV software)
Yes
Optimize mask fitting
Disappearance of SpO_2 abnormalities, discomfort & non-compliance
No
Suspect upper airway instability
Suspect persistent nocturnal hypoventilation (documented by $PtcCO_2$)
Asynchrony ? Central events ?
Yes
Increase EPAP
Increase IPAP or V_T
Resolution of SpO_2 abnormalities, discomfort and/or non-compliance
No
PSG
Pursue home-based nocturnal NIV with same ventilator settings
Yes

CWD: WHO SHOULD RECEIVE HMV?

- **Diagnostic certainty**
- **Symptoms eg. fatigue, dyspnoea, headaches**

1 of the following:

- **PaCO2 > 45mmHg**
- **Nocturnal SaO2 <88% for > 5 minutes**
- **MIP < 60cmH2O or FVC < 50% pred in progressive disorders**

Chest 1999;116:521-524

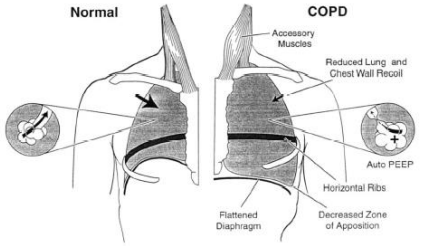
OHS: WHO SHOULD RECEIVE HMV?

- **IMC >30**
- **PaCO2> 45mmHg**

  or BE >3mmol/L or HCO3 > 27mmol/L (in the absence of another cause for metabolic alkalosis)>>this is an early stage of OHS

Hart N, Thorax 2018
Manuel, Chest 2015

COPD: WHO SHOULD RECEIVE HMV?

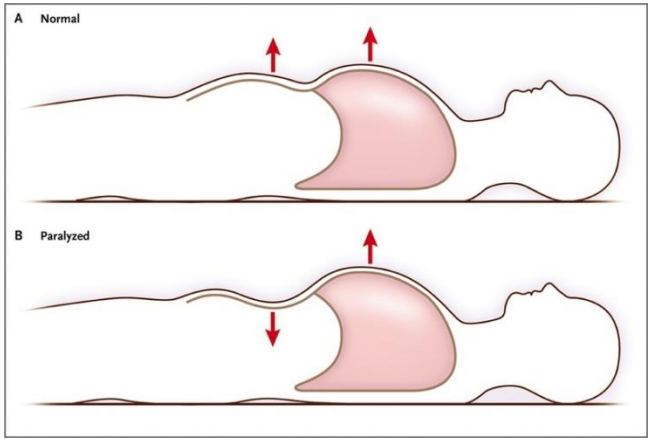


- Patients with <u>symptoms</u> (fatigue, dyspnea, morning headaches..) and:
- A $PaCO_2$ > 53 mmHg in a stable clinical condition
- $PaCO_2$ > 53 mmHg after 2-3 wks of admissions for hypercapnic respiratory failure
- High intensity ventilation (pressure and BURR) improve physiological outcomes. A reduction of $PaCO_2$ of at least 20% is important

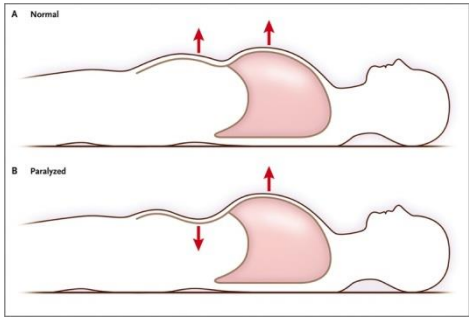
P Murphy et al, JAMA 2018
T Kohlein et al, Lancet Respir Med 2014
M Eliott, Lancet Respir Med 2014

NMD AND LONG-TERM NIV: MOST FREQUENT INDICATIONS

- Duchenne's and Becker's Muscular Dystrophy
- Steinert's myotonic dystrophy
- Amyotrophic lateral sclerosis (ALS)
- Spinal muscular atrophies
- Limg girdle muscular dystrophy
- Post-polio syndrome
- Myasthenia gravis



NMD AND HMV: WHEN?

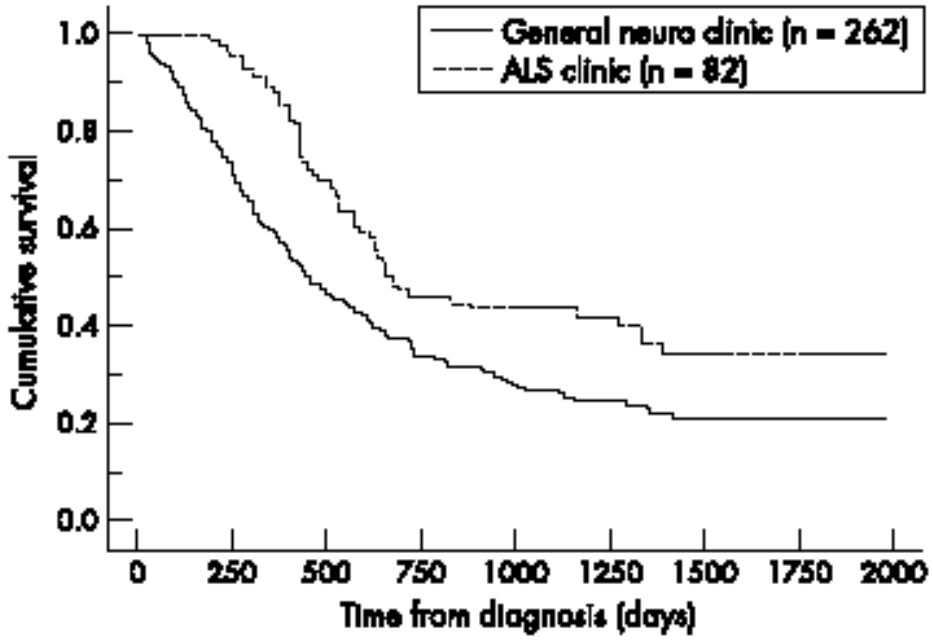


- Patients with <u>symptoms</u> (fatigue, dyspnea, morning headaches..) and:
- $PaCO_2$ > 45 mmHg
- MIP or SNIP < 60 cmH_2O and/or CV < 50% of predicted (in DMD: value of 30% predicted often used)
- Nocturnal SpO_2 < 88% for > 5min while under room air
- Nocturnal maxTcCO2 >49mmHg

A Goldberg et al; Chest 1999; 116: 521
Shneerson JM et al, Eur Respir J 2002

ORGANIZATION

ALS PATIENTS AT A MULTIDISCIPLINARY CLINIC HAVE BETTER PROGNOSIS



Traynor BJ, JNNP 2003

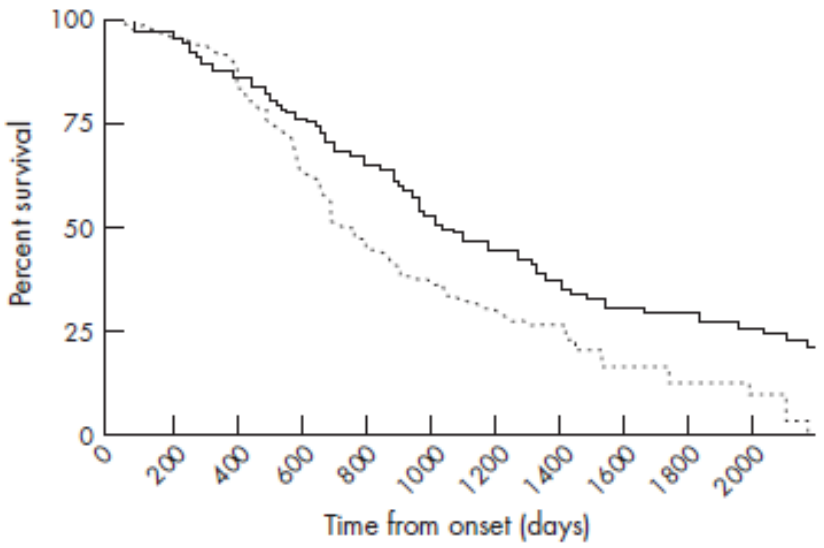


Figure 1 Survival curves of patients with amyotrophic lateral sclerosis (ALS) followed up by tertiary ALS centres (continuous line) and general neurology clinics (dotted line; p=0.0008).

Chiò A, JNNP 2006

Survival in Amyotrophic Lateral Sclerosis With Home Mechanical Ventilation*

The Impact of Systematic Respiratory Assessment and Bulbar Involvement

Eva Farrero, MD; Enric Prats, MD; Mónica Povedano, MD; J. Antonio Martinez-Matos, MD; Frederic Manresa, MD; and Joan Escarrabill, MD, FCCP

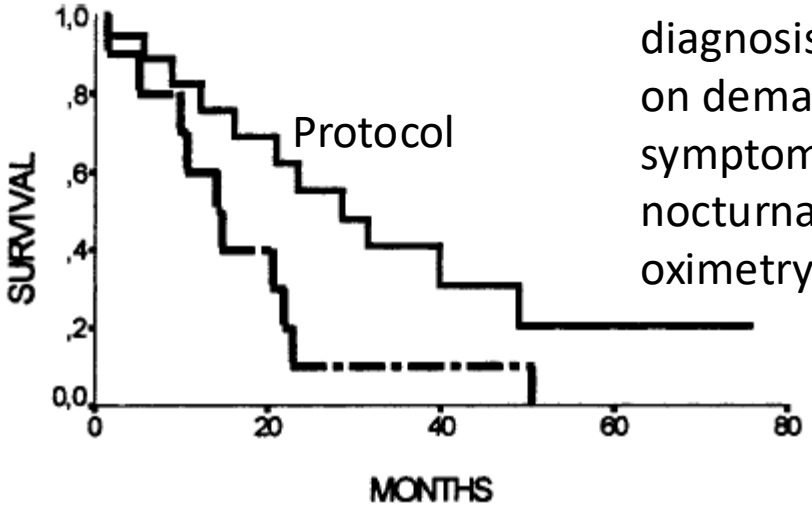


FIGURE 3. Survival times with NIV therapy in patients without bulbar impairment according to the initiation of NIV therapy before protocol initiation (broken line) or after protocol initiation (solid line).

Protocol: immediately after diagnosis and **every 3 months** (and on demand because of new symptoms):spirometry; home nocturnal pulse oximetry; ABG

CHEST 2005; 127:2132–2138

HMV in Sweden: Survival (1996-2005)

Network model

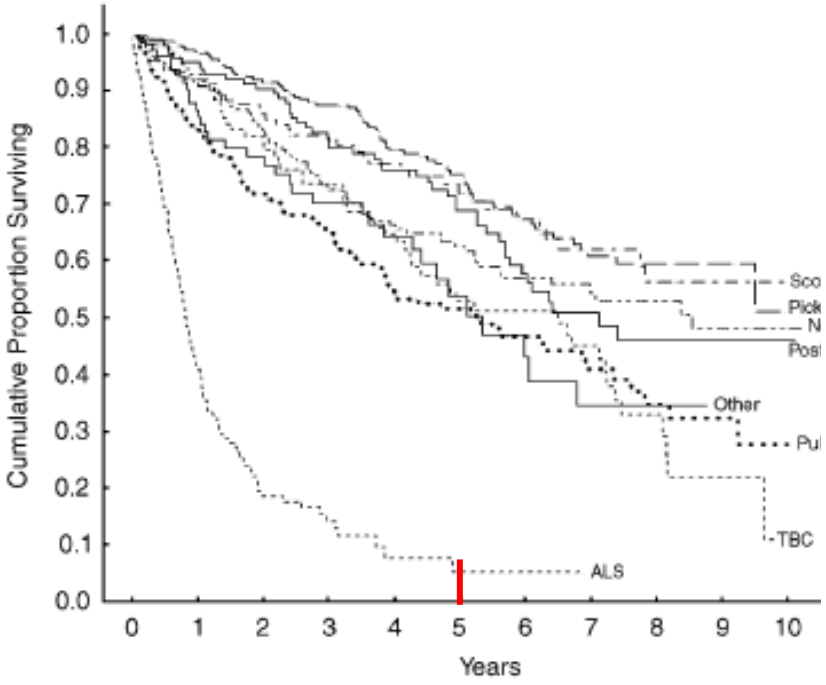


Figure 1 Probability to survive in 1526 adult patients starting HMV.

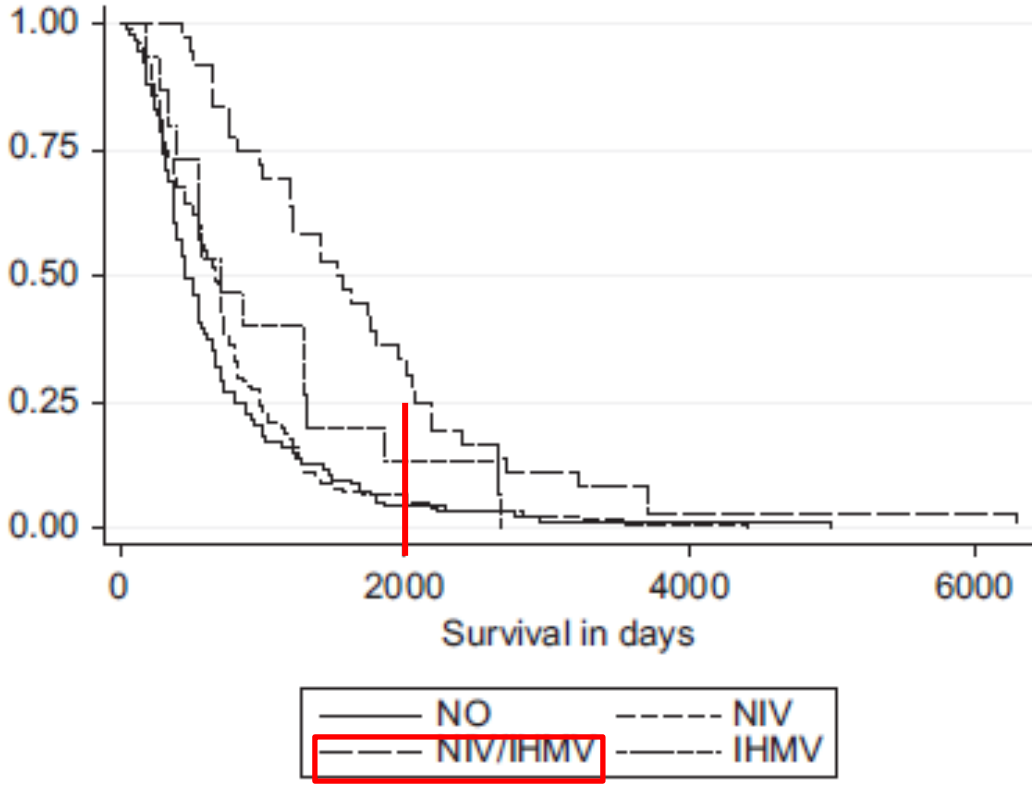
ALS: 165; mean age: 64 (10.5)

4% IHMV

Respiratory Medicine (2007) **101**, 1074–1078

HMV in Denmark (Respiratory Center West): ALS Survival 1998-2012

Reference centre model

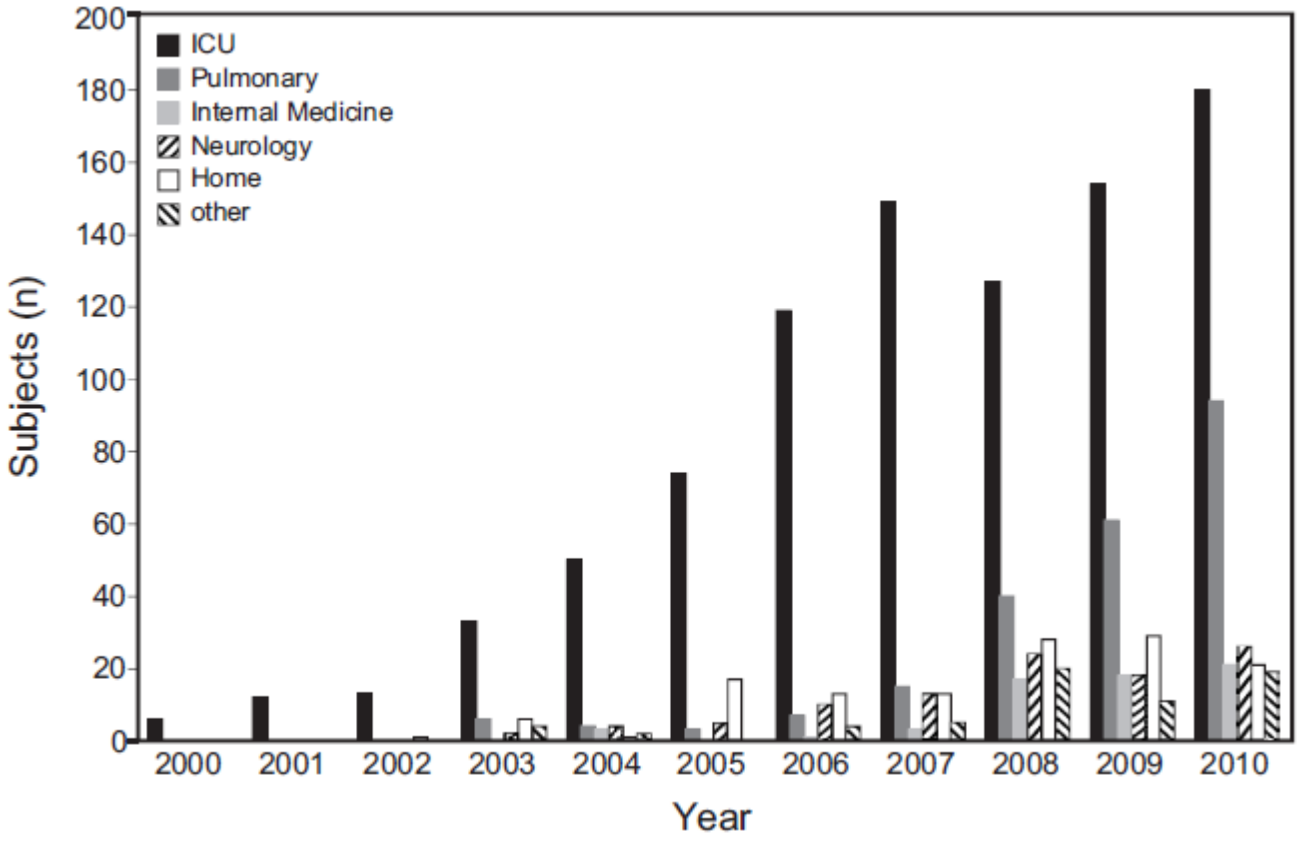


Total: 409; mean age 62

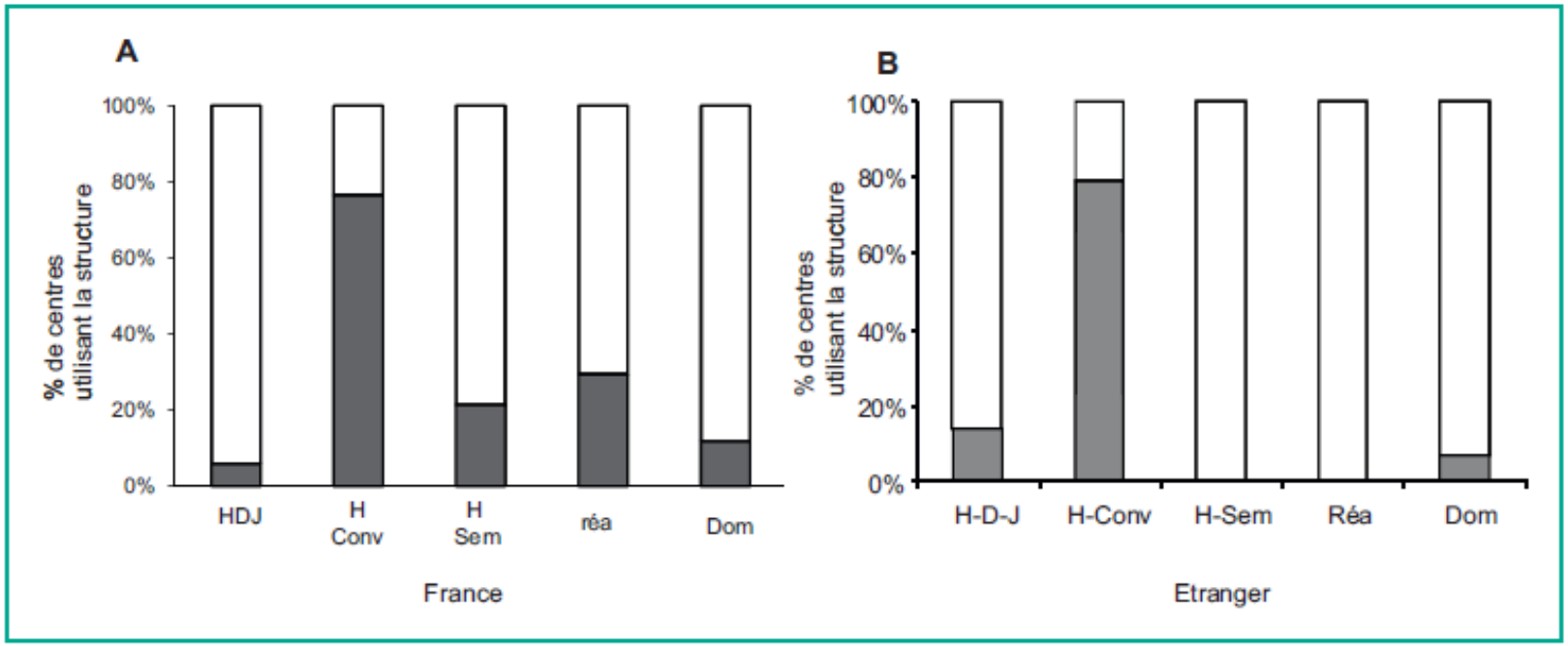
NIV/IHMV= 69; mean age 52.5 (9.1)

Amyotrophic Lateral Sclerosis and Frontotemporal Degeneration, 2014; 15: 62–67

HMV: SITE OF INITIATION (POLAND)

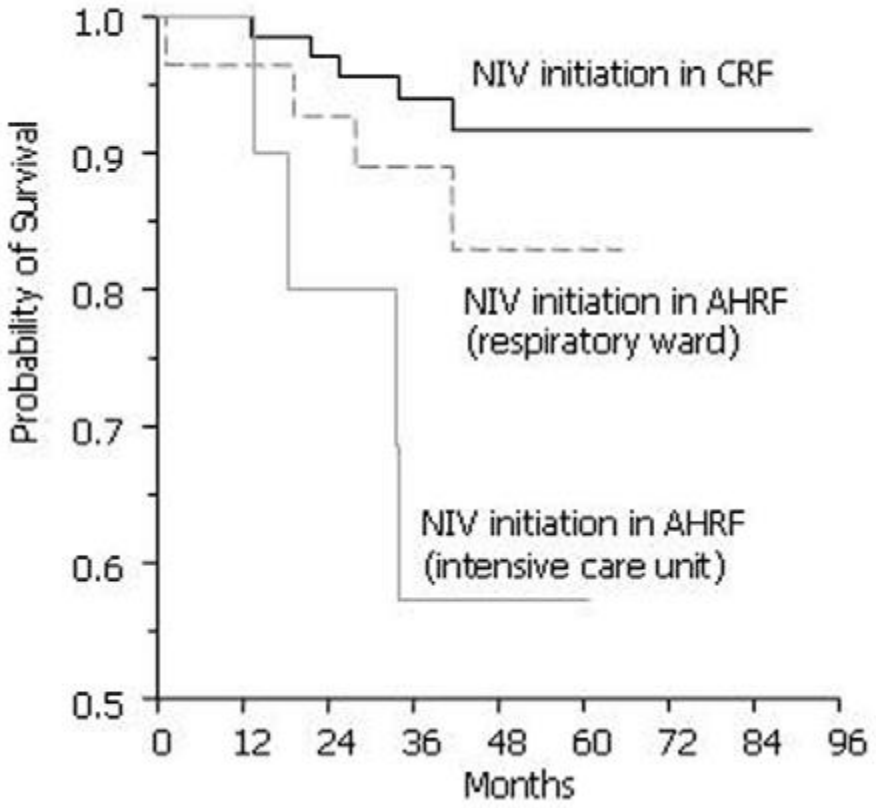


SURVEY CASAVNI 2007



Veale D, Rev Malad Respir 2010

SITE OF NIV INITIATION AND MORTALITY IN OHS



Borel JC et al, PlosOne 2012

Implementation of NIV: In or Out of Hospital?

	Year	COPD	Restrictive/ CWD	OHS	ALS	NMD
Lujan	2007	2	2	3	1	8
Chatwin*	2008	-	10	-	1	17
Domenéch-Clar	2008	-	16	6	?	20
Pallero	2014	-	29	9	-	15
Hazenberg**	2014	-	9	-	24	44
Sheers***	2014	-	-	-	29	-

- Only nocturnal hypoventilation; Excluded bulbar
- **Include 4 with Bulbar involvement

*** Include 7 with Bulbar phenotype

Implementation of NIV: In or Out of Hospital?

	Year	Setting	Duration	Ventilator
Lujan	2007	Day Hospital vs Ward	At least 3 h on consecutive days (mean 5.5±1.3 days)	11 Pressure/ 5 Volume
Chatwin	2008	Outpatient sessions vs Hospital ward	3 visits a week apart*settings were adjusted over a 30-45 min period.	Pressure
Domenéch-Clar	2008	Home vs conventional ward	6 days	?
Hazenberg	2014	Home vs Respiratory ward **	Home: Mean of 3 NP visits	Pressure
Pallero	2014	Day Hospital vs Respiratory Ward	Daily ventilation sessions of at least 2 or 3 h	Volume cycled 50; pressure 3
Sheers	2014	Day hospital vs Ward	4-h to commence ventilation with acclimatization at home	Pressure

Respiratory Medicine (2008) 102, 1521–1527

available at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/rmed

Adaptation and follow-up to noninvasive home mechanical ventilation: Ambulatory versus hospital

Rosalía Doménech-Clar [a,*], Dolores Nauffal-Manssur [b], Luís Compte-Torrero [b], Mª Dolores Rosales-Almazán [a], Encarna Martínez-Pérez [b], Elisa Soriano-Melchor [a]

Adaptation to HMV

	Day 1	Day 2	Days 3/4	Days 4/5	Days 5/6
Pneumologist	Initial visit Adaptation Parameters	Clinical visit Tolerance Synchrony	Clinical visit Tolerance Synchrony Modification parameters	Clinical visit Tolerance Synchrony	Discharge visit
Nurse	Clinical visit Tolerance Training	Clinical visit Tolerance Problems Training	Clinical visit Tolerance Problems Training	Clinical visit Arterial gases Pulse oximetry	Clinical visit
Physiotherapist		Visit Respiratory exercises	Visit Respiratory exercises		

Data sheet for each clinical visit

Symptoms and complications*	HMV start	Follow-up dates
Dyspnea		
Somnolence		
Cephalea		
Inefficient cough		
Voice changes		
Deglution disorders		
Aerophagia		
Mouth dryness		
Rhinitis		
Conjunctivitis		
Pressure ulcers		
Ventilator	HMV start	Follow-up dates
Hours/day of use		
Nocturnal/daily use		
Tolerance**		

*Symptoms 0–5 (0 = none; 1 = few; 2 = moderate; 3 = several; 4 = many; 5 = most).

**Tolerance: 0 = none; 1 = little; 2 = moderate; 3 = good; 4 = very good; 5 = excellent.

Respiratory Medicine (2007) 101, 1177–1182

ELSEVIER

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Non-invasive home mechanical ventilation: Effectiveness and efficiency of an outpatient initiation protocol compared with the standard in-hospital model

Manel Luján, Amalia Moreno, Carmen Veigas, Concepción Montón, Xavier Pomares, Christian Domingo*

Table 1 Minimum skills to be acquired by patients or their carers during initiation.

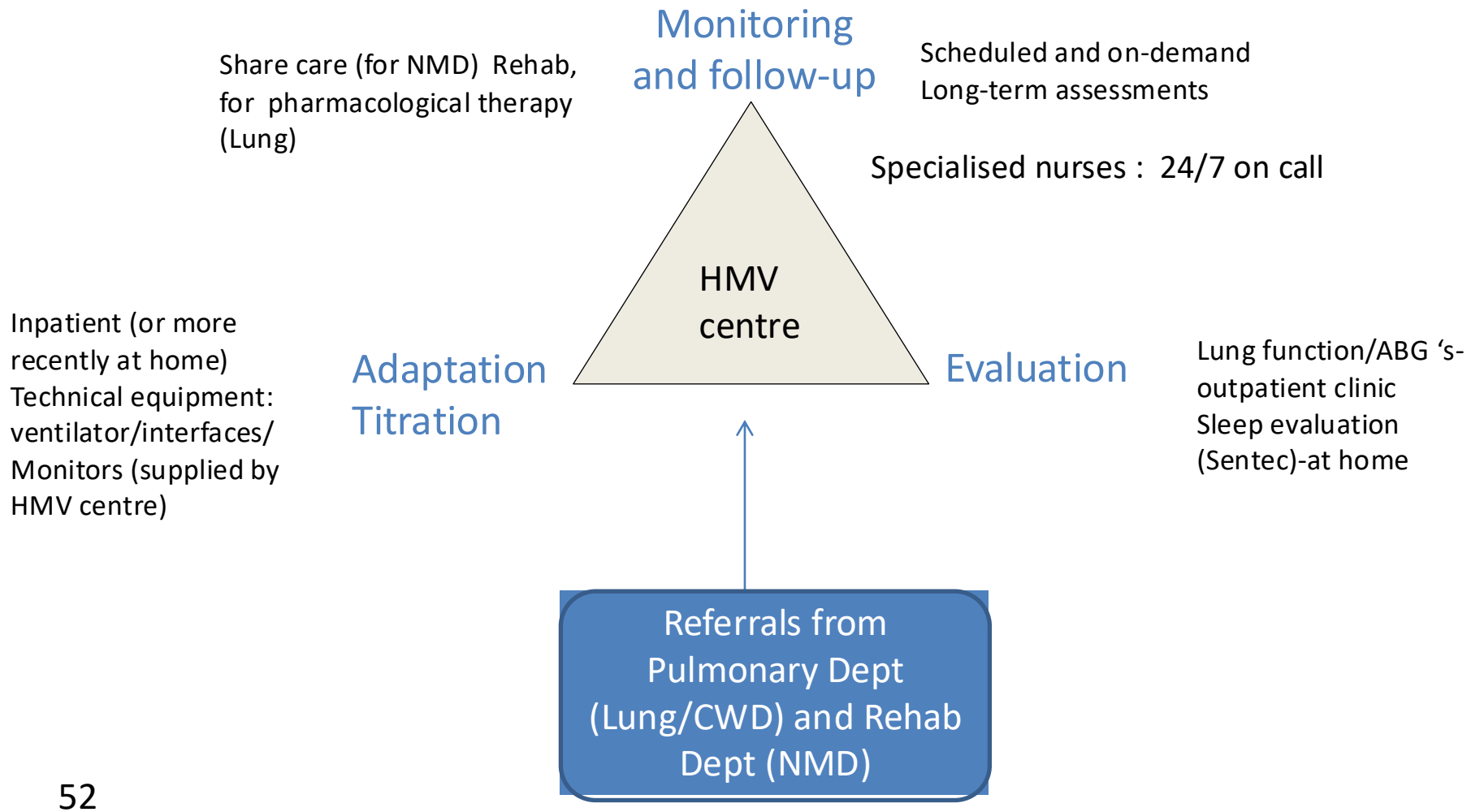
Placement and adjustment of the mask, without significant leakage
Adequate handling and placement of the expiratory valve
Familiarity with the most important parts of the ventilator
Familiarity with the main alarms on the ventilator
Adequate cleaning of the parts such as the filters, masks, and tubings
Ability to react to problems related to ventilation

Implementation of NIV: in or out of hospital?

	Year	ABG	Compliance	PaCO2 change
Lujan	2007	In 53.5+-5.5 Out 54.5 +-5.33	3M in: 6.6+-1.3h Out 6.8+-1h	similar
Chatwin*	2008	In 44.3 +-4.5 Out 45.8+- 5.25	2M In 4.3 +-2.7 h Out 3.9 2.6 h	similar
Domenéch-Clar	2008	In 53 (10.4) Home 49 (6.7)	No data	Better in ambulatory
Pallero	2014	In 50.3+- 5.7 Out 50.4+- 6.8	6M In 7.21 (2.52)h Out 6.90 (2.56)h	similar
Hazenberg	2014	In 49.5+- 8.3 Home 49.5+- 6.8	6M In 8.5 (0.67) h Out 10.0 (0.83) h	similar
Sheers	2014	In 46 (43 – 48) Out 43 (41 – 54)	No assessment	similar

	Year	Setting	Goal	Follow-up
Lujan	2007	Day Hospital vs Ward	PaCO2<50mmHg: OHS/COPD and < 45: NMD/CWD; mean nocturnal SpO2> 90%, and < 15% of time with SpO2 below 88%	3 M (ABG)
Chatwin	2008	Outpatient sessions vs Hospital ward	Settings increased ensuring good CW movement or maximum IPAP tolerated	2M in-hospital nocturnal TcCO2/spO2 3M (ABG), 12M clinic
Domenéch-Clar	2008	**Home** vs conventional ward	Reduction in PaCO2	1,3,6 M clinic (ABG, nocturnal pulse oximetry)
Hazenberg	2014	**Home** vs Respiratory ward **	Decrease of PaCO2 to at least 10 mmHg for Hospital and normalisation of TcCO2/spO2 for home	Home: TcCO2/spO2 when 6h HMV and at 2M Hospital: 2M admission to ICU for nocturnal ABG on HMV and TcCO2/spO2 6M clinic (ABG)
Pallero	2014	Day Hospital vs Respiratory Ward	Normalize daytime PaCO2	15 day nurse home visit 1,3,6M clinic (ABG)

ORGANIZATIONAL STRUCTURE



Conclusions

Early identification of potential HMV patients in the ICU is recommended and appropriate referral needed

Actively Identify at risk groups: NMD, severe scoliosis or CWD, morbid obesity or end-stage respiratory disease causing hypercapnic respiratory failure)>>> use simple tools (Vital capacity, ABG, Oximetry, TcCO2, Pimax/SNIP)

Start elective HMV to avoid ICU admissions

Create network of HMV centres

Francisco Henrique Moura George

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Date: 2016.12.14 08:06:27 Z

1899 – 2013 113 anos

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NORMA
DA DIREÇÃO-GERAL DA SAÚDE

NÚMERO:	**022/2011**
DATA:	**28/09/2011**
ATUALIZAÇÃO:	**11/09/2015**

ASSUNTO: **Cuidados Respiratórios Domiciliários: Prescrição de Ventiloterapia e outros Equipamentos**

A VNI é iniciada nas doenças restritivas que não envolvem o parênquima pulmonar (doenças neuromusculares, lesões vertebro-medulares e deformações da caixa torácica) na presença de sintomas de hipoventilação e, pelo menos, um dos seguintes critérios fisiopatológicos: PaCO2 > 45 mm Hg ou dessaturação noturna, com saturação periférica de O2 (SpO2) < 88%, durante 5 minutos consecutivos. Nas lesões vertebro-medulares, considera-se ainda iniciar a VNI se SpO2 < 90 % por > 10 % do tempo total de sono. A VNI está ainda indicada no síndrome de obesidade/ hipoventilação com ou sem eventos obstrutivos do sono da via área superior.

Nas doenças neuromusculares rapidamente progressivas, a VNI é iniciada quando a capacidade vital forçada (FVC) for < 50% (valor teórico) ou a pressão máxima inspiratória (PMI) for < 60 cmH2O, independentemente dos critérios anteriores.

No caso da esclerose lateral amiotrófica (ELA) a VNI deverá ser ponderada com FVC ≤ 70%.

Francisco Henrique Moura George

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ASSUNTO: **Cuidados Respiratórios Domiciliários: Prescrição de Ventiloterapia e outros Equipamentos**

Na doença pulmonar obstrutiva crónica (DPOC) a VNI é ponderada nos doentes que, apesar de uma oxigenoterapia de longa duração (OLD) bem conduzida (quando para além do cumprimento de mais de 15h diárias de oxigenoterapia, incluindo o período noturno, o doente deixou de fumar, cumpre a terapêutica inalada e é seguido em programas de reabilitação respiratória), evoluam para uma de duas situações:

a) $PaCO_2 > 55$ mmHg;

b) $PaCO_2$ entre 50 e 54 mmHg, numa das seguintes circunstâncias: dessaturação noturna ($SpO_2 < 88\%$ durante 5 minutos consecutivos, não corrigida com administração de O_2 a 2 L/min) ou mais que duas exacerbações agudas por ano acompanhadas de acidose respiratória com necessidade de VNI.

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Home mechanical ventilation in adults: Clinical practice recommendations from the Portuguese Respiratory Society home mechanical ventilation assembly

Carla Ribeiro[a,b], Rita Gomes[c], Alexandra Carreiro[d], Ana Luísa Vieira[e,f], Bárbara Seabra[g], Bebiana Conde[h,i,j], Carla Nogueira[a], Cristina Jácome[k], Joana Lages[e], Margarida Aguiar[l], Mónica Grafino[m], Paula Pamplona[n], Ana Cysneiros[o,p], Célia Durães[q], Cidália Rodrigues[r], Cláudia Pimenta[s], Cristina Cristóvão[t], Daniela Rodrigues[u,v], Diva Ferreira[w], Filipe Gonçalves[x,y], Helena Ramos[z,aa], João Cravo[bb], João Paulo Silva[cc], Karl Cunha[z,aa], Lucía Méndez[c,dd], Mafalda Van Zeller[ee,ff], Márcia Araújo[g], Margarida Barata[gg], Margarida Raposo[t], Margarida Redondo[hh], Maria Jacob[k,ii], Maria João Araújo[q], Miguel R. Gonçalves[jj,kk,ll], Miguel Guia[mm,nn,oo], Nuno Faria[pp,qq], Pedro Viegas[a], Sara Conde[a], Marta Drummond[ee,ff] and Paula Pinto[mm,nn,oo]