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SIMG
SOCIETÀ ITALIANA DI MEDICINA GENERALE E DELLE CURE PRIMARIE

FIMMG campania

ASL Azienda Sanitaria Locale Napoli 1

LA RETE TERRITORIALE:
innovazione nell'assistenza ai pazienti con patologie respiratorie e nella presa in carico degli stessi

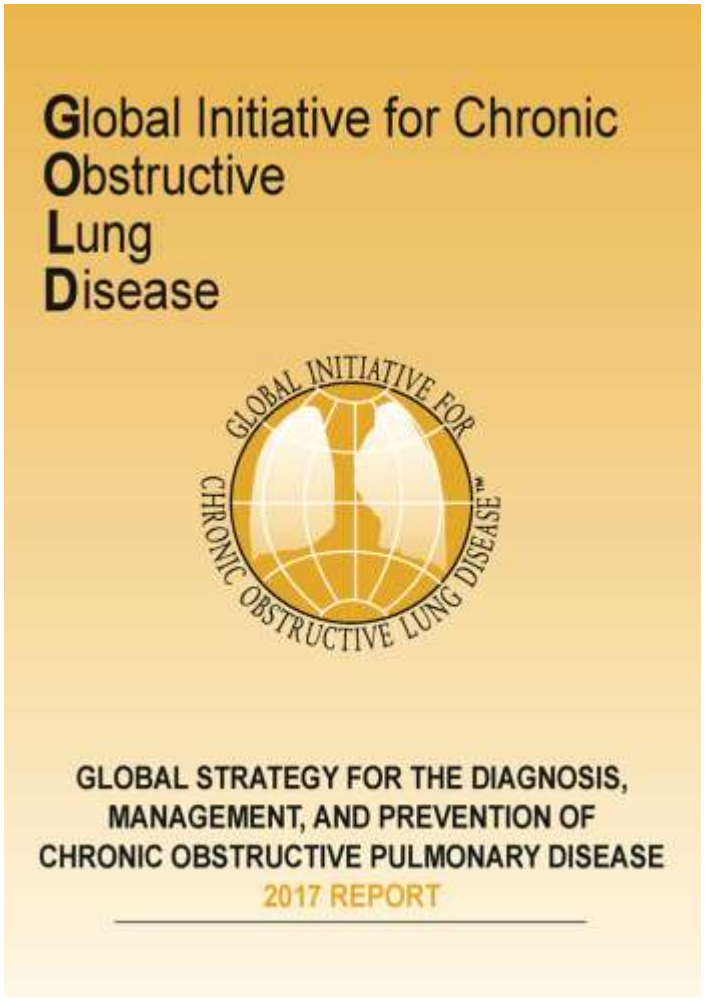
Napoli
Sabato 1 aprile 2017
Sala Convegni Ordine dei Medici Chirurghi
e degli Odontoiatri di Napoli
Riviera di Chiaia, 9/C

BPCO : La gestione della riacutizzazione
Costi della patologia e ospedalizzazioni

g. fiorentino

ECM
n° 183428

GOLD 2017 Report: Chapters



1. Definition and Overview
2. Diagnosis and Initial Assessment
3. Evidence Supporting Prevention & Maintenance Therapy
4. Management of Stable COPD
5. Management of Exacerbations
6. COPD and Comorbidities

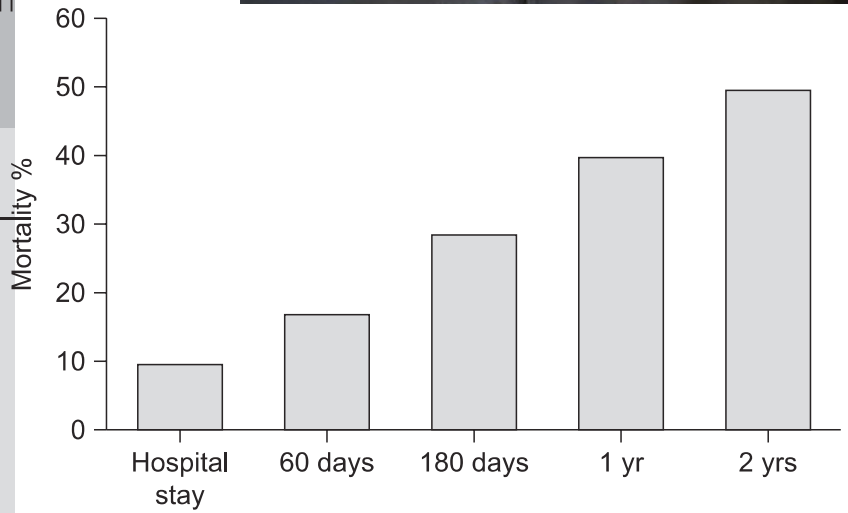
Impact of exacerbations on COPD

Eur Respir Rev 2010; 19: 116, 113–118

A. Anzueto

TABLE 1 Risk factors for frequent exacerbations (more than two per year) in patients with chronic obstructive pulmonary disease

Risk factors
Increased age
Severity of FEV_1 impairment
Chronic bronchial mucus hypersecretion
Frequent past exacerbations
Daily cough and wheeze
Persistent symptoms of chronic bronchitis
Comorbid conditions: mainly cardiovascular disease



Mortality after chronic obstructive pulmonary disease exacerbation.

TERAPIA DELLA BPCO AD OGNI STADIO

Classificazione	0:A Rischio	I: Lieve	II: Moderata	III: Grave	IV: Molto grave
Caratteristiche	• Sintomi cronici • Esposizione a fattori di rischio • Spirometria normale	• VEMS/CVF < 70% • VEMS≥ 80% • Con o senza sintomi	• VEMS/CVF < 70% • 50% < VEMS< 80% • Con o senza sintomi	• VEMS/CVF < 70% • 30% < VEMS<50% • Con o senza sintomi	• VEMS/CVF < 70% • VEMS< 30% o presenza di insufficienza respiratoria cronica o scompenso cardiaco destro

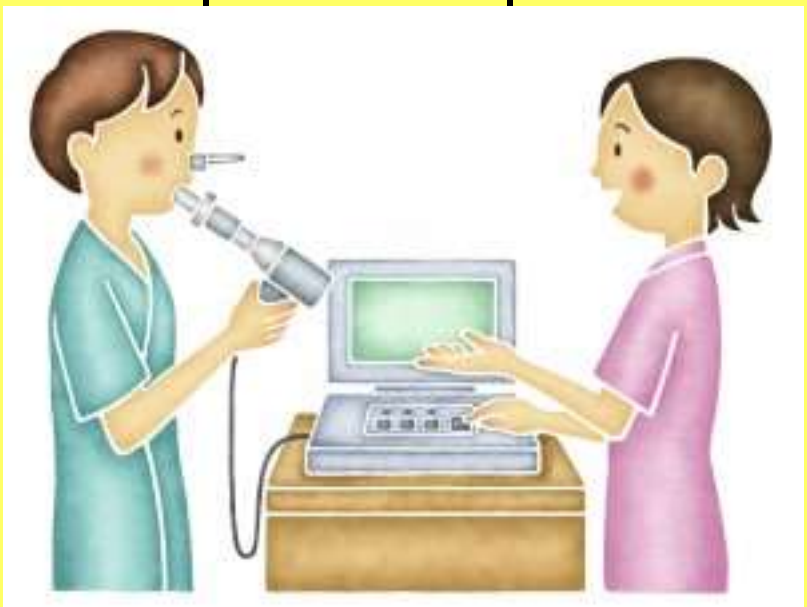
Evitare I fattori di rischio; vaccinazioni antinfluenzale ed antipneumococcica

+ broncodilatatori a breve durata d'azione al bisogno

+ trattamento regolare con uno o più broncodilatatori a lunga durata d'azione
+ riabilitazione

+ steroidi per via inalatoria in caso di ripetute riacutizzazioni

+ O2 terapia a lungo termine in caso di insuff. respiratoria *Considerare* i trattamenti chirurgici



ABCD Assessment Tool

Figure 2.4. The refined ABCD assessment tool

Spirometrically confirmed diagnosis → Assessment of airflow limitation → Assessment of symptoms/risk of exacerbations

Post-bronchodilator $FEV_1/FVC < 0.7$

	FEV_1 (% predicted)
GOLD 1	≥ 80
GOLD 2	50-79
GOLD 3	30-49
GOLD 4	< 30

Exacerbation history

- ≥ 2 or ≥ 1 leading to hospital admission
- 0 or 1 (not leading to hospital admission)

C	D
A	B

mMRC 0–1, CAT < 10 | mMRC ≥ 2, CAT ≥ 10

Symptoms

COPD Exacerbations

- An acute worsening of respiratory that requires additional care
  - Dyspnea
  - Increased sputum production
  - Change in sputum color
- Precipitated most commonly by respiratory infections

Management of Exacerbations

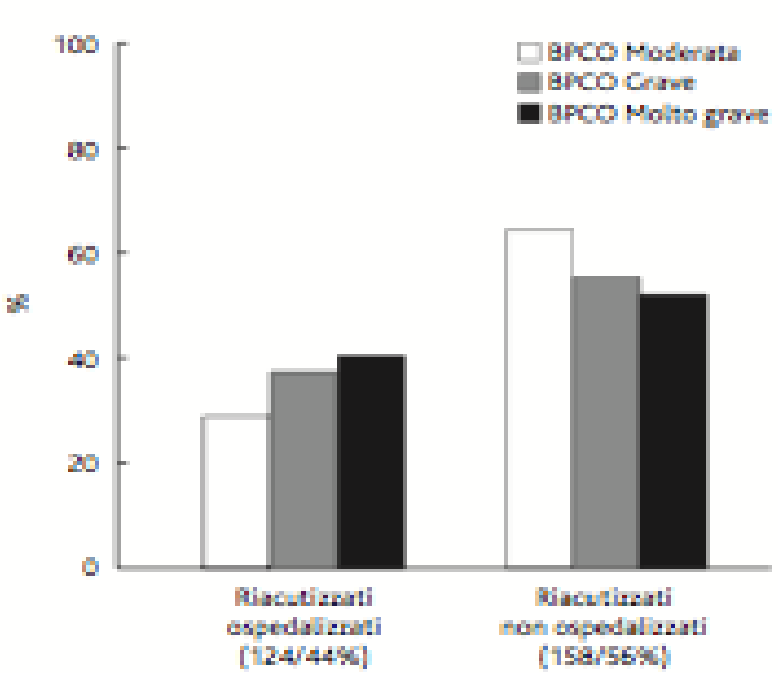
- They are classified as:
  - **Mild** (treated with short acting bronchodilators only, SABDs)
  - **Moderate** (treated with SABDs plus antibiotics and/or oral corticosteroids) or
  - **Severe** (patient requires hospitalization or visits the emergency room). Severe exacerbations may also be associated with acute respiratory failure.

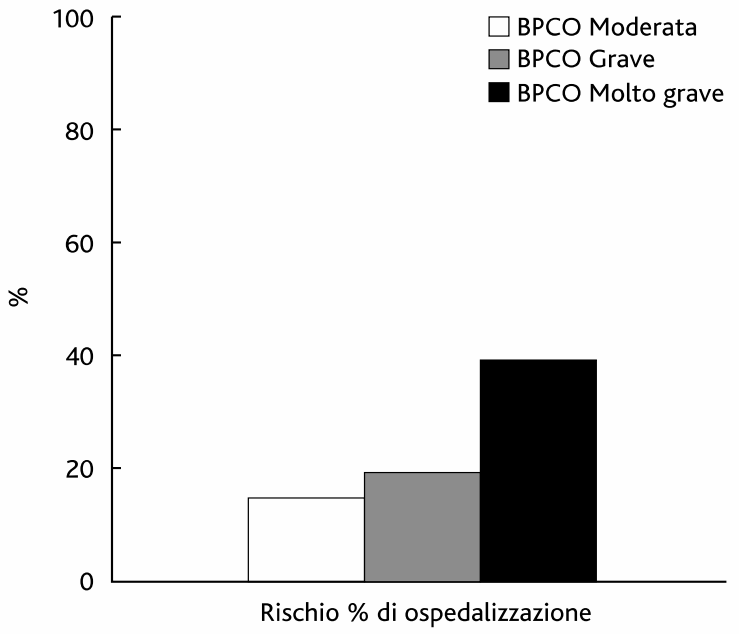
Severity stratification and hospitalization risk in COPD exacerbations: Clinical data from the ICE (Italian costs for exacerbations) study

TABELLA I: NUMERO DI PAZIENTI STRATIFICATI SECONDO I CRITERI GOLD DI GRAVITÀ E NUMERO DI RIACUTIZZAZIONI AL FOLLOW UP

	Stadio GOLD			
Numero di riacutizzazioni	Moderato	Grave	Molto grave	Totale
0	124	94	70	288
1	72	53	61	186
2	25	23	30	78
> 2	5	4	9	18
Totale	226	174	170	570

p = 0,07 per correlazione tra numero di riacutizzazioni e stadio GOLD.
Tratto da [6] mod.





Comorbidity in patients with chronic obstructive pulmonary disease in family practice: a cross sectional study

García-Olmos *et al. BMC Family Practice* 2013, **14**:11

Table 2 Comorbidity levels in patients with COPD

Comorbidity	Men	Women	Total
	N (%)	N (%)	N (%)
COPD alone	242 (10.19)	46 (6.15)	288 (9.22)
COPD + 1 or more	2134 (89.81)	702 (93.85)	2836 (90.78)
COPD + 2 or more	1706 (71.80)	593 (79.28)	2299 (73.59)
COPD + 3 or more	1262 (53.11)	452 (60.43)	1714 (54.87)
COPD + 4 or more	829 (34.89)	293 (39.17)	1122 (35.92)
COPD + 5 or more	505 (21.25)	164 (21.93)	669 (21.41)

Table 3 Prevalence of chronic diseases in patients with COPD

EDC	Prevalence Men	Prevalence Women	Prevalence Total
Arterial hypertension	49.96	58.42	**51.98**
Disorders of lipid metabolism	34.22	35.16	**34.44**
Obesity	24.66	27.41	**25.32**
Diabetes mellitus	22.26	16.04	**20.77**
Anxiety/Depression	16.58	31.68	**20.20**
Cardiac arrhythmia	15.99	15.24	**15.81**
Thyroid disease	10.94	24.60	**14.21**
Malignant neoplasms	14.56	7.62	**12.90**
Generalised atherosclerosis	12.46	4.14	**10.47**
Ischaemic heart disease	9.30	5.75	**8.45**
Deafness, hearing loss	7.74	9.63	**8.19**
Congestive heart failure	7.70	9.09	**8.03**
Cerebrovascular disease	7.91	6.15	**7.49**
Osteoporosis	2.65	20.72	**6.98**
Chronic renal failure	7.11	3.88	**6.34**
Asthma	3.75	12.43	**5.83**
Degenerative joint disease	4.08	10.70	**5.67**
Glaucoma	4.97	6.42	**5.31**
Chronic liver disease	5.72	2.67	**4.99**
Chronic skin ulcer	2.36	2.41	**2.37**
Cardiac valve disease	2.31	1.87	**2.21**
Dementias	1.85	2.14	**1.92**
Parkinson's disease	1.73	1.47	**1.66**
Schizophrenia	1.09	1.34	**1.15**
Benign prostatic hypertrophy	20.71		

EDC: expanded diagnosis cluster.

Management of Exacerbations

Pharmacologic treatment

The three classes of medications most commonly used for COPD exacerbations are:

- Bronchodilators
  - Although there is no high-quality evidence from RCTs, it is recommended that short-acting inhaled beta$_2$-agonists, with or without short-acting anticholinergics, are the initial bronchodilators for acute treatment of a COPD exacerbation.
- Corticosteroids
  - Data from studies indicate that systemic glucocorticoids in COPD exacerbations shorten recovery time and improve lung function (FEV1). They also improve oxygenation, the risk of early relapse, treatment failure, and the length of hospitalization.
- Antibiotics

Antibiotic Selection for COPD Exacerbations

Exacerbation Severity	LikelyCausative Organism	SuggestedAntibiotic(s)
Mild	*H.influenzae,S. pneumoniae,M. catarrhalis,Chlamydia pneumonia*,viruses	st 1Line:Amoxicillin,ampicillin, penicillin,TMP/SMX,tetracycline, nd 2Line:Azithromycin, nerd amoxicillin/clavulanate,2or3 gen.cephalosporin,clarithromycin
Moderate	GroupAstrep.andBeta lactamaseproducing*S. pneumoniae*, *Enterobacteriaceae*	Amoxicillin/clavulanate, fluoroquinolones, ampicillin/sulbactam
Severe	GroupBstrep.and *pseudomonas*	Ciprofloxacin,Levofloxacin,B-lactamwith*pseudomonas*activity

Management of Exacerbations

Table 5.1. Potential indications for hospitalization assessment*

- Severe symptoms such as sudden worsening of resting dyspnea, high respiratory rate, decreased oxygen saturation, confusion, drowsiness.
- Acute respiratory failure.
- Onset of new physical signs (e.g., cyanosis, peripheral edema).
- Failure of an exacerbation to respond to initial medical management.
- Presence of serious comorbidities (e.g., heart failure, newly occurring arrhythmias, etc.).
- Insufficient home support.

*Local resources need to be considered.

Management of Exacerbations

Table 5.2. Management of severe but not life-threatening exacerbations*

- Assess severity of symptoms, blood gases, chest radiograph.
- Administer supplemental oxygen therapy, obtain serial arterial blood gas, venous blood gas and pulse oximetry measurements.
- Bronchodilators:
  - » Increase doses and/or frequency of short-acting bronchodilators.
  - » Combine short-acting beta 2-agonists and anticholinergics.
  - » Consider use of long-active bronchodilators when patient becomes stable.
  - » Use spacers or air-driven nebulizers when appropriate.
- Consider oral corticosteroids.
- Consider antibiotics (oral) when signs of bacterial infection are present.
- Consider noninvasive mechanical ventilation (NIV).
- At all times:
  - » Monitor fluid balance.
  - » Consider subcutaneous heparin or low molecular weight heparin for thromboembolism prophylaxis.
  - » Identify and treat associated conditions (e.g., heart failure, arrhythmias, pulmonary embolism etc.).

*Local resources need to be considered.

Management of Exacerbations - Summary

Table 5.3. Key points for the management of exacerbations

- Short-acting inhaled beta$_2$-agonists, with or without short-acting anticholinergics, are recommended as the initial bronchodilators to treat an acute exacerbation **(Evidence C)**.
- Systemic corticosteroids can improve lung function (FEV_1), oxygenation and shorten recovery time and hospitalization duration. Duration of therapy should not be more than 5-7 days **(Evidence A)**.
- Antibiotics, when indicated, can shorten recovery time, reduce the risk of early relapse, treatment failure, and hospitalization duration. Duration of therapy should be 5-7 days **(Evidence B)**.
- Methylxanthines are not recommended due to increased side effect profiles **(Evidence B)**.
- Non-invasive mechanical ventilation should be the first mode of ventilation used in COPD patients with acute respiratory failure **(Evidence A)**.
- NIV should be the first mode of ventilation used in COPD patients with acute respiratory failure who have no absolute contraindication because it improves gas exchange, reduces work of breathing and the need for intubation, decreases hospitalization duration and improves survival **(Evidence A)**.

Management of Exacerbations

Classification of hospitalized patients

- No respiratory failure:

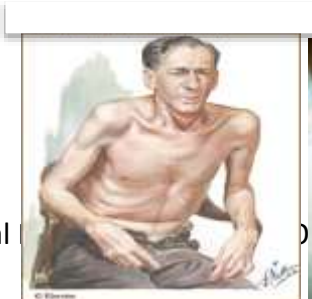
- **Respiratory rate**: 20-30 breaths per minute;
- **no use of accessory** respiratory muscles;
- **no changes in mental** status;
- **hypoxemia** improved with supplemental oxygen given via Venturi mask 28-35% inspired oxygen (FiO_2);
- **no increase in $PaCO_2$**.

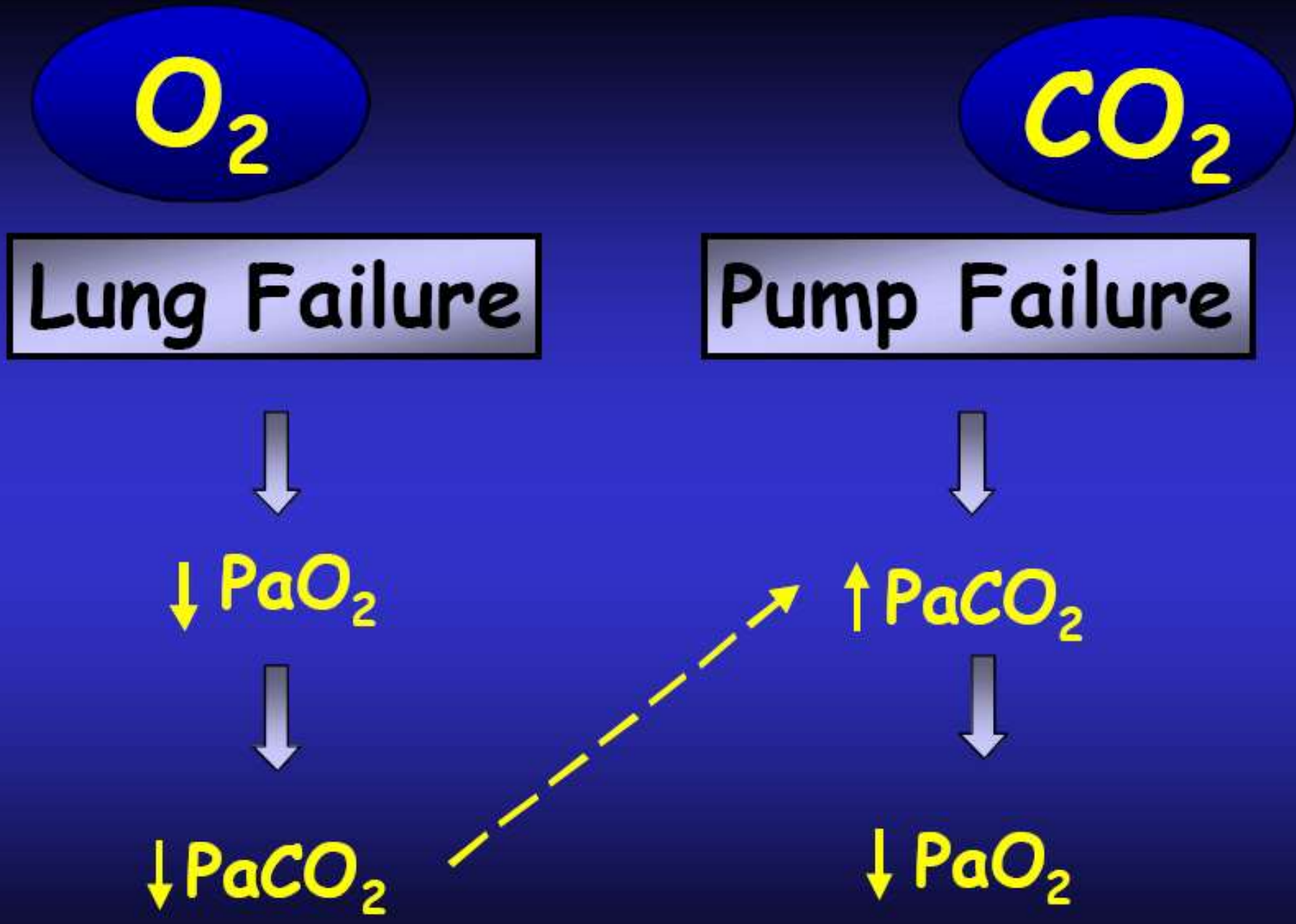
Management of Exacerbations

Classification of hospitalized patients

Acute respiratory failure — non-life-threatening:

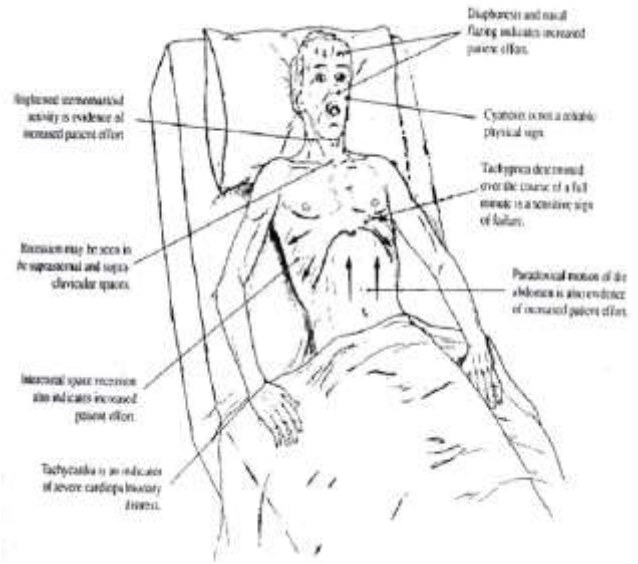
- Respiratory rate: > 30 breaths per minute;
- **using accessory respiratory mu**scles;
- no change in **mental status**;
- **hypoxemia** improved with supplemental oxygen via Venturi mask 25-30% FiO_2;
- **hypercarbia** i.e., $PaCO_2$ increased compared with baseline or elevated 50-60 mmHg.




O_2
CO_2
Lung Failure
Pump Failure
$\downarrow PaO_2$
$\uparrow PaCO_2$
$\downarrow PaCO_2$
$\downarrow PaO_2$


IPOSSIA
IPERCAPNIA

Management of Exacerbations



Classification of hospitalized patients

Acute respiratory failure — life-threatening:

- **Respiratory rate**: > 30 breaths per minute;
- **using accessory** respiratory muscles;
- **acute changes** in mental status;
- **hypoxemia** not improved with supplemental oxygen via Venturi mask or requiring FiO_2 > 40%;
- **hypercarbia** i.e., $PaCO_2$ increased compared with baseline or elevated > 60 mmHg or the presence of **acidosis** (pH $\leq$ 7.25).

Sintomi neurologici

pH

7.30 Rallentamento mentale, cefalea

Tachipnea

7.25 Encefalopatia ipercapnica (turbe di coscienza)

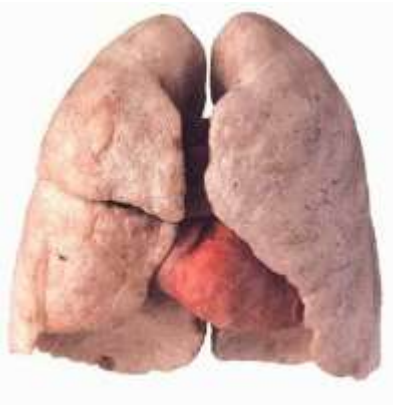
Respiro superficiale >30

7.15 Encefalopatia ipercapnica
(turbe di coscienza e motorie)

Fatica muscoli respiratori
(respiro paradosso, o alternante)

7.10 Stupor, coma

Bradipnea



Sintomi respiratori

Management of Exacerbations

Respiratory support

Table 5.4. Indications for respiratory or medical intensive care unit admission*

- Severe dyspnea that responds inadequately to initial emergency therapy.
- Changes in mental status (confusion, lethargy, coma).
- Persistent or worsening hypoxemia (PaO_2 < 5.3 kPa or 40 mmHg) and/or severe/worsening respiratory acidosis (pH < 7.25) despite supplemental oxygen and noninvasive ventilation.
- Need for invasive mechanical ventilation.
- Hemodynamic instability—need for vasopressors.

*Local resources need to be considered.

Table 5.5. Indications for noninvasive mechanical ventilation (NIV)

At least one of the following:

- Respiratory acidosis ($PaCO_2$ ≥ 6.0 kPa or 45 mmHg and arterial pH ≤ 7.35).
- Severe dyspnea with clinical signs suggestive of respiratory muscle fatigue, increased work of breathing, or both, such as use of respiratory accessory muscles, paradoxical motion of the abdomen, or retraction of the intercostal spaces.
- Persistent hypoxemia despite supplemental oxygen therapy.

Management of Exacerbations

Respiratory support

Table 5.6. Indications for invasive mechanical ventilation

- Unable to tolerate NIV or NIV failure.
- Status post - respiratory or cardiac arrest.
- Diminished consciousness, psychomotor agitation inadequately controlled by sedation.
- Massive aspiration or persistent vomiting.
- Persistent inability to remove respiratory secretions.
- Severe hemodynamic instability without response to fluids and vasoactive drugs.
- Severe ventricular or supraventricular arrhythmias.
- Life-threatening hypoxemia in patients unable to tolerate NIV.

Management of Exacerbations

Table 5.7. Discharge criteria and recommendations for follow-up

- Full review of all clinical and laboratory data.
- Check maintenance therapy and understanding.
- Reassess inhaler technique.
- Ensure understanding of withdrawal of acute medications (steroids and/or antibiotics).
- Assess need for continuing any oxygen therapy.
- Provide management plan for comorbidities and follow-up.
- Ensure follow-up arrangements: early follow-up < 4 weeks, and late follow-up < 12 weeks as indicated.
- All clinical or investigational abnormalities have been identified.

1–4 Weeks Follow-Up

- Evaluate ability to cope in his/her usual environment.
- Review and understanding treatment regimen.
- Reassessment of inhaler techniques.
- Reassess need for long-term oxygen.
- Document the capacity to do physical activity and activities of daily living.
- Document symptoms: CAT or mMRC.
- Determine status of comorbidities.

12–16 Weeks Follow-Up

- Evaluate ability to cope in his/her usual environment.
- Review understanding treatment regimen.
- Reassessment of inhaler techniques.
- Reassess need for long-term oxygen.
- Document the capacity to do physical activity and activities of daily living.
- Measure spirometry: FEV_1.
- Document symptoms: CAT or mMRC.
- Determine status of comorbidities.

Management of Exacerbations

Table 5.8. Interventions that reduce the frequency of COPD exacerbations	
Intervention class	**Intervention**
Bronchodilators	LABAs LAMAs LABA + LAMA
Corticosteroid-containing regimens	LABA + ICS LABA + LAMA + ICS
Anti-inflammatory (non-steroid)	Roflumilast
Anti-infectives	Vaccines Long term macrolides
Mucoregulators	N-acetylcysteine Carbocysteine
Various others	Smoking cessation Rehabilitation Lung volume reduction

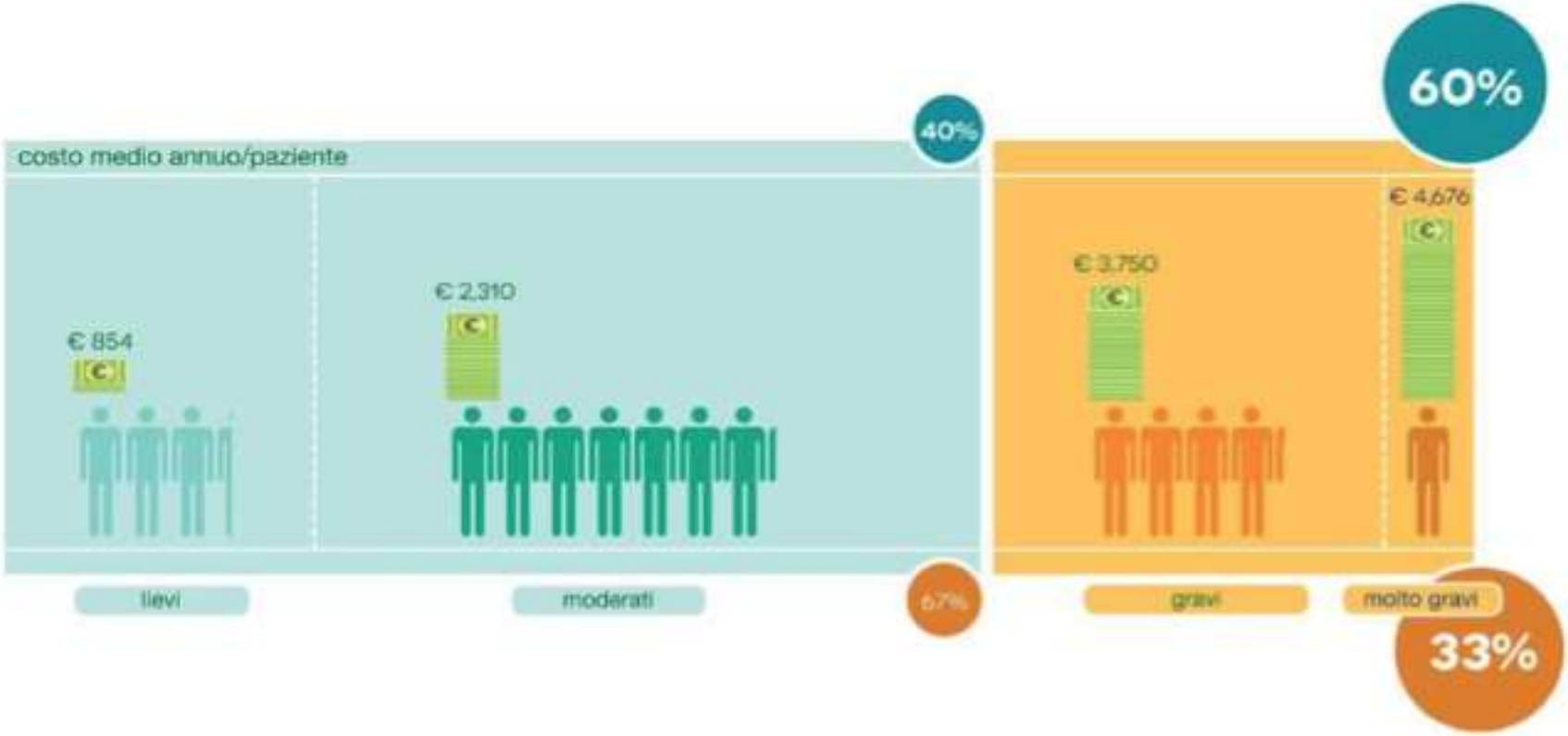
Le malattie dell'apparato respiratorio costituiscono la terza causa di morte in Campania dopo il gruppo delle malattie cardio e cerebrovascolari e la prima causa di morte all'interno delle patologie neoplastiche.

Con tassi mediamente superiori rispetto alla media nazionale.

Tabella 5 - Tassi di mortalità per alcuni gruppi di cause (valori assoluti e tassi stand. anno 2013)

Causa iniziale di morte -European Short List	ITALIA				CAMPANIA			
	Uomini		Donne		Uomini		Donne	
	Decessi	tassi st.	Decessi	tassi st.	Decessi	tassi st.	Decessi	tassi st.
malattie del sistema circolatorio	98.891	36,3%	130.082	25,6%	9.227	45,2%	11.952	34,2%
malattie ischemiche del cuore	37.591	13,7%	37.016	7,3%	3.613	17,2%	3.547	10,2%
malattie cerebrovascolari	23.843	8,8%	37.193	7,3%	2.353	11,8%	3.695	10,5%
malattie del sistema respiratorio	23.508	8,7%	19.798	3,9%	1.927	9,5%	1.321	3,9%
cause esterne di traumatismo e avvelenamento	13.244	4,7%	9.847	2,2%	820	3,6%	826	2,4%
malattie dell'apparato digerente	11.388	4,0%	9.001	1,9%	1.059	4,7%	950	2,9%
malattie del sistema nervoso e degli organi di senso	10.367	3,7%	14.588	3,1%	693	3,2%	878	2,6%
diabetemelito	9.238	3,3%	12.229	2,6%	1.039	4,8%	1.643	4,9%
tumori maligni	95.059	33,1%	73.438	18,3%	8.154	35,8%	5.728	18,4%
di cui tumori maligni dela trachea, dei bronchi e dei polmoni	24.805	8,6%	8.626	2,3%	2.405	10,4%	660	2,2%
di cui tumori maligni del colon, del retto e dell'ano	10.378	3,6%	8.781	2,1%	781	3,5%	615	1,9%

COSTI DELLA BPCO in Italia

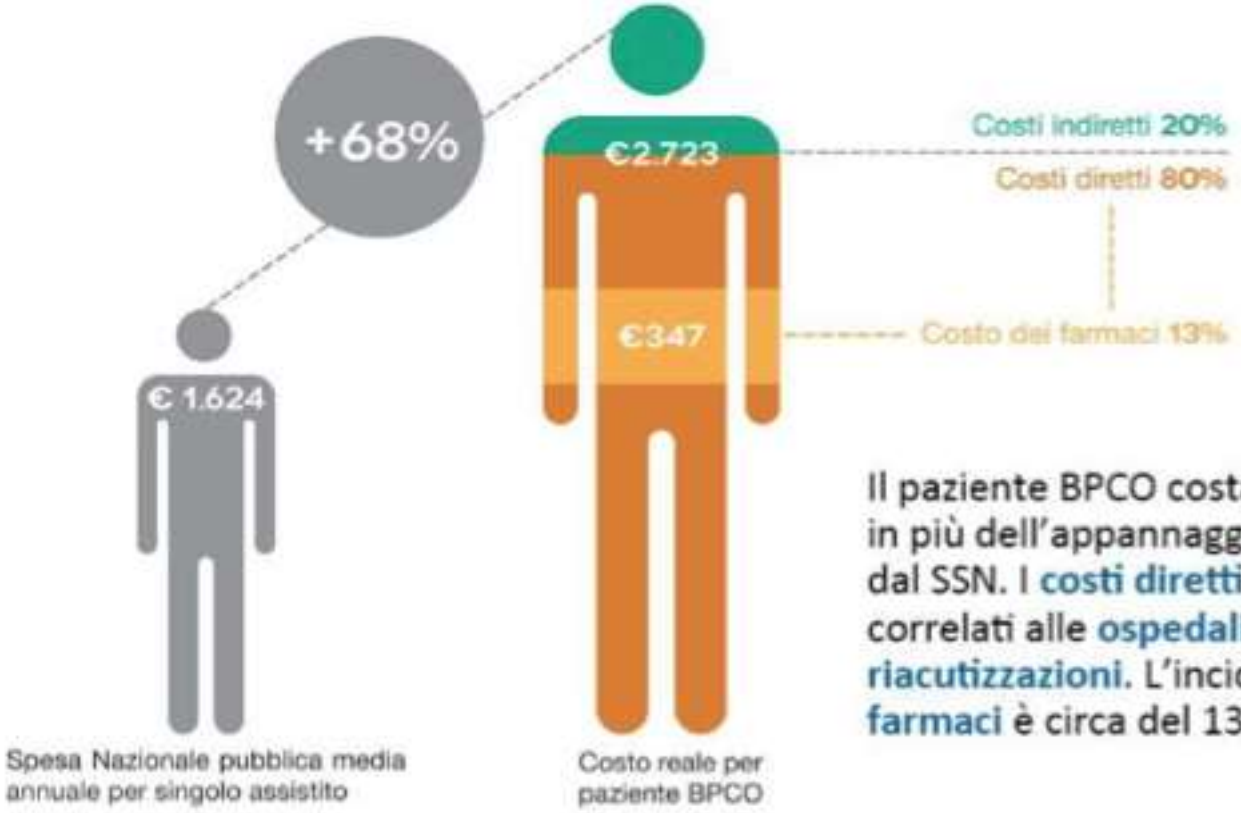


Si deve tenere conto del **costo considerevole** generato dalle **forme moderate** generalmente meno definite in chiave diagnostica.

Circa il **60%** del costo annuo è dovuto esclusivamente alle **forme gravi e molto gravi** che rappresentano solo il **33%** di tutti i pazienti.

Fonte: Dal Negro R.W. et al. - Respiratory Medicine, 2008, 102: 92-101

COSTO MEDIO ANNUALE per paziente BPCO



Il paziente BPCO costa mediamente il **68%** in più dell'appannaggio procapite previsto dal SSN. I **costi diretti** sono prevalenti e correlati alle **ospedalizzazioni** dovute alle **riacutizzazioni**. L'incidenza del **costo dei farmaci** è circa del 13%.

Prevenire le riacutizzazioni può ridurre significativamente i costi della BPCO in Italia

Fonte: Dal Negro R.W. et al. - Respiratory Medicine, 2008, 102: 92-101
Dal Negro R.W et al. - Respiratory Medicine, 2003, S43-S50

Optimizing economic outcomes in the management of COPD

Dal Negro R.W. – Intern. J. COPD, 2007

Costs (euro/patient/year)				
	Stage I	Stage II	Stage III	Stage IV
Direct cost independent from exacerbation	527.48	918.38	1,592.59	3,586.18
Direct cost per exacerbation		1,219.46	1,475.87	2,637.33
Indirect cost independent from exacerbation		15.77	21.97	43.71
Indirect cost per exacerbation		27.81	38.76	77.10

Costs of chronic obstructive pulmonary disease (COPD) in Italy: The SIRIO study (Social Impact of Respiratory Integrated Outcomes)

R.W. Dal Negro[a,d], S. Tognella[a,d], R. Tosatto[b], M. Dionisi[b], P. Turco[a,d], C.F. Donner[c,d,*]

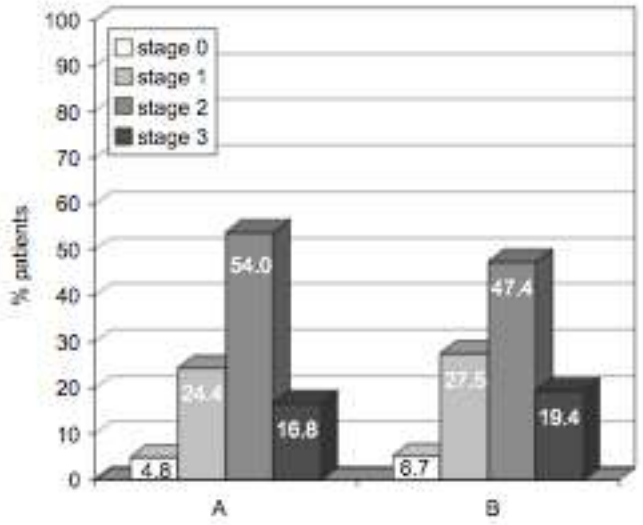


Figure 1 (A and B) Distribution of COPD patients according to their clinical severity (GOLD 2001): (A) baseline; (B) follow-up.

- **increasing by 35%** **(2003-2008) to reach an average of 2720/patient**

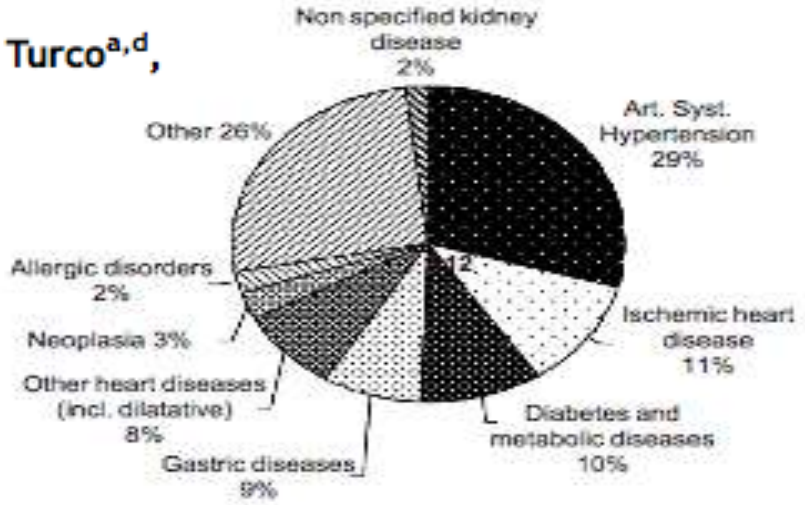


Figure 2 Distribution of concomitant diseases. Total patients with at least one comorbidity ($n = 380$).

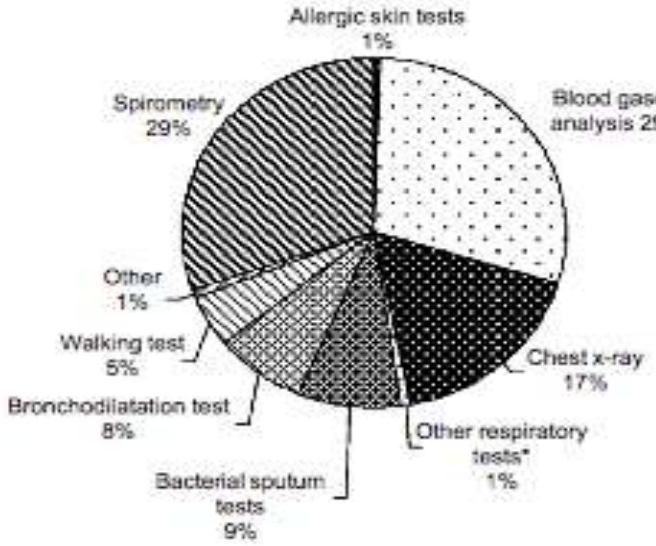


Figure 3 Distribution of diagnostic tests performed in the 12 months preceding enrollment.

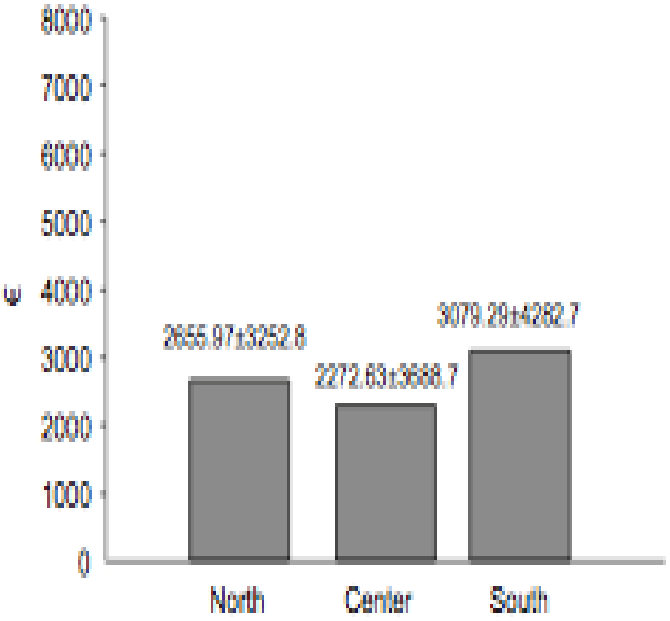
Costs of chronic obstructive pulmonary disease (COPD) in Italy: The SIRIO study (Social Impact of Respiratory Integrated Outcomes)

Table 2 A and B—visits and/or hospital admissions and/or Emergency Care use by patients: (A) baseline; (B) follow-up.

Visits/admissions	A ($n = 561$)			B ($n = 561$)		
	Total, n	n	No. of patients	% Patients	Total, n	n	No. of patients	% Patients
Visits to GP		2541	358	63.8		1361	322	57.4
Visits to NHS specialist		1335	431	76.8		812	327	58.3
Visits to private specialist		123	56	10.0		108	51	9.1
Access to Emergency Care		207	125	22.3		104	70	12.5
Hospital admission		268	184	33.0		148	103	18.4
Day Hospital		199	32	5.7		158	30	5.3
Total work days off	5703				5212			

Table 3 Direct, indirect and total mean costs per patient.

Parameters	Baseline		Follow-up	
	Mean cost per patient ($n = 561$)		Mean cost per patient ($n = 561$)	
	Value in €	%	Value in €	%
Principal pharmacological therapy	347.23	12.7	663.78	31.1
Concomitant pharmacological therapy	186.82	6.9	256.44	12.0
Hospital admissions	1519.67	55.8	823.12	38.6
Day Hospital	88.68	3.3	70.41	3.3
Access to Emergency Care	7.62	0.3	3.83	0.2
Visits to GP and specialist	150.59	5.5	93.99	4.4
Examinations*	162.68	6.0	124.66	5.8
Verifications of side effects	0.70	0.0	0.12	0.0
Environmental preventive therapy and home help	3.07	0.1	2.35	0.1
Alternative therapy†	39.77	1.5	5.88	0.3
Total direct costs	2506.84	92.0	2044.58	95.9
Work days lost	216.84	8.0	88.31	4.1
Total indirect costs	216.84	8.0	88.31	4.1
Total costs	2723.68 ± 3831.24	100	2132.89 ± 2776.30‡	100



Costs of illness analysis in Italian patients with chronic obstructive pulmonary disease (COPD): an update

ClinicoEconomics and Outcomes Research 2015

Roberto W Dal Negro[1,4]
Luca Bonadiman[1]
Paola Turco[2]
Silvia Tognella[3]
Sergio Iannazzo[4]

- **The total per-patient cost was Euro 3291 (20.8% higher than that of 2008)**
- **Hospitalization costs 67.2% of the direct cost (similar to that of 2008)**
- **Pharmacological therapy costs were Euro 498.6 (43.6% higher than that of 2008)**

Sirio study-Update,2008-2012

Costs of illness analysis in Italian patients with chronic obstructive pulmonary disease (COPD): an update

ClinicoEconomics and Outcomes Research 2015:7 153–159

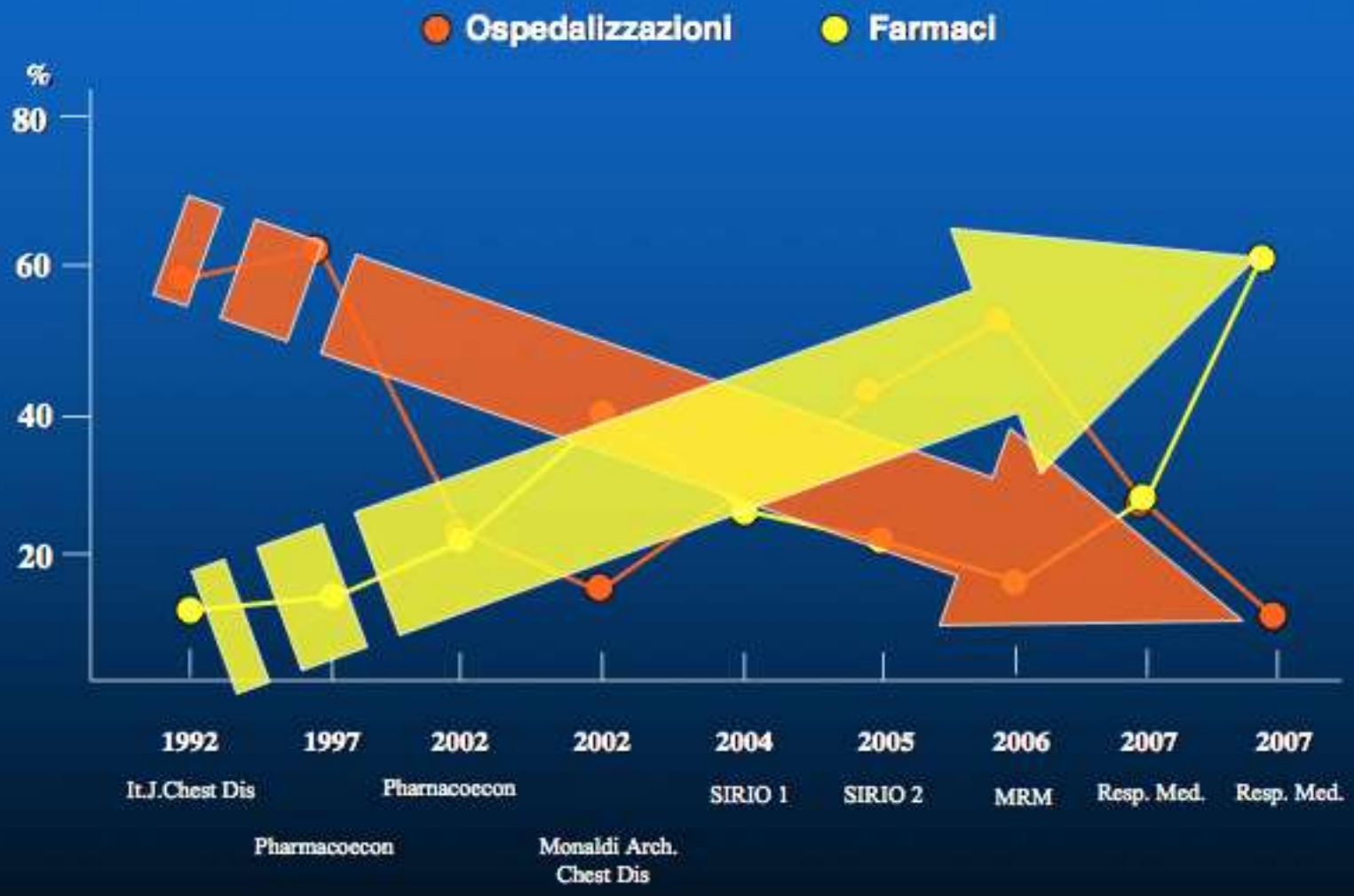
Table 2 Direct, indirect, and total mean cost per patient at baseline (12 months before enrollment) and at 12-month follow-up

	Mean cost (euro) at baseline (12 months before enrollment) [95% CI]	Mean cost (euro) at 12-month follow-up [95% CI]	P-value
Direct costs	2,932.2 [2,643.1; 3,221.3]	2,460.4 [2,332.2; 2,588.6]	0.0001
Hospitalization costs	1,970.4 [968.0; 2,972.8]	1,569.7 [1,427.9; 1,711.5]	0.0001
Outpatient costs	463.2 [207.5; 718.9]	343.9 [255.1; 432.7]	0.0001
Pharmaceutical costs	498.6 [252.5; 744.7]	546.8 [503.8; 589.8]	ns
Indirect costs	358.5 [119.0; 598.0]	246.3 [189.5; 303.1]	0.001
Total costs	3,290.7 [2,539.9; 4,051.2]	2,706.7 [2,571.5; 2,841.9]	0.0001

Table 4 Mean costs calculated at the first visit in patients who survived and who died over the 3-year period

	Mean cost (euro) for patients (n=164) who survived [95% CI]	Mean cost (euro) for patients (n=111) who died [95% CI]	Welch's t-test P-value
Hospitalization costs	673.9 [420.6; 1,094.6]	3,886.1 [3,007.4; 4,764.8]	0.001
Outpatient costs	147.5 [87.8; 207.7]	929.5 [699.9; 1,159.4]	0.001
Pharmaceutical costs	218.2 [134.9; 301.5]	809.5 [600.7; 1,018.3]	0.001
Direct costs	1,039.6 [868.1; 1,211.1]	5,625.1 [5,030.6; 6,219.6]	0.001
Indirect costs	121.4 [65.1; 177.7]	533.8 [342.8; 724.8]	0.001
Total costs	1,161.0 [968.4; 1,353.6]	6,158.9 [5,508.0; 6,809.8]	0.001

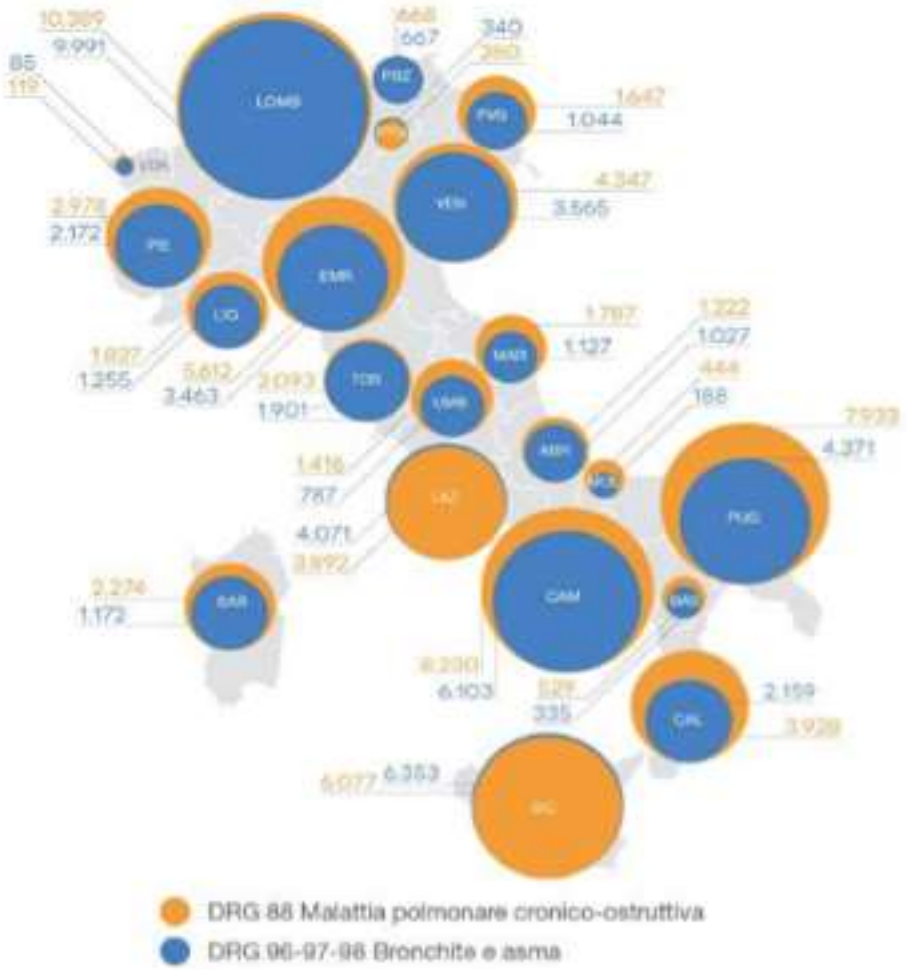
Andamento dei principali determinanti dei costi diretti



Dal Negro R.W., 2007

DIMISSIONI DI DEGENZA ORDINARIA E COSTO DEI RICOVERI

% tot 4,1 degenza media 8,6-11,5



Fonte: elaborazione Nebo Ricerche PA
su dati Ministero della Salute 2010

RICOVERI POTENZIALMENTE INAPPROPRIATI

In Italia **circa il 12%** di tutte le giornate di ricovero **sono potenzialmente inappropriate***

Malattie dell'apparato respiratorio	**48,1%**
Altre diagnosi	27,5%
Sistema circolatorio	11,6%
Malattie del sistema genito-urinario	5,2%
Malattie dell'apparato digerente	4,2%
Malattie sistema nervoso ed organi di senso	3,4%
TOTALE	**100%**

Di queste il **48,1% (oltre 3 milioni)** sono nell'ambito delle malattie dell'**apparato respiratorio**.

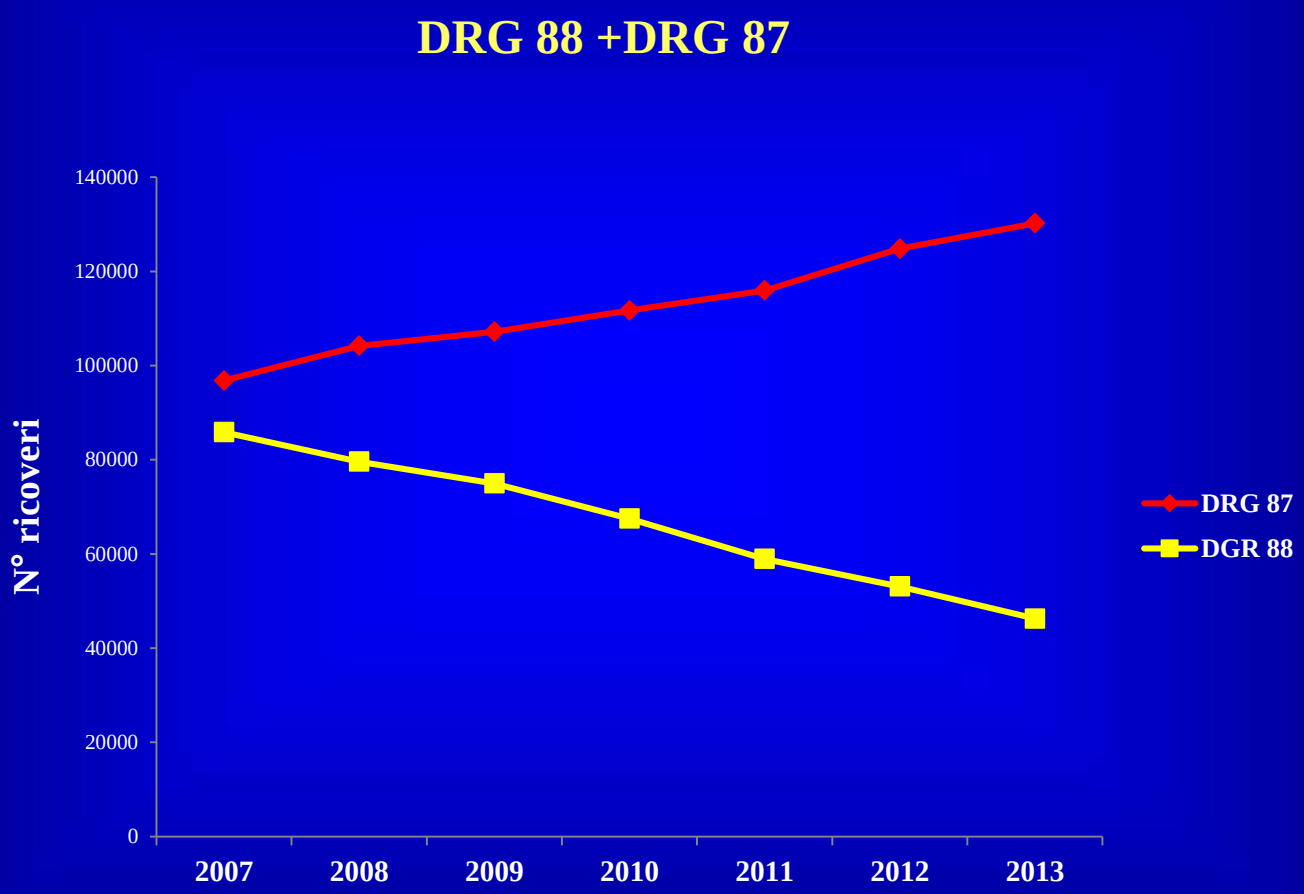
*Sezione della ospedalizzazione generale che **può essere identificata** e di conseguenza **contrastata** ponendo sotto osservazione quelle cause di ricovero per le quali la ricerca scientifica valuta generalmente più opportune **risposte sanitarie diverse dall'ospedale in senso stretto**.

Fonte: Atlante ERA 2009

Aumento del numero dei ricoveri per BPCO dal 2007 al 2013 in Italia

DRG 88 = malattia polmonare cronica ostruttiva

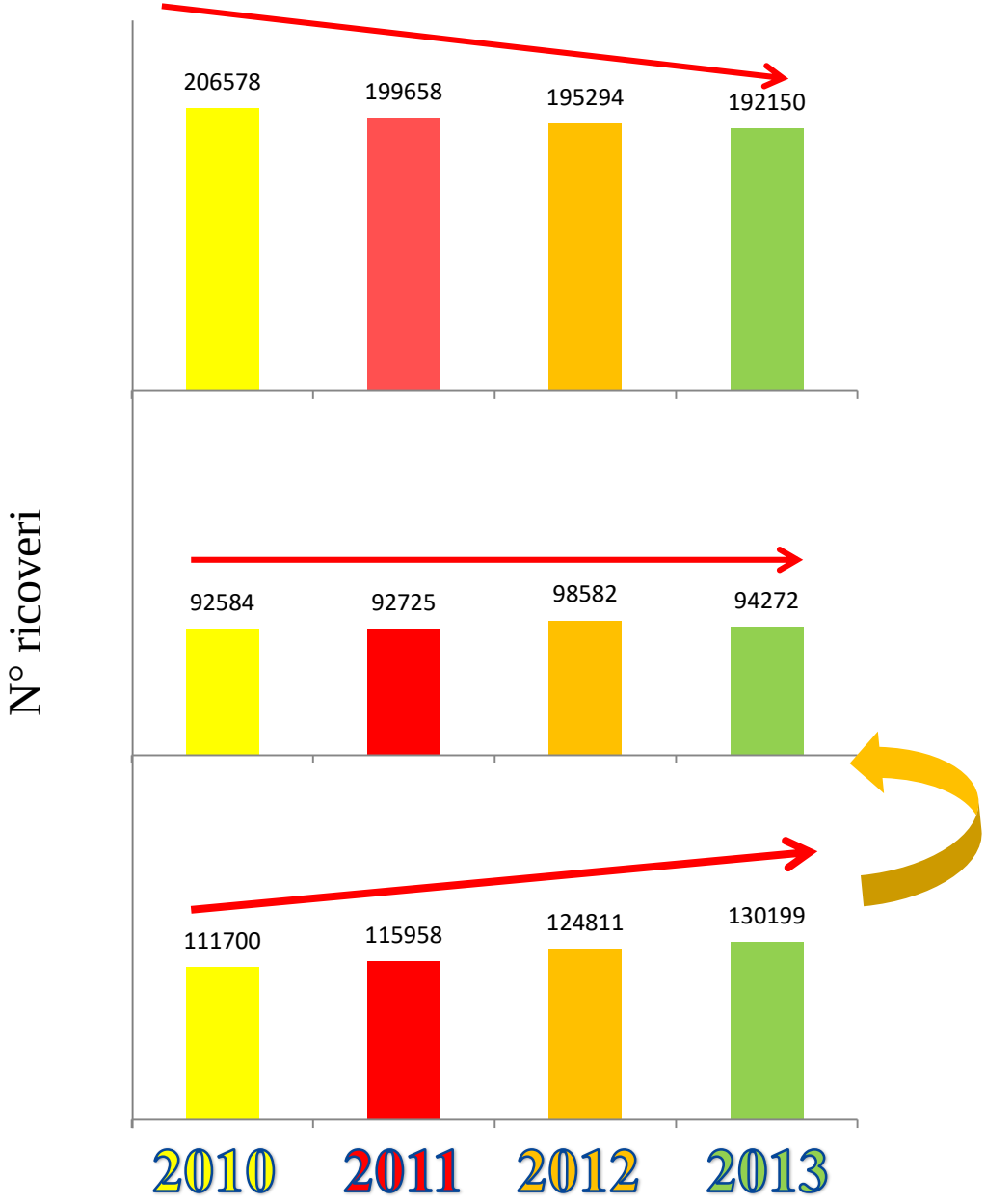
DRG 87 = edema polmonare e insufficienza respiratoria



N° RICOVERI

http://www.ministerosalute.it/programmazione/sdo/ric_informazioni/sceltadrg.jsp

DRG erogati in regime per acuti in Italia - Anno 2010-2013



Insufficienza cardiaca e shock

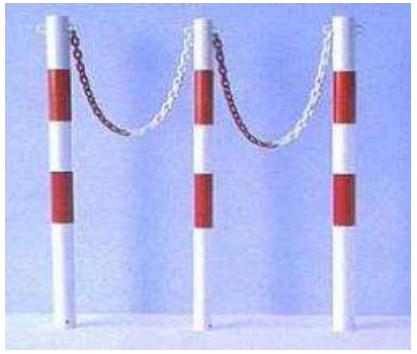
Emorragia intracranica e infarto cerebrale

Edema polmonare e insufficienza respiratoria

***Tab. 2* - Criteri di appropriatezza dei ricoveri ospedalieri per riacutizzazione di BPCO (3).**

- Inadeguata o mancata risposta al trattamento instaurato a domicilio
- Presenza di comorbilità a elevato rischio (polmonite, aritmie cardiache, insufficienza cardiaca congestizia, diabete mellito, insufficienza epatica o renale) o di età molto avanzata del paziente
- Anamnesi di frequenti riacutizzazioni
- Aumento notevole della dispnea e/o insorgenza di nuovi segni (cianosi, edemi periferici, aritmie cardiache)
- Aggravamento significativo della ipossiemia
- Aggravamento della ipercapnia/acidosi respiratoria (non rilevabile a domicilio)
- Alterazioni dello stato mentale
- Incapacità di dormire o mangiare per i sintomi
- Mancanza o inaffidabilità dell'assistenza familiare con incapacità del paziente di autogestirsi
- Incertezza nella diagnosi

Il ricovero ospedaliero è giustificato soprattutto in caso di documentata comparsa e/o aggravamento dell'insufficienza respiratoria.



Mortality and Mortality-Related Factors After Hospitalization for Acute Exacerbation of COPD*

Volume 124, Issue 2, August 2003, Pages 459–467

Results

A total of 171 patients were included in the study. The mortality rate during hospital stay was 8%, increasing to 23% after 1 year of follow-up. Despite a comparable in-hospital mortality rate (6%), the 1-year mortality rate was significantly higher for patients admitted to the ICU for respiratory failure (35%). The multivariate Cox proportional hazards model was used to determine independent predictors of survival. Variables included in the regression model were age, sex, FEV_1, Pa_{O_2}, Pa_{CO_2}, body mass index, long-term use of oral corticosteroids, comorbidity index, and hospital readmissions. The maintenance use of oral glucocorticosteroids (relative risk [RR], 5.07; 95% confidence interval [CI], 2.03 to 12.64), Pa_{CO_2} (RR, 1.17; 95% CI, 1.01 to 1.38), and age (RR, 1.07; 95% CI, 1.01 to 1.12) were independently related to mortality.

Conclusion

We conclude that the prognosis for patients who have been admitted to the hospital for acute exacerbation of COPD is poor. Long-term use of oral corticosteroids, higher Pa_{CO_2}, and older age could be identified as risk factors associated with higher mortality.

Oggi la mortalità per infarto miocardico acuto nei nostri ospedali è circa il 4%

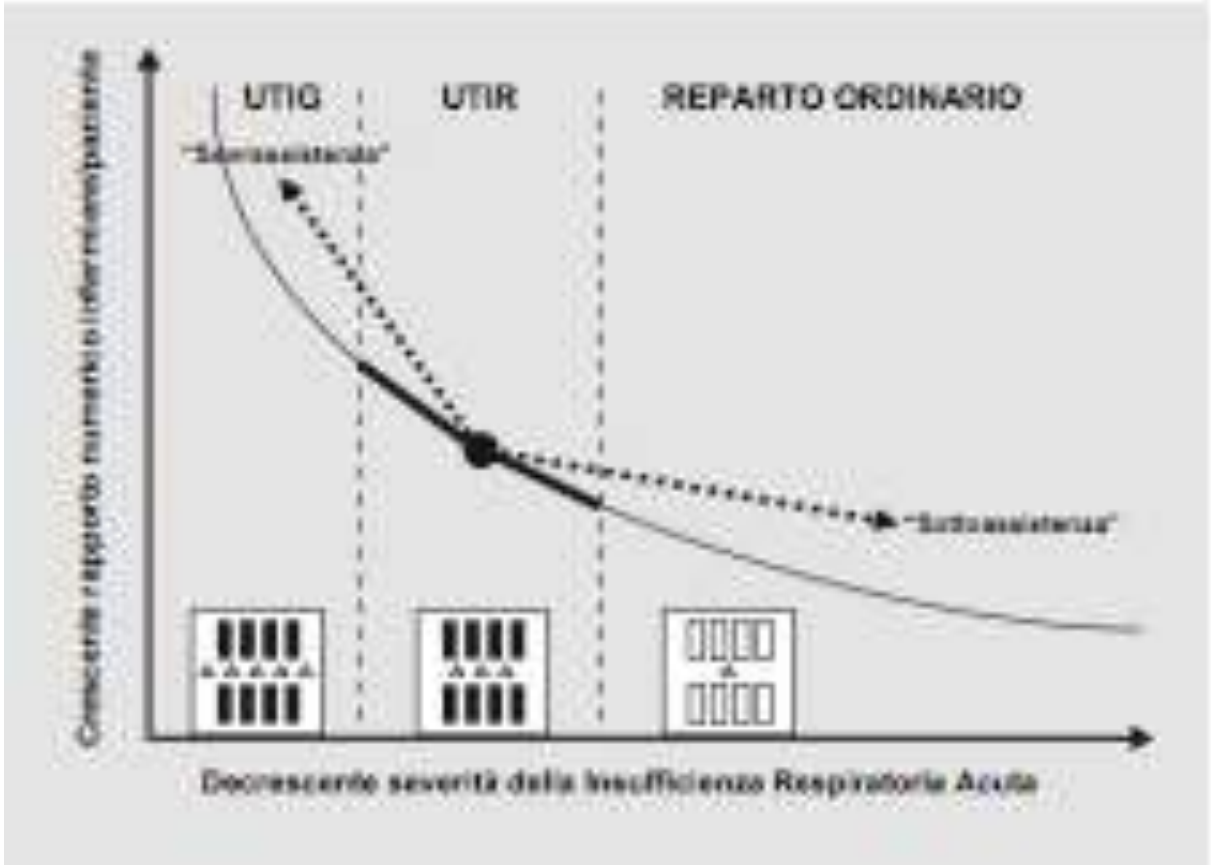
NIMV: Indicazioni sulla sede di applicazione

Gravità	Luogo di cura	Trattamento
pH > 7.36	Degenza ordinaria	Farmaci+Ossigeno
pH 7.36 -7.30	UMR	NIMV + Terapia Medica
pH <7.30; Paz. Vigile	UTIIR	NIMV
pH < 7.25 e/o Alterazione dello stato neurologico, Fatica muscolare, Indicazione alla IOT, MOF	UTIR se non MOF UTI se MOF	IOT o NPPV o NPV

IOT: *Intubazione Oro-Tracheale*
MOF: *Multi Organ Failure*
UMR*: Unità di Monitoraggio Respiratorio*
UTIIR*: Unità di Terapia Intensiva Intermedia Respiratoria*
UTIR*: Unità di Terapia Intensiva Respiratoria*
UTI: *Unità di Terapia Intensiva*

La gestione ospedaliera dell'insufficienza respiratoria acuta: il ruolo dello pneumologo e dell'Unità di Terapia Intensiva Respiratoria

Raffaele Scala



Gravità Intervento	Luogo di cura	Strategia terapeutica
pH > 7.35	Degenza ordinaria	Terapia medica
pH 7.35 -7.30	UMR	Terapia Medica + NIV
pH <7,30 con sensorio integro, stabilità emodinamica	UTIIR	Terapia medica + NIV
pH < 7.25 e/o Alterazione grave del sensorio, Fatica muscolare, instabilità emodinamica, MOF	UTIR se non MOF UTIG se MOF	Terapia medica + VMI o NIV

Advanced COPD patients under Home Mechanical Ventilation and/or Long Term Oxygen Therapy: Italian Healthcare Costs

M. Vitacca[1], L. Bianchi[1], A. Bazza[1], E.M. Clini[2]

Monaldi Arch Chest Dis
2011; 75: 4, 207-214

Table 1. - Characteristics of Patients' Population

	NIMV	IMV	LTOT	ANOVA p
Patient Number (%)	30 (36.1)	12 (14.5)	41 (49.4)	*ns*
Age, y	67±10	72±6	73±8	*0.027*
Males, n	19	8	34	*ns*
Ex smokers, n	23	6	29	*ns*
Current smokers, n	7	0	5	*ns*
Patients with BMI <24 (kg/m²), n	13	10	11	*ns*
Hospitalizations/year, n	1.70±1.06	2.92±1.24	1.54±1.33	*0.011*
Previous admission in ICU, (%)	50	67	32	*0.01*
Patients with at least one hospitalization in the last year, n	25	17	41	*ns*
Symptoms, y	11±8	13±7	11±7	*ns*
Dyspnea MRC scale ≥2 (%)	30	33	41	*ns*
LTOT, y	4.7±2.92	6.9±4.2	3.5±2.9	*0.011*
FEV_1, % prd	32±14	19±2.0	41±20	*0.010*
VC, % prd	44±21	32±7.0	58±21	*ns*
PaO_2, mmHg *	52±5	51±7.0	53±5	*ns*
$PaCO_2$, mmHg *	49±9	54±7.0	48±9	*ns*
pH *	7.37±0.02	7.35±0.01	7.38±0.02	*0.046*
MIP, % prd	44±14	30±10	41±19	*ns*
MEP, % prd	46±20	38±10	47±17	*ns*
Co-morbidities, n	2.17±1.12	2.40±1.08	2.25±1.59	*ns*
PLS	2.38±0.81	3.07±0.75	2.01±0.82	*0.0001*

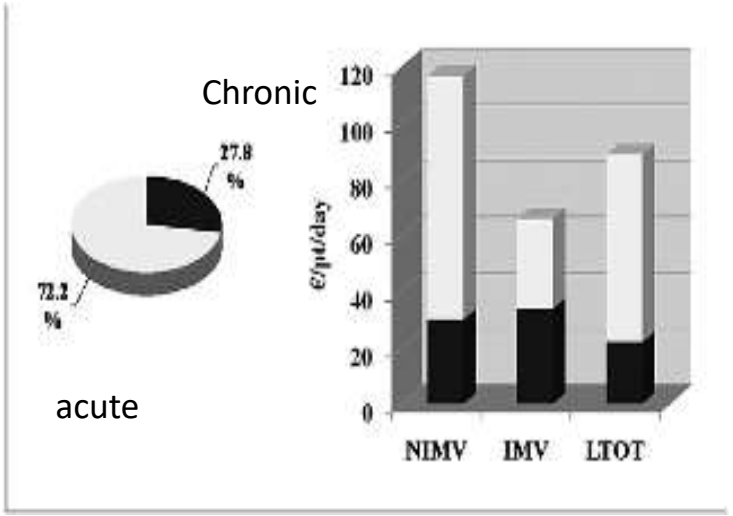


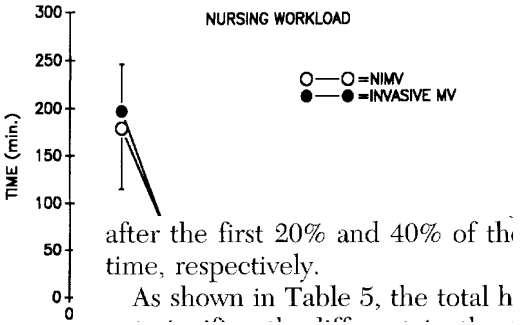
Table 3. - Average Acute Cost (€/patient/day) of Items by Patient Groups

(€/patient/day)	NIMV (n = 30)	IMV (n = 12)	LTOT (n = 41)	ANOVA p
Hospital admissions	34±32	24±29	36±40	0.59
ICU admissions	52±111	7±24	29±84	0.31
Drugs (antibiotics, systemic steroids)	0.8±0.7	0.7±0.7	0.8±0.9	0.83
Others	0.5±0.5	0.3±0.4	0.5±0.7	0.78
Total AC/patient	87±131	32±40	67±104	0.33

ons: We conclude that in the first 48 h of ventilation, daily NIMV is neither more exp
-consuming and staff demanding than InMV. After the first few days of ventilation, NIM
ntly less time-consuming than InMV, for MDs and Ns, so that medical and paramedica
ure seems not to be a major problem during NIMV. *(CHEST 1997; 111:16*

ds: economic resources; invasive mechanical ventilation; medical doctors workload; noninvasive mec
nursing workload; respiratory intensive care unit; respiratory therapists workload

ions: APACHE=acute physiology and chronic health e inspired
vasive mechanical ventilation; MD=medical doctor; MV=mechanical ventilation; N=nurse; NIMV=noni



after the first 20% and 40% of th time, respectively.

As shown in Table 5, the total h

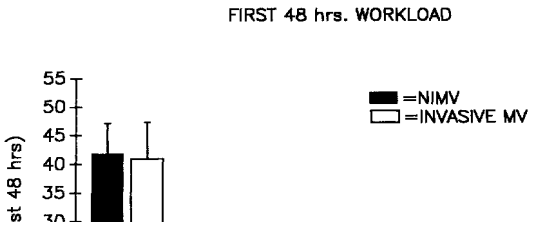
of variance for repeated measurements. Statistical significance was defined as a two-tailed p value <0.05.

RESULTS

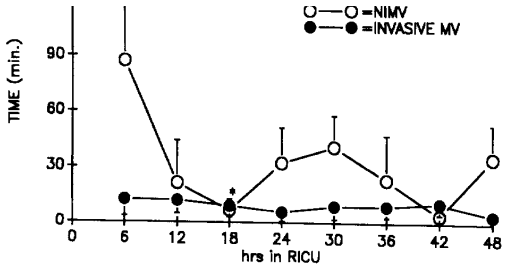
As illustrated in Table 2, the institution of both NIMV and InMV improved the arterial blood gas values of the patients by hospital discharge, although one patient from each group died before the weaning. The group A patient died of pneumonia on day 9. Multiple organ failure was the cause of death for

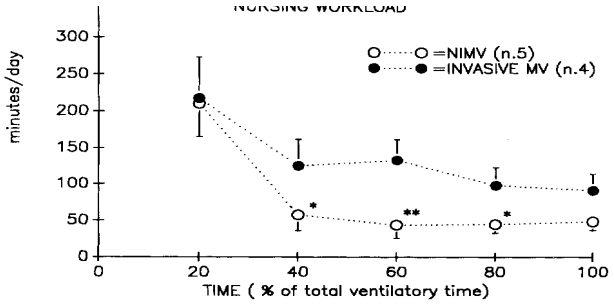
easily increase the staff's total workload per patient in group B, as compared to the patients who did not fail the initial NIMV trial.

Figure 3 shows the minutes spent per day by Ns and MDs in the care of the patients ventilated



Stefano Nava, MD; Ilaria Evangelisti, RN; Ciro Rampulla, MD;
Maria Laura Compagnoni, PhD; Claudio Fracchia, MD; and Fiorenzo Rubini, MD





Non-invasive positive pressure ventilation for treatment of respiratory failure due to exacerbations of chronic obstructive pulmonary disease (Review)

Ram FSF, Picot J, Lightowler J, Wedzicha JA

***The Cochrane Library* 2009, Issue 3**

- Decreased intubation (relative risk 0.41, 95% CI 0.33-0.53)
- Decreased mortality (relative risk 0.52, 95% CI 0.35-0.76)
- Decreased complications (relative risk 0.38, 95% CI 0.24-0.60)
- Decreased treatment failure (relative risk 0.48, 95% CI 0.37-0.63)
- Decreased hospital length of stay (Weight mean diff. -3.24 days, 95% CI -4.42 to -2.06)

The utility and futility of non-invasive ventilation in non-designated areas: Can critical care outreach nurses influence practice?

Karen Sumnera, et al.

Intensive and Critical Care Nursing, Volume 27, Issue 4, August 2011, Pages 211-217

Opening of a Respiratory Intermediate Care Unit in a General Hospital: Impact on Mortality and Other Outcomes

Table 4. Characteristics of patients included in the case-control study according to hospital setting

	RICU	Emergency unit	Internal medicine wards	p value
Patients included, n	60	58	62	
Dead patients with ARF, AECOPD, or CAP, n	31	29	33	
Age, years	69.8 (8.1)	73.1 (7.2)	71.9 (8.4)	0.075
Male/female ratio	1.81	1.63	2.2	
Charlson comorbidity index	7.7 (3.8)	7.8 (4.1)	7.6 (3.9)	0.965
PaO_2 at admission, mm Hg	59 (6.0)	58.7 (8.4)	60.1 (10.3)	0.631
$PaCO_2$ at admission, mm Hg	61.3 (29.7)	54.1 (18.4)	52.7 (12.7)	0.063
pH at admission	7.33 (0.14)	7.34 (0.09)	7.34 (0.09)	0.846
PaO_2/FiO_2 at admission, mm Hg	199 (67.8)	201 (76.9)	223 (48.8)	0.082
Lung injury score	2.5 (0.9)	2.4 (1.2)	2.2 (1.4)	0.097
APACHE II score	22.5 (5.9)	21.4 (7.1)	19.8 (6.4)	0.071
DRG weight	1.69 (0.6)	1.61 (0.3)	1.35 (0.5)	0.001*

Conclusions: The opening of a RICU may be advantageous to reduce in-hospital mortality, the need for ICU admission, and the hospital stay of patients with AECOPD, CAP, and ARF. Better use of care resources contributed to better patient management in the RICU.

Table 5. Management attitude and treatment timing in a sample of matched patients with ARF admitted in different hospital setting

	RICU	Emergency unit	Internal medicine wards	p
Median time to second blood gas check, h	1.56 (0.4)	4.26 (3.4)	17.1 (10.9)	<0.0001
Mean time to antibiotics initiation, h	0.84 (0.3)	1.63 (1.6)	2.2 (2.12)	<0.0001
Median time to mechanical ventilation, days	0.3 (0.6)	0.7 (0.7)	4.8 (3.2)	0.0001
Use of NIV, n (%)	42 (6.02)	27 (12.45)	12 (12.26)	0.0001
Use of corticosteroids, n (%)	58 (96.6)	46 (79.3)	39 (62.9)	0.0012
Use of chest physiotherapy, n (%)	43 (71.6)	11 (18.9)	6 (9.6)	0.0001

Data in parentheses are interquartile ranges or standard deviations unless otherwise indicated.

Risk factors and outcomes associated with chronic obstructive pulmonary disease exacerbations requiring hospitalization

Can Respir J Vol 16 No 4 July/August 2009

Final multivariate models of risk factors for readmission to hospital for acute exacerbations of chronic obstructive pulmonary disease

Variables in the equation	P	OR	95% CI Lower	95% CI Upper
Use of home oxygen preadmission	0.001	2.554	1.474	4.424
History of lung infection	0.048	1.727	1.005	2.967
Other chronic respiratory disease	0.030	1.779	1.057	2.994
Length of stay	0.002	0.439	0.262	0.737

- During the study period, **38% of subjects were readmitted at least once.**

- **Comparative analysis among the three hospitals identified a significant difference in readmission rates** (54%, 36% and 18%, respectively).

Comparison of the three hospitals surveyed

Variable	Hospital A	Hospital B	Hospital C
Admissions (n=310)			
Single admission	54 (46)	73 (64)	64 (82)
1 readmission	33 (28)	24 (21)	10 (13)
2 readmissions	15 (13)	11 (10)	3 (4)
≥3 readmissions	15 (13)	7 (6)	1 (1)
Total	117	115	78
Patient characteristics (n=310)			
Age, years (mean ± SD)	76±10	70±11	75±15
Men	69 (59)	67 (58)	30 (39)
Ethnicity			
Canadian born	21 (18)	7 (6)	3 (4)
Foreign born	34 (29)	19 (17)	43 (55)
Missing data	62 (53)	89 (77)	32 (41)
Premorbid health characteristics			
FEV$_1$ % predicted, L (mean ± SD)	33 ±10	48 ±13	56±19
Preadmission home oxygen	47 (40)	31 (27)	17 (22)
Charlson comorbidity			
Congestive heart failure	56 (48)	33 (29)	24 (31)
Other respiratory disease	67 (57)	43 (55)	64 (56)
History of lung infection	41 (35)	36 (31)	18 (23)
Social characteristics			
Living with someone	72 (62)	40 (35)	50 (64)
Formal home support	40 (34)	28 (24)	20 (26)
Health care and delivery characteristics (n=503 patient encounters)			
Admitting services			
Respiratory medicine	46 (21)	36 (19.3)	12 (12.5)
Internal medicine	69 (32)	98 (52.4)	61 (63.5)
Family practice	63 (29)	6 (3.2)	10 (10.4)
Respiratory medication use in the first 24 h of admission			
Inhaled corticosteroids	64 (28)	57 (31)	53 (55)
Oral corticosteroids	69 (31)	121 (65)	22 (23)
Parenteral corticosteroids	31 (14)	15 (8)	35 (36)
Antibiotics	129 (59)	116 (62)	84 (88)
Postdischarge follow-up			
Family doctor	122 (56)	145 (78)	49 (51)
Respirologist	69 (31)	143 (77)	24 (25)
Internist	9 (4)	69 (37)	7 (7)

PRO: Pag. 36

delle risorse, incluse quelle umane. In particolare, ferma restando la responsabilità tecnica operativa di ognuna delle unità operative devono essere garantite, nell'ambito del medesimo dipartimento, azioni di riorganizzazione utilizzando modelli organizzativi ad elevata flessibilità, adattabili ai diversi contesti ospedalieri promuovendo modelli sperimentali di assistenza per intensità di cure.

Possono essere attivati posti letto per pazienti critici in una "AFO area critica" a disposizione delle unità operative afferenti al relativo dipartimento; i pazienti che occupano i posti letto indistinti sono a carico delle unità operative che hanno disposto il ricovero.

Nelle AA.OO. Nelle quali sono presenti UU.OO. di Chirurgia Toracica e di Pneumologia possono essere attivate unità operative autonome di Terapia Intensiva/sub Intensiva Respiratoria.

Nei DEA di I e II livello, nonché nelle A.O. inserite quali HUB nelle reti tempo dipendenti e di specialità, possono essere costituite unità operative autonome di Medicina Fisica e Riabilitativa ad indirizzo cardiologico o respiratorio.

il continuum dell'assistenza sanitaria considerato nel contesto dei costi e della qualità di vita del paziente