

UNIVERSITÀ DEGLI STUDI DI PERUGIA

*Dipartimento di Medicina*

**Sezione di Medicina del Lavoro, Malattie Respiratorie e Tossicologia Professionali e Ambientali**

*Centro di Riferimento Nazionale INAIL per le Malattie Professionali dell'Apparato Respiratorio*

*Direttore Prof. Giacomo Muzi*

# La BPCO correlata con il lavoro

**Nicola Murgia**



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**Sezione di Medicina del Lavoro, Malattie Respiratorie e Tossicologia  
Professionale e Ambientale - Università degli Studi di Perugia**



# Broncopneumopatia cronica ostruttiva BPCO

- Caratterizzata da:
  - Ostruzione bronchiale non/poco reversibile
  - Infiammazione delle vie aeree da broncoirritanti
- Patologia eterogenea
- Multifattoriale



# Chronic obstructive pulmonary disease (COPD) by the numbers

**4<sup>th</sup>** leading cause of death in the U.S.



**15+**  
million  
Americans  
have been diagnosed with COPD

**12**  
million\*  
Americans  
may have undiagnosed COPD



\*Estimated

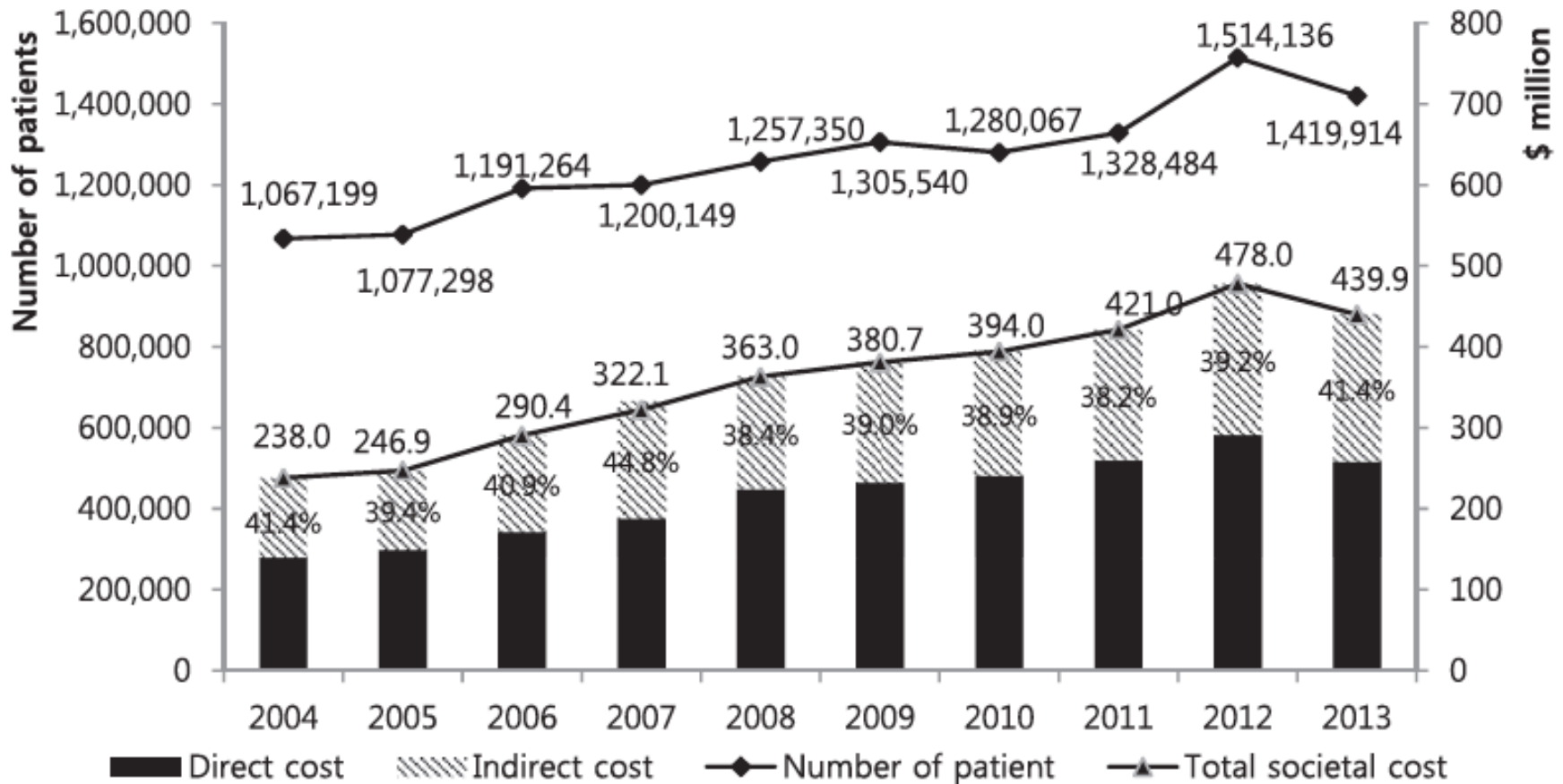
Source: Martinez FJ, Mannino D, et al. A new approach for identifying patients with undiagnosed chronic obstructive pulmonary disease. Am J Respir Crit Care Med. 2016 Oct 26.



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# Economic burden of COPD



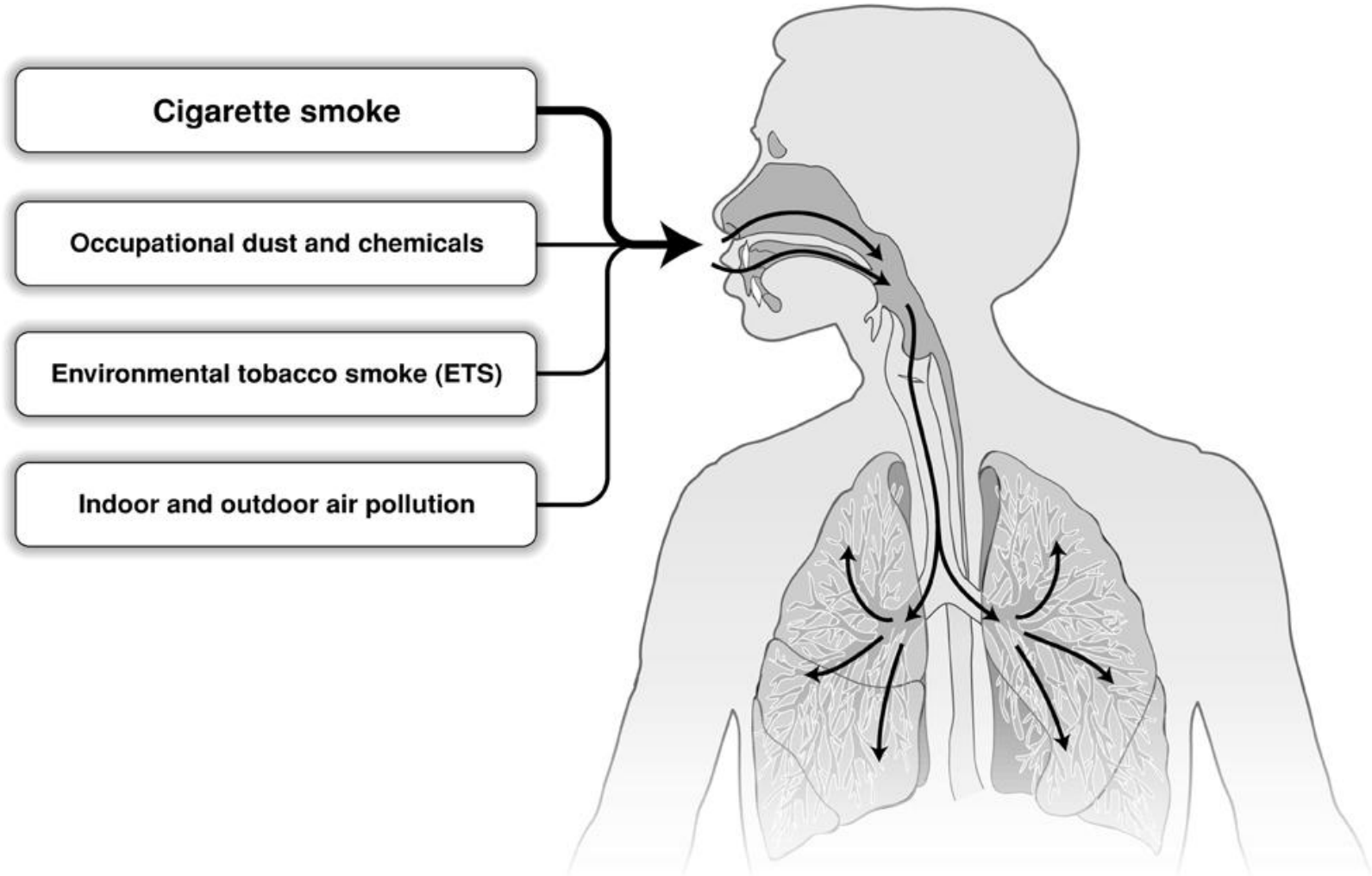
From Jim J et al J Med Econ. 2016



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# COPD etiology



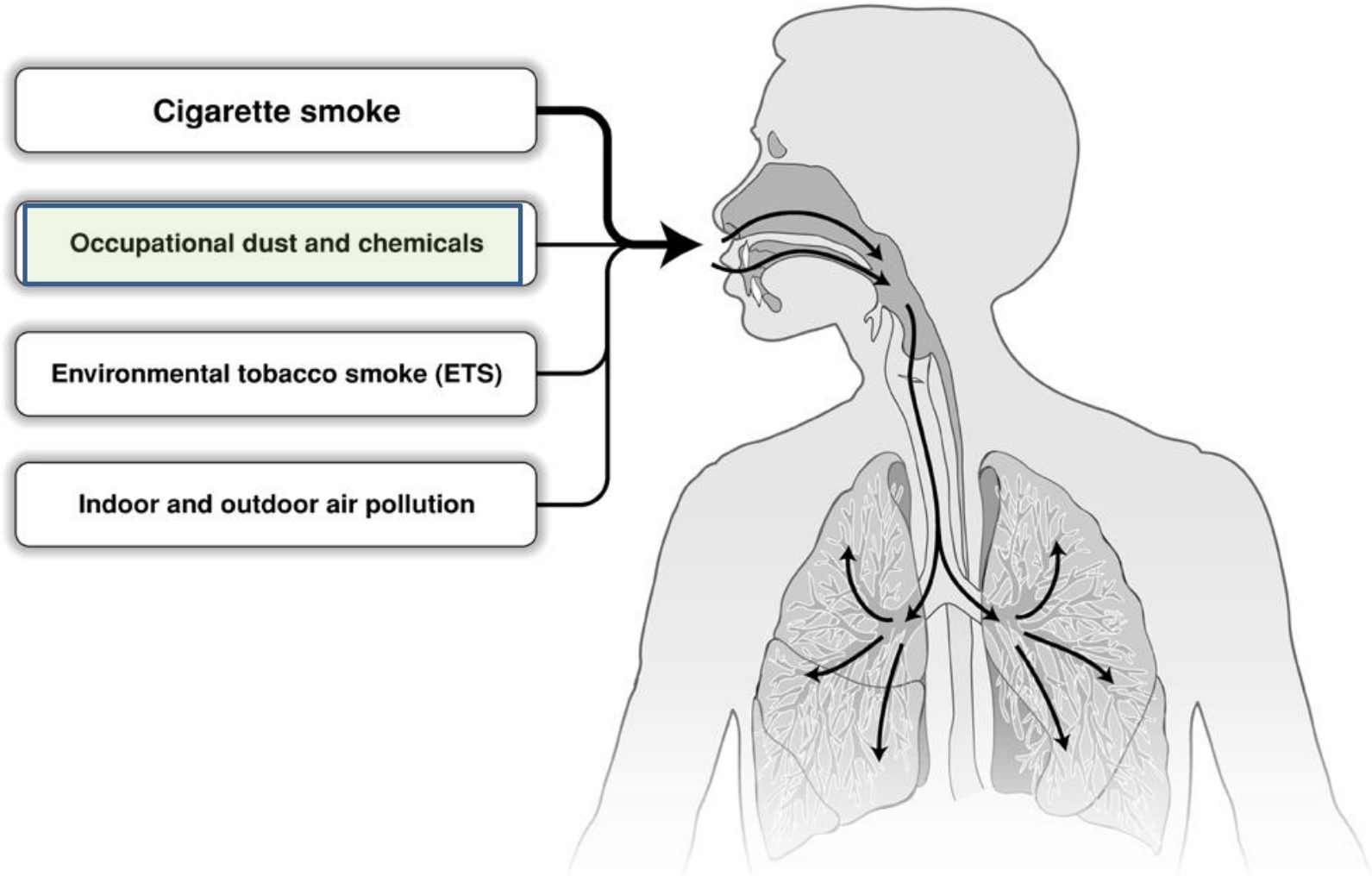
*From Global Initiative for Chronic Obstructive Lung Disease 2014*



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# COPD etiology



*From Global Initiative for Chronic Obstructive Lung Disease 2014*

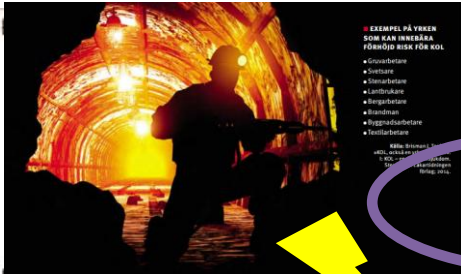


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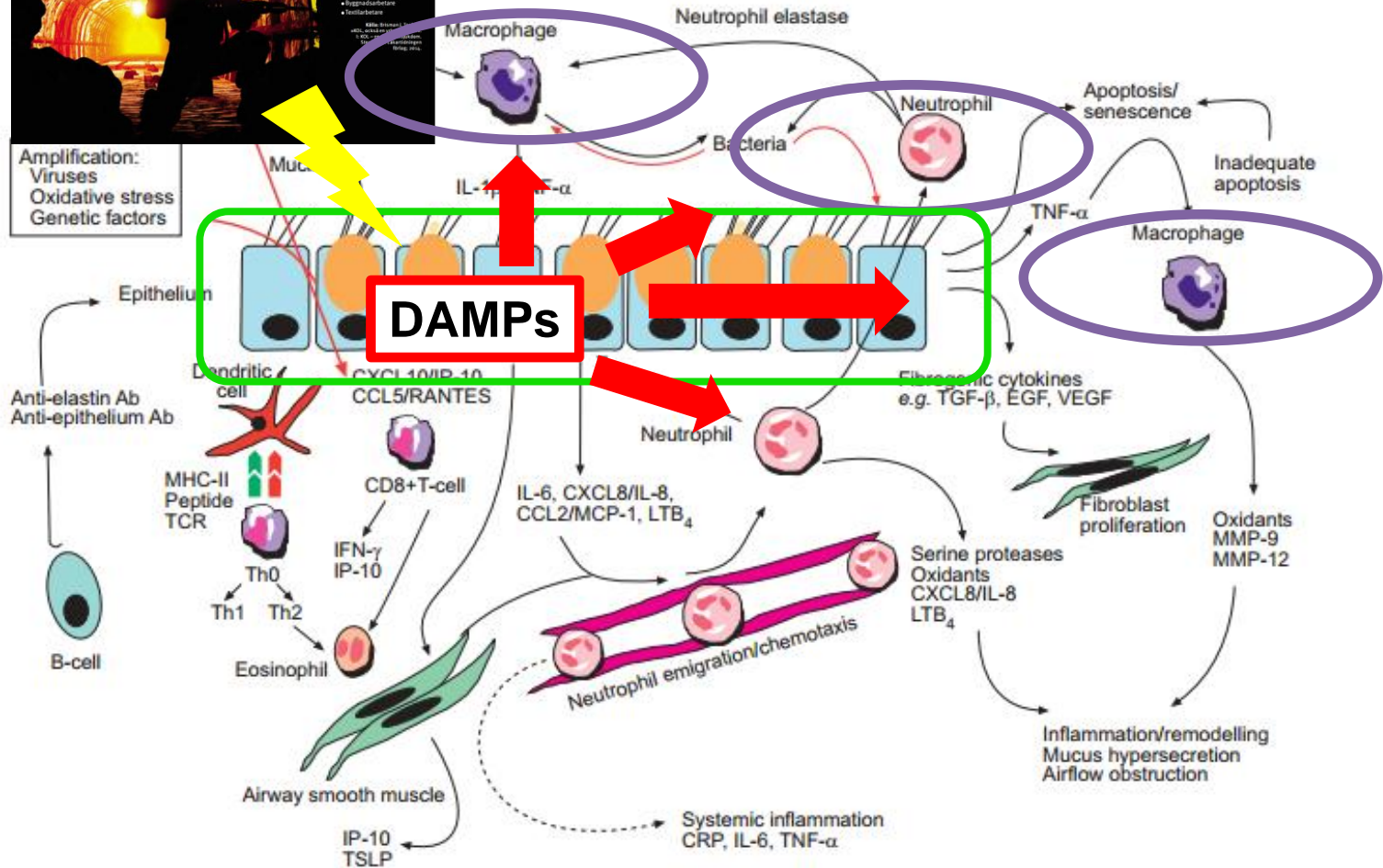


EXEMPEL PÅ VÄRER  
SOM KAN INNEBÄRA  
FÖRÖKAD RISK FÖR KOL

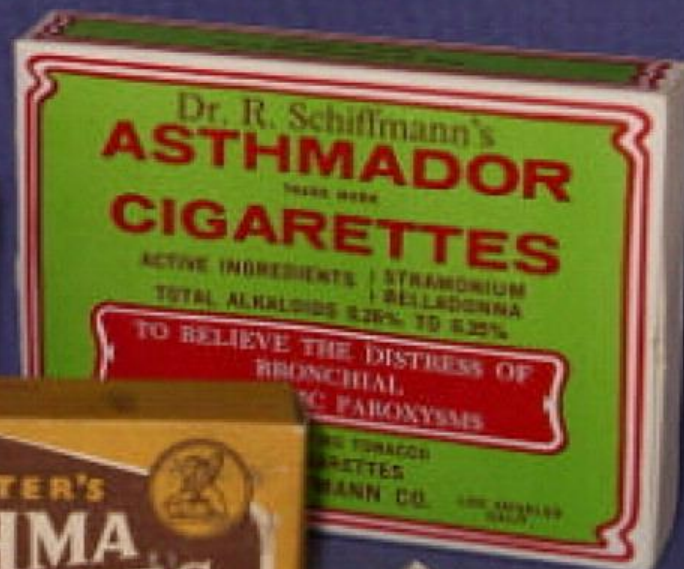
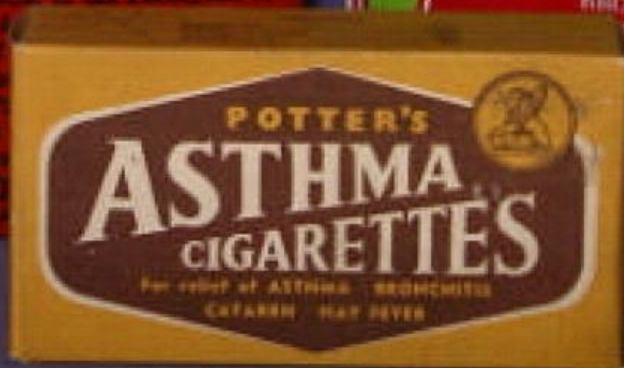
- Småstoft
- Svaveldioxid
- Luftfuktighet
- Svaveldioxid
- Syre
- Kvävgas
- Koldioxid
- Partiklar

08

MULTIFACETED MECHANISMS IN COPD







# BRITISH MEDICAL JOURNAL

LONDON SATURDAY AUGUST 1 1953

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## CHRONIC BRONCHITIS: AN INTRODUCTORY EXAMINATION OF EXISTING DATA\* †

BY

N. GOODMAN, B.Sc.

R. E. LANE, M.D., F.R.C.P.

AND

S. B. RAMPLING, M.D., M.R.C.P.†

*(From the Nuffield Department of Occupational Health, University of Manchester)*

...dusty trades, even within social class, are  
linked to chronic bronchitis mortality...



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# occupational and environmental lung disease

## Chronic Airflow Limitation: Its Relationship to Work in Dusty Occupations\*

*Margaret R. Becklake, M.D.†*

The classic diseases of dusty occupations may be on the decline, but this is not the case for chronic nonmalignant lung disease characterized by airflow limitation. This group of diseases, almost certainly multifactorial in etiology, occurs in those engaged in dusty occupations as well as in those who are not. Among the environmental factors concerned,

pointing to the importance of host or personal factors. Evidence is now accumulating in support of what has been called the Dutch hypothesis. This explanation of the natural history of chronic airflow limitation suggests that an “asthmatic tendency” is a necessary factor whether the putative exposure is to cigarettes or to other airborne pollutants.

CHEST / 88 / 4 / OCTOBER, 1985



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# American Thoracic Society Documents

## American Thoracic Society Statement: Occupational Contribution to the Burden of Airway Disease

THIS OFFICIAL STATEMENT OF THE AMERICAN THORACIC SOCIETY WAS APPROVED BY THE ATS BOARD OF DIRECTORS JUNE 2002.

INT J TUBERC LUNG DIS 11(3):251-257  
© 2007 The Union

### STATE OF THE ART

STATE OF THE ART SERIES  
Occupational lung disease in high- and low-income countries  
*Edited by M. Chan-Yeung*  
NUMBER 2 IN THE SERIES

### Occupation in chronic obstructive pulmonary disease and chronic bronchitis: an update

P. D. Blanc,\* K. Torén†

\* Division of Occupational and Environmental Medicine, University of California San Francisco, San Francisco, California, USA; † Department of Occupational and Environmental Medicine, Sahlgrenska University Hospital, Göteborg, Sweden

*Occupational Medicine* 2015;65:270-282  
doi:10.1093/occmed/kqv019

### IN-DEPTH REVIEW

### Occupational chronic obstructive pulmonary disease: a standard of care

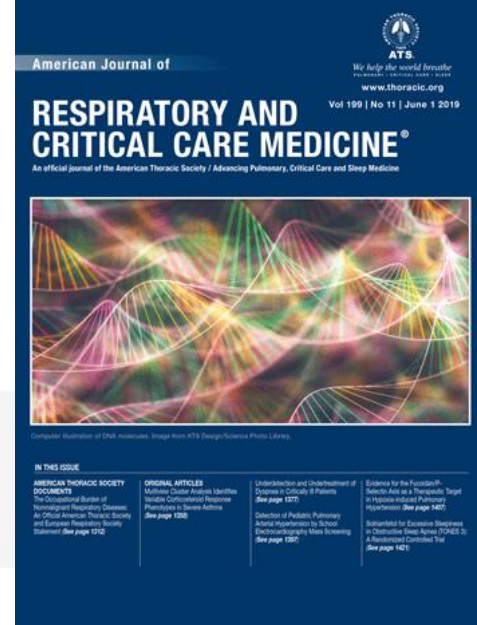
D. Fishwick<sup>1</sup>, D. Sen<sup>2</sup>, C. Barber<sup>1</sup>, L. Bradshaw<sup>1</sup>, E. Robinson<sup>1</sup>, J. Sumner<sup>1</sup> and The COPD Standard Collaboration Group\*

PAR : 15%



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# AMERICAN THORACIC SOCIETY DOCUMENTS

## The Occupational Burden of Nonmalignant Respiratory Diseases An Official American Thoracic Society and European Respiratory Society Statement

Paul D. Blanc, Isabella Annesi-Maesano, John R. Balmes, Kristin J. Cummings, David Fishwick, David Miedinger, Nicola Murgia, Rajen N. Naidoo, Carl J. Reynolds, Torben Sigsgaard, Kjell Torén, Denis Vinnikov, and Carrie A. Redlich; on behalf of the American Thoracic Society and European Respiratory Society

THIS OFFICIAL STATEMENT WAS APPROVED BY THE AMERICAN THORACIC SOCIETY MAY 2019 AND THE EUROPEAN RESPIRATORY SOCIETY MARCH 2019



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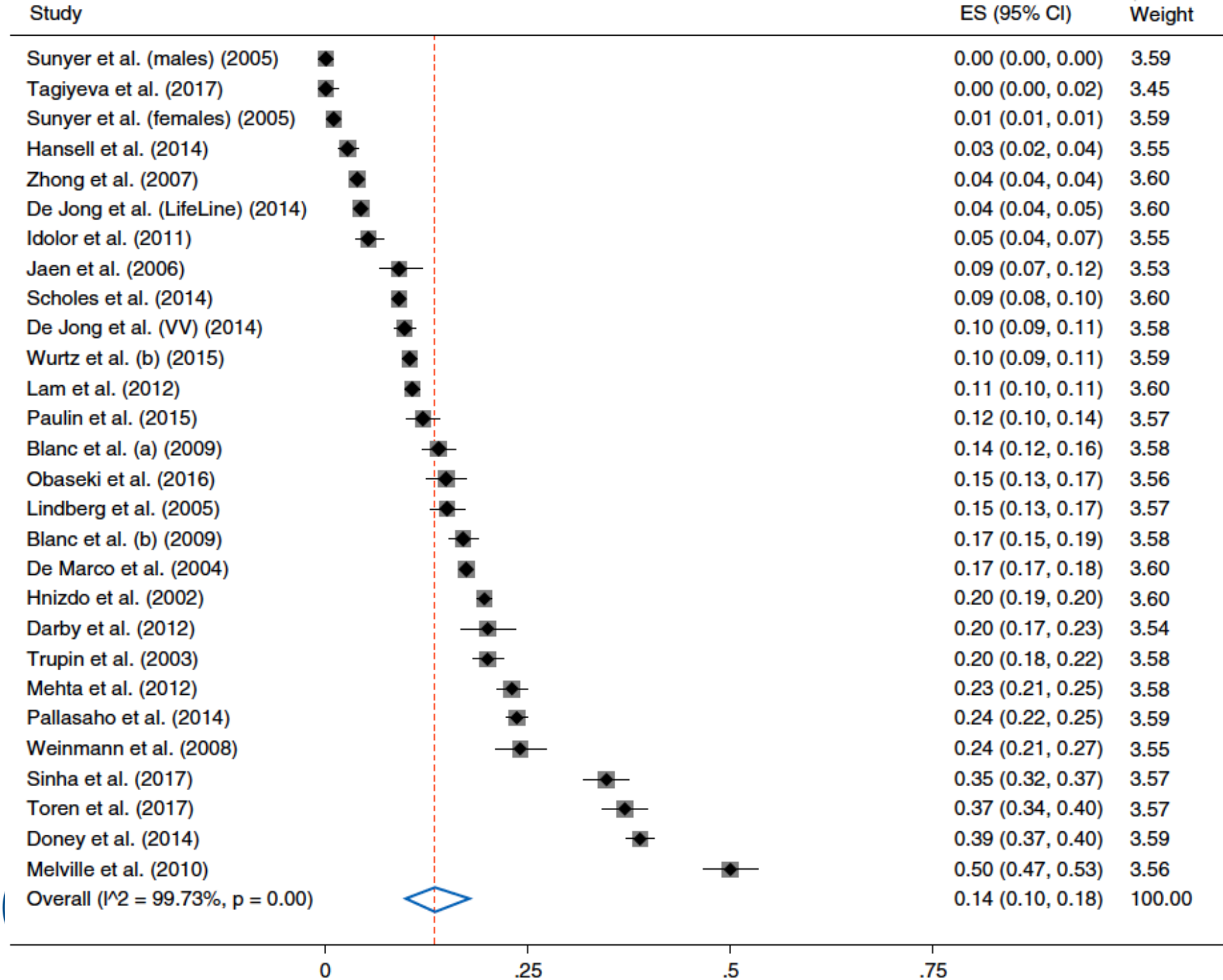
**Table 2.** Population-based Studies of Occupational Risk for Chronic Obstructive Pulmonary Disease

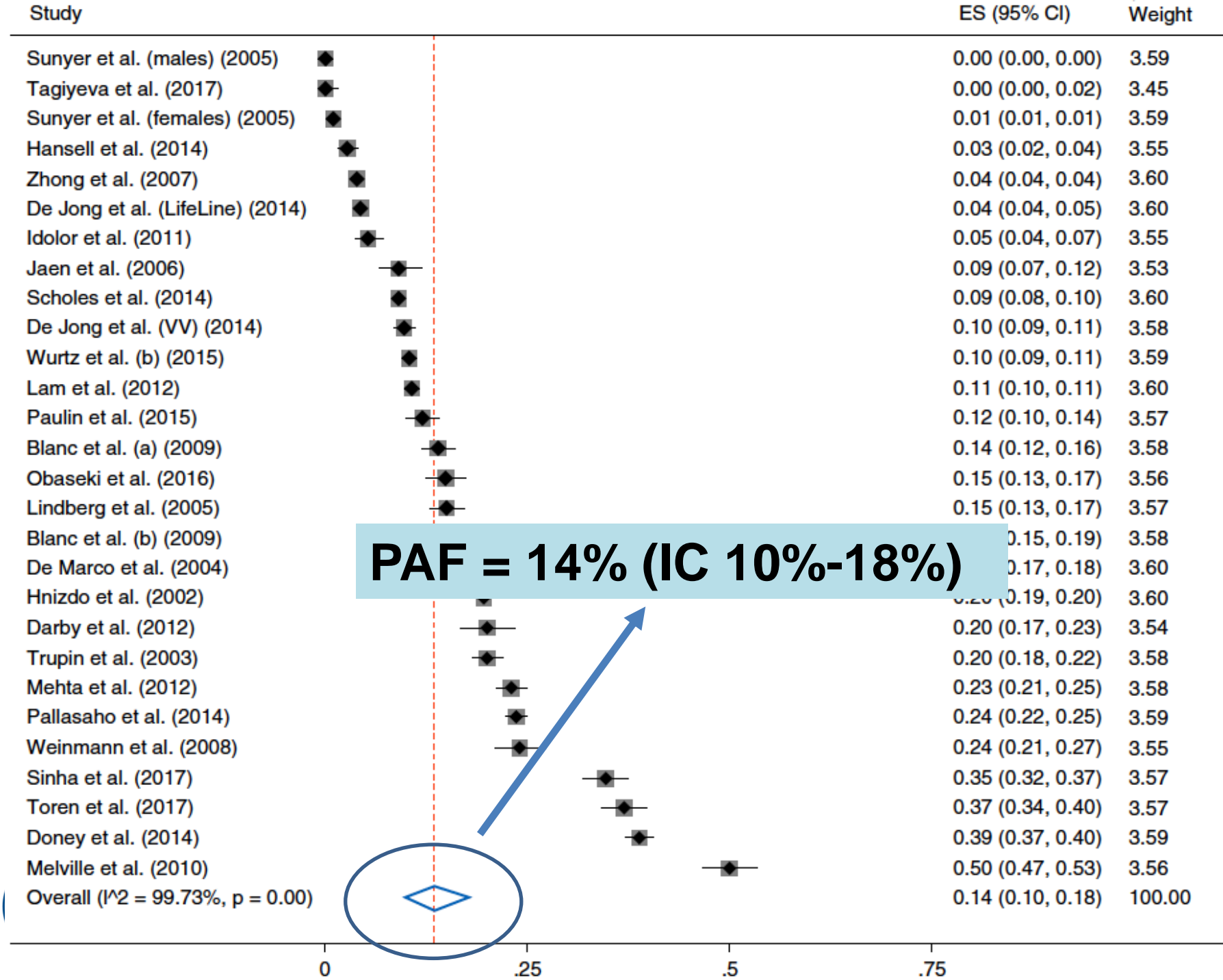
First Author, Year, Location (Reference)	Study Type and Population	Total (N)	Number of Cases	Definition of COPD	Exposure Information	PAF (%)
Hnizdo, 2002, USA (35)	Population based	9,823	693	COPD = FEV <sub>1</sub> /FVC <0.7 and FEV <sub>1</sub> <80% (pre-BD)	Occupational groups	19.6
Trupin, 2003, USA (36)	Population based	1,932	377	Self-reported doctor's diagnosis	Self-reported	20.0
de Marco, 2004, international (37)	Population based	14,318	1,751	COPD = FEV <sub>1</sub> /FVC <0.7 (pre-BD)	Self-reported exposure to dust, gas, and fumes	17.4
Lindberg, 2005 Sweden (38)	Population based (longitudinal)	1,109	83	COPD = FEV <sub>1</sub> /FVC <0.7 and FEV <sub>1</sub> <80% (pre-BD)	Socioeconomic classification (manual worker in industry)	15.0
Sunyer, 2005, international (39)	Population based (longitudinal), females	3,279	53	COPD = FEV <sub>1</sub> /FVC <0.7 (pre-BD)	VGDF by JEM (high exposure)	1.0
Sunyer, 2005, international (39)	Population based (longitudinal), males	3,202	61	COPD = FEV <sub>1</sub> /FVC <0.7 (pre-BD)	VGDF by JEM (high exposure)	0
Jaén, 2006, Spain (40)	Population based	497	73	COPD = FEV <sub>1</sub> /FVC <0.7 (post-BD)	Self-reported (any exposure to dust, gas, and fumes)	9.0
Zhong, 2007, China (41)	Population based	20,245	1,668	COPD = FEV <sub>1</sub> /FVC <0.7 (post-BD)	Self-reported (any exposure to dust, gas, and fumes)	3.9
Weinmann, 2008, USA (42)	Case-control	744	388	COPD = FEV <sub>1</sub> /FVC below LLN or by algorithm	JEM	24
Blanc, 2009, USA (43)	Case-control	1,504	1,202	COPD = FEV <sub>1</sub> /FVC <0.7 (pre-BD)	VGDF by JEM (high exposure)	14.0
Blanc, 2009, USA (44)	Case-control	1,788	79	COPD = FEV <sub>1</sub> /FVC <0.7	VGDF self-reported	17.0
Melville, 2010, UK (45)	Population based	841	84	COPD = FEV <sub>1</sub> /FVC <70 and FEV <sub>1</sub> <80% (post-BD)	Self-reported occupational exposure at risk of COPD	50.0
Idolor, 2011, Philippines (46)	Population based	722	141	COPD = FEV <sub>1</sub> /FVC <70 (post-BD)	Self-reported exposure in a dusty job	5.2
Mehta, 2012, Switzerland (47)	Population based (longitudinal)	1,958*	43*	COPD = FEV <sub>1</sub> /FVC below LLN stage II + (pre-BD)	VGDF by JEM (high exposure)	23*
Lam, 2012, China (48)	Population based	8,216	461	COPD = FEV <sub>1</sub> /FVC below LLN (pre-BD)	Self-reported (any exposure to dust, gas, and fumes)	10.4
Darby, 2012, UK (49)	Population based	571	197	COPD = FEV <sub>1</sub> /FVC <70 (pre-BD)	Self-reported VGDF exposure	20
Hansell, 2014, New Zealand (50)	Population based	750	83	COPD = FEV <sub>1</sub> /FVC below LLN (pre-BD)	VGDF by JEM (high exposure)	2.7
Doney, 2014, USA (51)	Population based	3,508	196	COPD = FEV <sub>1</sub> /FVC below LLN and FEV <sub>1</sub> below LLN (pre-BD)	Self-reported (severe exposure)	38.8
de Jong, 2014, Netherlands (52)	Population based (LifeLine cohort)	11,851	1,754	COPD = FEV <sub>1</sub> /FVC <0.7 (pre-BD)	VGDF by JEM (high exposure)	4.3
de Jong, 2014, Netherlands (52)	Population based (Mlagtwedde-Vlaardingen cohort)	2,364	639	COPD = FEV <sub>1</sub> /FVC <0.7 (pre-BD)	VGDF by JEM (high exposure)	9.7
Pallasaho, 2014, Finland (53)	Population based (longitudinal)	4,080	140	Self-reported	Self-reported	23.6
Scholes, 2014, UK (54)	Population based	7,603	1,032	COPD = FEV <sub>1</sub> /FVC below LLN (pre-BD)	Job classification as routine occupation	9.1
Paulin, 2015, USA (55)	Population-based cohort of smokers	1,075	721	COPD = FEV <sub>1</sub> /FVC <0.7 (post-BD)	VGDF by JEM (intermediate/high risk)	12.0
Würtz, 2015, Denmark (56)	Population based	4,132	279	COPD = FEV <sub>1</sub> /FVC below LLN (pre-BD)	VGDF by JEM (high exposure)	10.3
Obaseki, 2016, Nigeria (57)	Population based	875	67	COPD = FEV <sub>1</sub> /FVC below LLN (post-BD)	Self-reported (dusty jobs)	14.9
Tagiyeva, 2017, UK (58)	Population based	237	63	COPD = FEV <sub>1</sub> /FVC below LLN (post-BD)	VGDF by JEM	0
Sinha, 2017, India (59)	Population based	1,203	122	COPD = FEV <sub>1</sub> /FVC <0.7 (post-BD)	Self-reported	34.6
Torén, 2017, Sweden (60)	Population based	1,052	50	COPD = FEV <sub>1</sub> /FVC <0.7 + dyspnea, wheezing, or chronic bronchitis	Self-reported	37

Definition of abbreviations: BD = bronchodilator; COPD = chronic obstructive pulmonary disease; JEM = job exposure matrix; LLN = lower limit of normal; PAF = population attributable fraction; UK = United Kingdom; USA = United States; VGDF = vapors, gas, dust, or fumes.

The pooled PAF for the occupational contribution to COPD was 14% (95% confidence interval, 10–18%). The pooled PAF for the occupational contribution to COPD in nonsmokers (references not in table [35, 47, 51, 64–66]) was 31% (95% confidence interval, 10–18%).

\*Ever-smokers.





# MINISTERO DEL LAVORO E DELLE POLITICHE SOCIALI

**Aggiornamento dell'elenco delle malattie per le quali è obbligatoria la denuncia ai sensi e per gli effetti dell'articolo 139 del testo unico approvato con decreto del Presidente della Repubblica 30 giugno 1965, n. 1124, e successive modifiche e integrazioni**

## INDICE ALFABETICO DELLE MALATTIE PROFESSIONALI EX ART. 139 T.U. D.P.R. 1124/1965 E S.M.I.

### LISTA I - Malattie la cui origine lavorativa è di elevata probabilità

BRONCHITE	ACIDO SOLFORICO	I.1.26.	J40
BRONCHITE	ZINCO leghe e composti	I.1.17.	J40
BRONCHITE IRRITATIVA	SELENIO leghe e composti	I.1.12.	J40
BRONCOPNEUMOPATIA CRONICA OSTRUTTIVA	ANIDRIDE SOLFOROSA	I.1.25	J44
BRONCOPNEUMOPATIA CRONICA OSTRUTTIVA	CADMIO leghe e composti	I.1.04.	J44
BRONCOPNEUMOPATIA CRONICA OSTRUTTIVA	CEMENTO, CALCARE, GESSO, CALCE, ALTRE POLVERI	I.4.12.	J44
BRONCOPNEUMOPATIA CRONICA OSTRUTTIVA	FUMI E GAS DI SALDATURA	I.4.15	J44



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# MINISTERO DEL LAVORO E DELLE POLITICHE SOCIALI

Aggiornamento dell'elenco delle malattie per le quali è obbligatoria la denuncia ai sensi e per gli effetti dell'articolo 139 del testo unico approvato con decreto del Presidente della Repubblica 30 giugno 1965, n. 1124, e successive modifiche e integrazioni

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# BPCO lavoro-correlata

- Identificazione precoce
- Gestione



# BPCO lavoro-correlata - Identificazione

- Sorveglianza sanitaria
  - Questionari
  - Spirometria
  - Declino della funzione polmonare



## ACOEM GUIDANCE STATEMENT

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# Spirometry in the Occupational Health Setting—2011 Update

*Mary C. Townsend, DrPH, and the Occupational and Environmental Lung Disorders Committee*

*JOEM* • Volume 53, Number 5, May 2011



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# AMERICAN THORACIC SOCIETY DOCUMENTS



## Official American Thoracic Society Technical Standards: Spirometry in the Occupational Setting

Carrie A. Redlich, Susan M. Tarlo, John L. Hankinson, Mary C. Townsend, William L. Eschenbacher, Susanna G. Von Essen, Torben Sigsgaard, and David N. Weissman; on behalf of the American Thoracic Society Committee on Spirometry in the Occupational Setting

THIS OFFICIAL STATEMENT OF THE AMERICAN THORACIC SOCIETY (ATS) WAS APPROVED BY THE ATS BOARD OF DIRECTORS, DECEMBER 2013

American Journal of Respiratory and Critical Care Medicine Volume 189 Number 8 | April 15 2014



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## Workplace Safety & Health Topics



### Workplace Safety and Health Topics

#### Spirometry

Spirometry Monitoring Technology

#### ►SPIROLA Software

Quick Calculation of FEV1 Decline

Spirometry Training Course

[NIOSH](#) > [Workplace Safety and Health Topics](#) > [Spirometry](#) > [Spirometry Monitoring Technology](#)

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## SPIROMETRY

### Spirometry Longitudinal Data Analysis (SPIROLA) Software

SPIROLA software is an easy-to-use visual and quantitative tool intended to assist the health care provider in monitoring and interpreting computerized longitudinal spirometry data for individuals as well as for a group. The software is only intended to assist the user in assembling the information required to make medical decisions, but cannot be substituted for competent and informed professional judgment. NIOSH does not warrant the reliability or accuracy of the software, graphics, or text. The users need to be aware of applicable federal, state and local laws and regulations that may impact utilization of this software. SPIROLA has been developed and is maintained by CDC and is licensed by CDC to be downloaded free of charge from the CDC webpage by anybody who may need it.



SPIROLA is easy to install and test-run with a demonstration database included with the software (names in the database are fictional). SPIROLA Worksite Assessment module is optional and is designed to help with worksite exposure evaluation (see user manual). SPIROLA only supports 32-bit versions of Microsoft Office. Additionally, if you do not have Microsoft Access 2007 or a newer version installed, download and install the 32-bit version of the [Microsoft Access 2010 runtime](#).

Listed below are some of the features SPIROLA provides. Please [send us your questions or comments](#) on SPIROLA.

- Print page
- Get email updates
- Subscribe to RSS
- Listen to audio/Podcast

#### Contact Us:

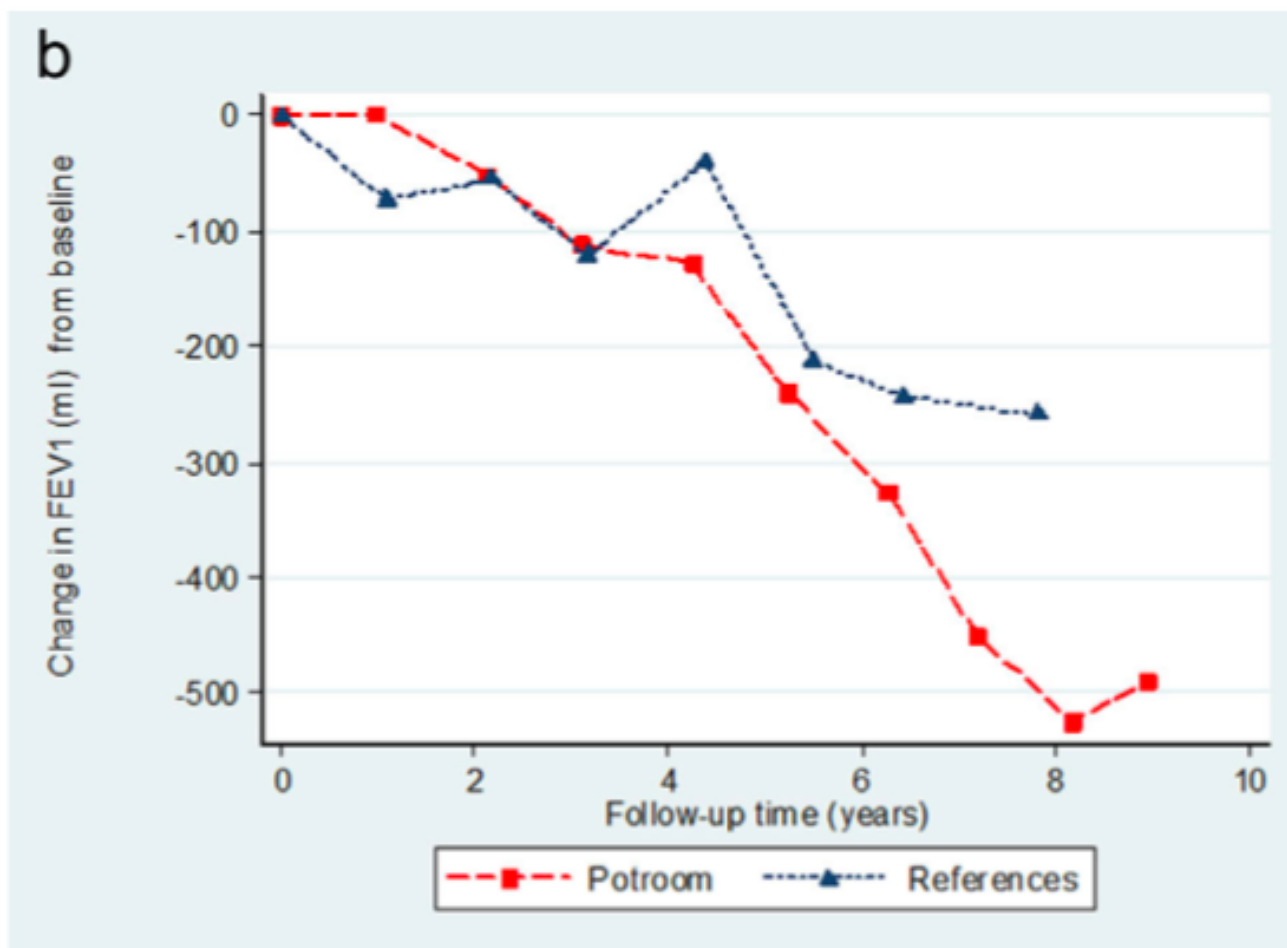
- [National Institute for Occupational Safety and Health \(NIOSH\)](#)  
Centers for Disease Control and Prevention
- 800-CDC-INFO  
(800-232-4636)  
TTY: (888) 232-6348
- New Hours of Operation  
8am-8pm ET/Monday-Friday  
Closed Holidays
- [Contact CDC-INFO](#)





# Annual Decline in Forced Expiratory Volume is Steeper in Aluminum Potroom Workers Than in Workers Without Exposure to Potroom Fumes

Vidar Søyseth, MD, PhD,<sup>1,2,3\*</sup> Paul K. Henneberger, MPH, ScD,<sup>3</sup> Gunnar Einvik, MD, PhD,<sup>1</sup> Mohammed Abbas Virji, MSc, ScD,<sup>3</sup> Berit Bakke, MSc, PhD,<sup>4</sup> and Johny Kongerud, MD, PhD<sup>2,5</sup>



*Società Italiana di Medicina del Lavoro e Igiene Industriale*

**LINEE GUIDA**  
**per la sorveglianza sanitaria di lavoratori esposti ad**  
**irritanti e tossici per l'apparato respiratorio**

**P. Maestrelli** (*coordinatore*)

**P. Boschetto, P. Carta, M. Corradi, R. De Zotti, L. Di Lorenzo, M. Ferrari, G. Guarnieri, M. Imbriani, A. Innocenti, C. Mapp, N. Murgia, G. Muzi, L. Patrini, A. Quercia, L. Riboldi, C. Romano, L. Soleo**

# BPCO – lavoro correlata - identificazione

- Sorveglianza sanitaria
  - Questionario (annuale)
  - Spirometria (annuale)
  - Altri accertamenti integrativi(opzionali)
    - Spirometria globale (CPT, VR)
    - Diffusione alveolo-capillare
    - Test di broncodilatazione
    - Rx torace



# BPCO lavoro-correlata - Gestione

- Nei luoghi di lavoro
  - Valutazione del rischio-> eliminazione-riduzione
  - Sorveglianza sanitaria
  - Informazione e formazione
  - DPI
  - Promozione della salute



## Occupational exposures and the risk of COPD: dusty trades revisited

P D Blanc,<sup>1</sup> C Iribarren,<sup>2</sup> L Trupin,<sup>3</sup> G Earnest,<sup>1</sup> P P Katz,<sup>3</sup> J Balmes,<sup>1</sup> S Sidney,<sup>2</sup>  
M D Eisner<sup>1,2</sup>

### Smoking/Occupational Exposures

	OR
No/No	1,0
No/Yes	1,7
Yes/No	8,3
Yes/Yes	18,7



# BPCO lavoro-correlata - Gestione

- Nei luoghi di lavoro
  - Valutazione del rischio-> e
  - Sorveglianza sanitaria
  - Informazione e formazione
  - DPI
  - Promozione della salute

**Quando un lavoratore con BPCO non è idoneo a lavorare in un ambiente con broncoirritanti?**



# Molto difficile da rispondere

- Se rimane esposto-> possibile peggioramento BPCO
- Se non idoneo-> possibile disabilità lavorativa
- La risposta potrebbe dipendere da :
  - Livelli di esposizione
  - Idoneità lavorativa globale
  - Tipo di lavoro (consumo di ossigeno)



# Conclusioni

- Ci sono evidenze che alcune attività lavorative ed esposizioni sono correlate a BPCO e il 14% dei casi ha come causa o concausa il lavoro
- La BPCO lavoro correlata ha rilevanti costi socio-economici
- La gestione del lavoratore con BPCO lavoro correlata (e non solo) è difficile e dovrebbe essere multidisciplinare

