KRONISK LUFTVÄGSOBSTRUKTION HOS VUXNA VILKA VÄGAR LEDER DIT?

LUNGAN GENOM LIVET

Stockholm 230329

Magnus Sköld

118-2023-MARK

MY DISCLOSURES

- research grants
  - Boehringer Ingelheim,
  - Roche
  - Sandoz
- consultancy or speaker fees
  - AstraZeneca, Boehringer Ingelheim, GlaxoSmithKline, Meda, Novartis, Mundipharma, Sandoz, Chiesi, Almirall, Intermune and Roche.

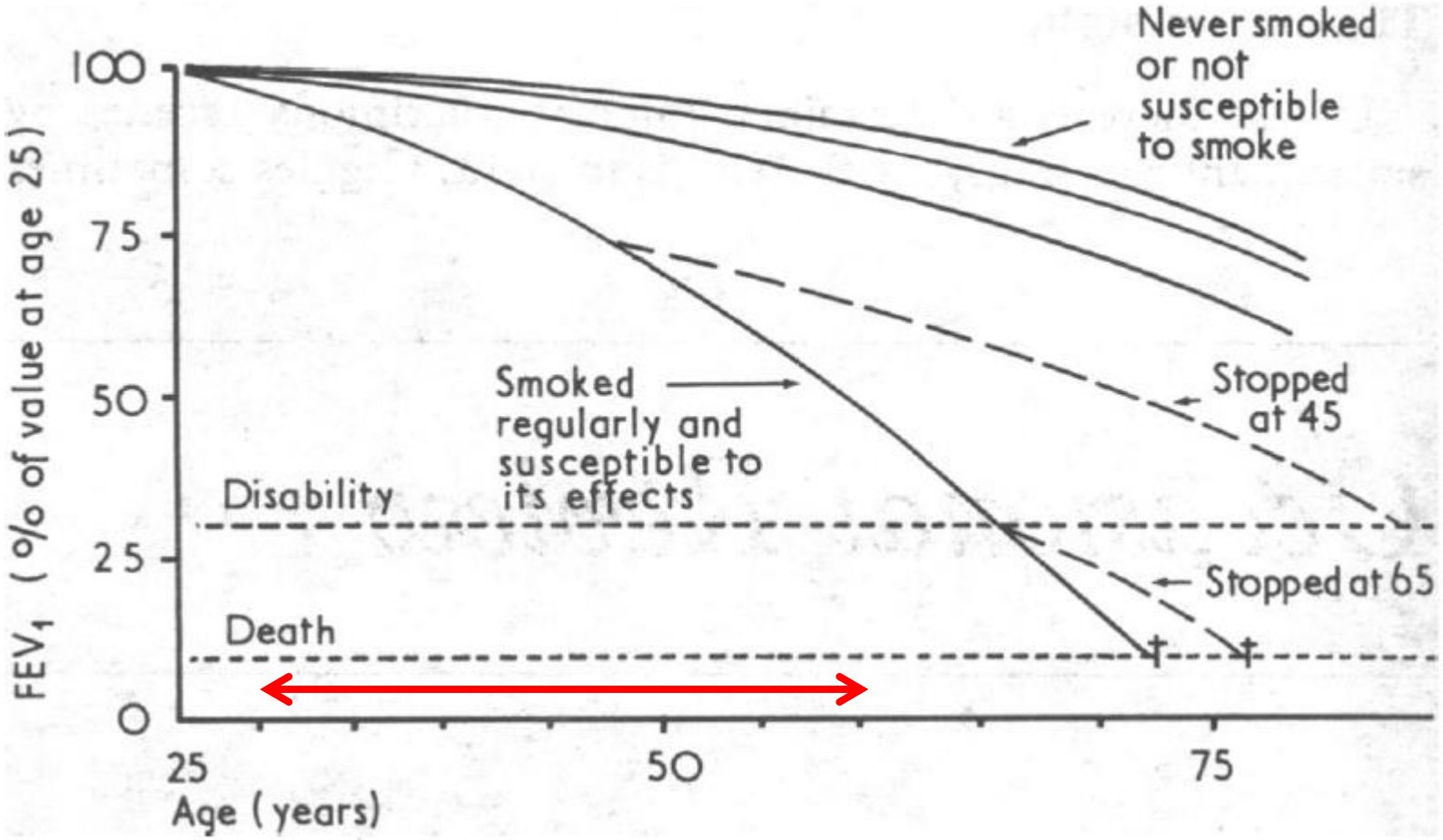
AGENDA

- KOL – naturalförlopp
- KOL – definition
- Fenotyper – SCAPIS
- KOL hos aldrigrökare
- Vägar till kronisk luftvägsobstruktion
- Sammanfattning

KOL: NATURALFÖRLOPP

The natural history of chronic airflow obstruction

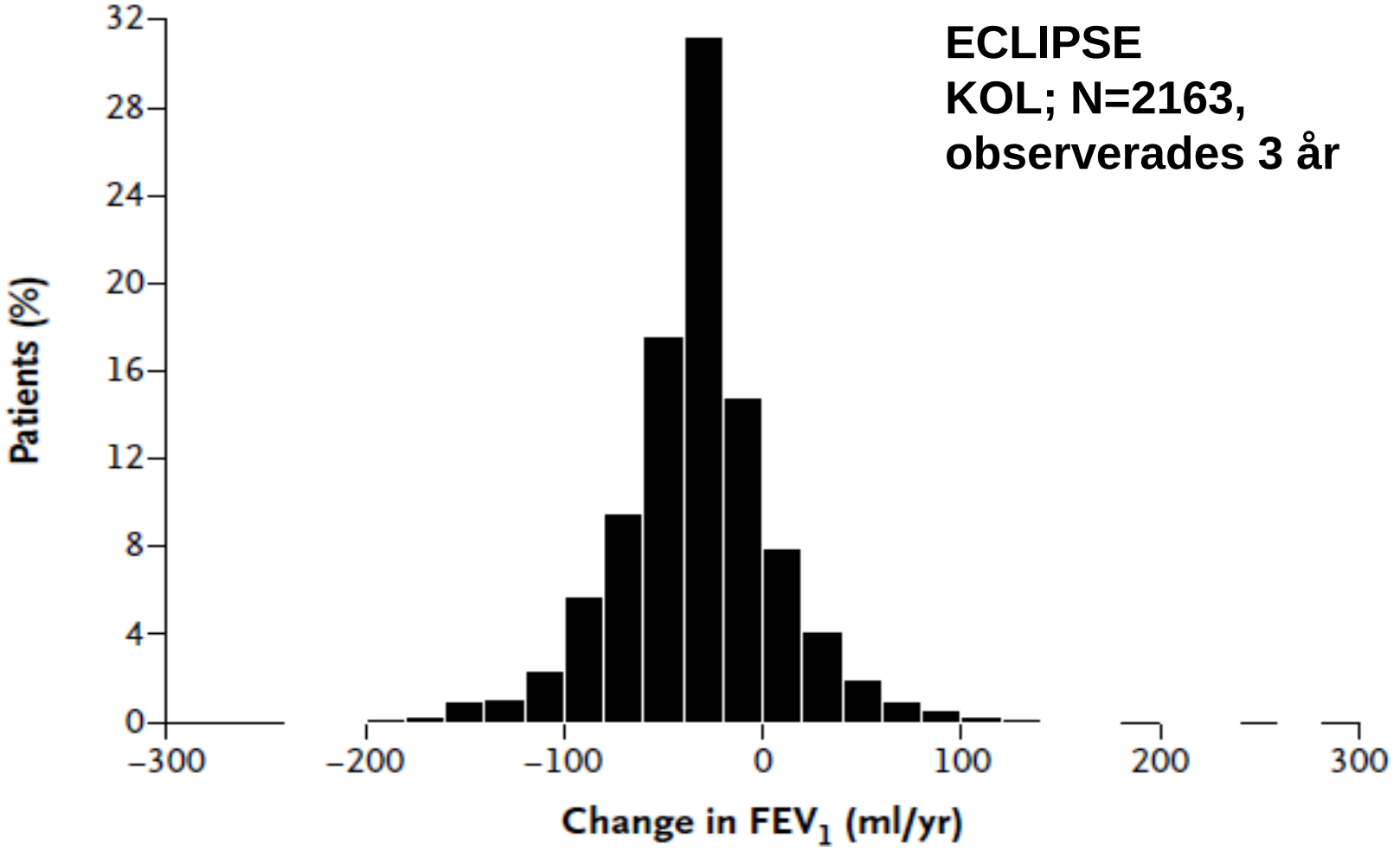
CHARLES FLETCHER, RICHARD PETO



Fletcher and Peto, BMJ 1977; 1: 1645-1658

118-2023-MARK

FÖRÄNDRING AV FEV_1 ÖVER TID

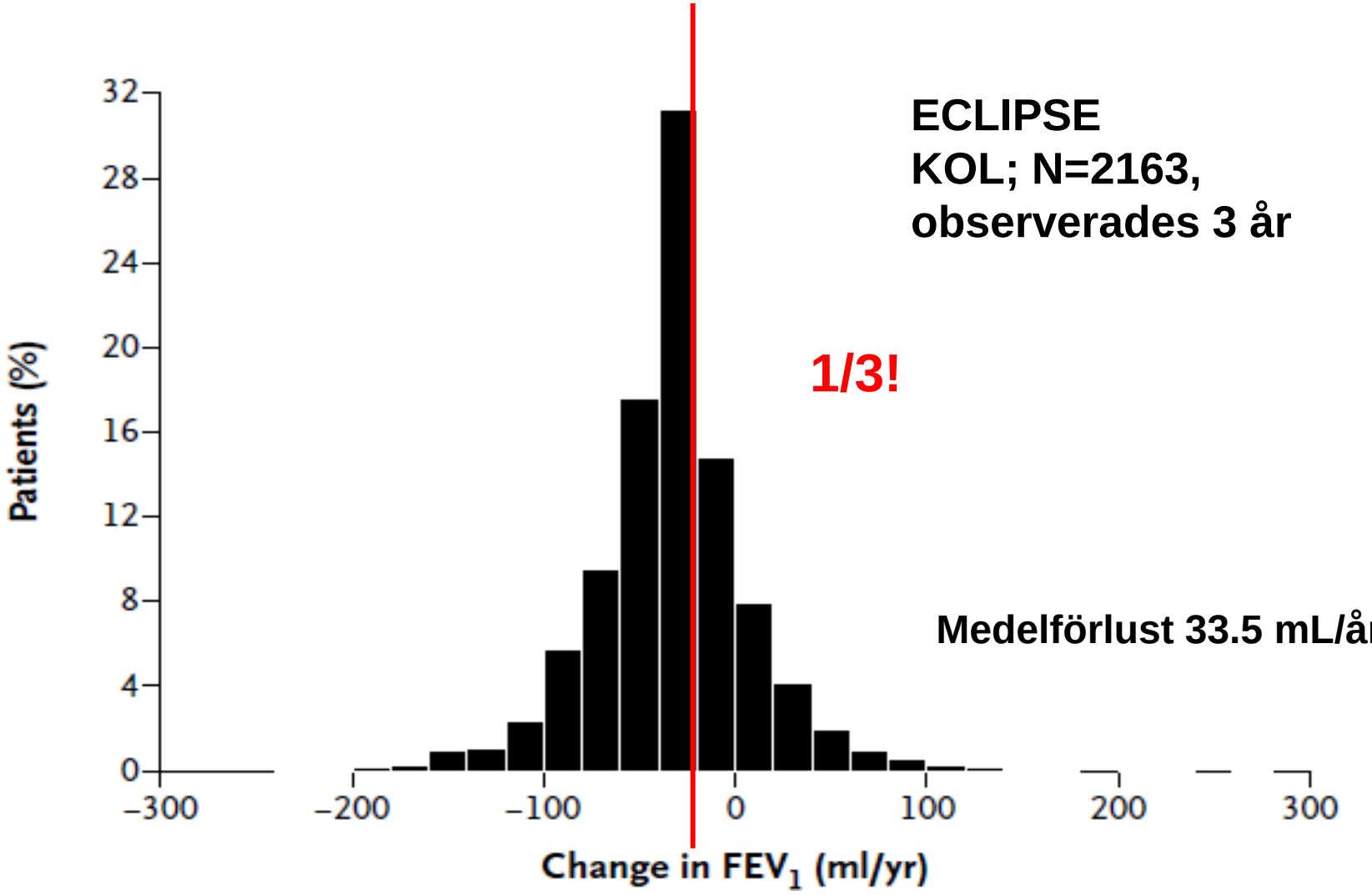


ECLIPSE
KOL; N=2163,
observerades 3 år

Vestbo J et al. N Engl J Med 2011; 365: 1184-1192

118-2023-MARK

FÖRÄNDRING AV FEV_1 ÖVER TID



ECLIPSE
KOL; N=2163,
observerades 3 år

1/3!

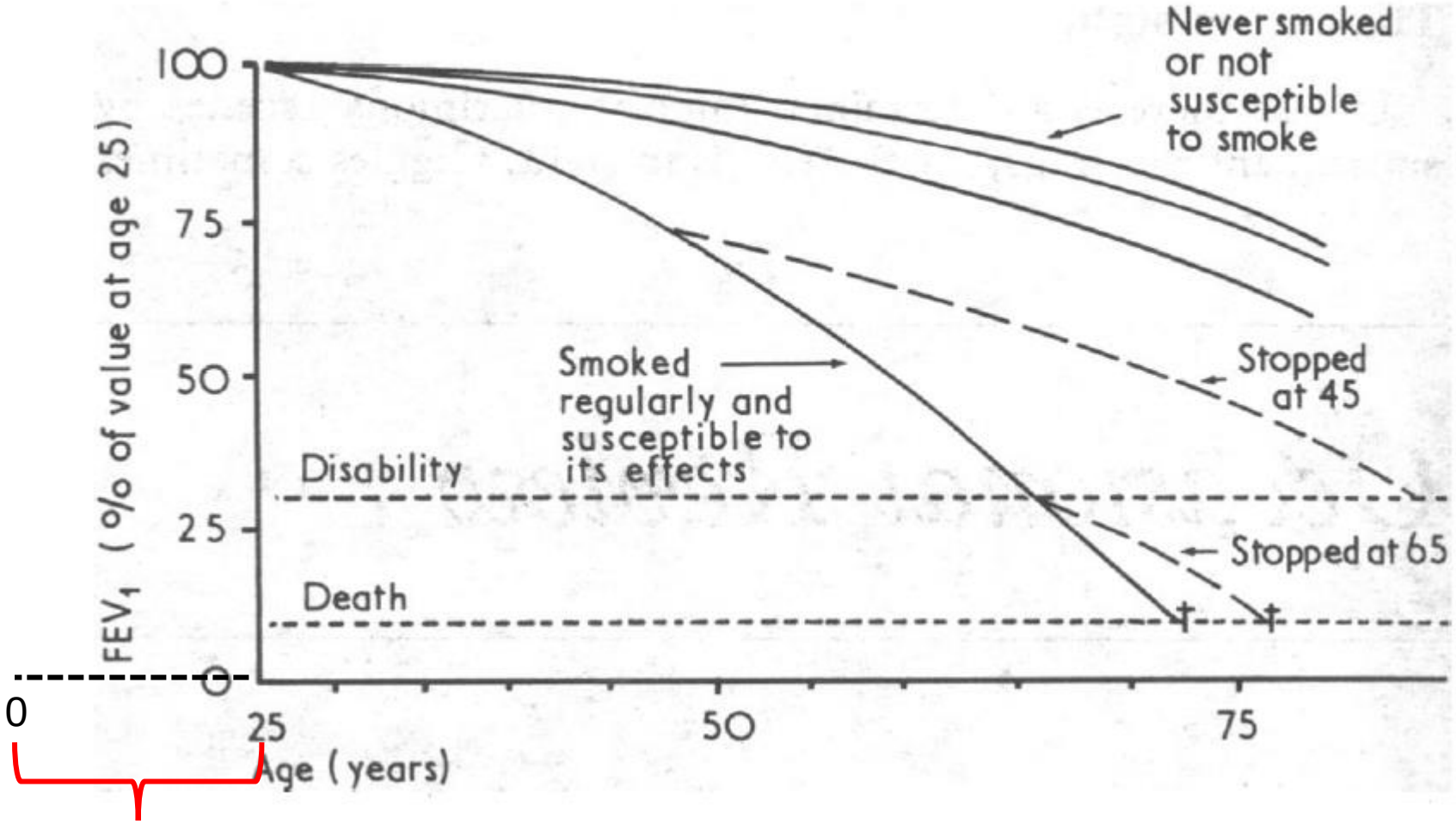
Medelförlust 33.5 mL/år

Vestbo J et al. N Engl J Med 2011; 365: 1184-1192

118-2023-MARK

The natural history of chronic airflow obstruction

CHARLES FLETCHER, RICHARD PETO



VAD HÄNDER HÄR?

Fletcher and Peto, BMJ 1977; 1: 1645-1658

118-2023-MARK

The NEW ENGLAND JOURNAL of MEDICINE

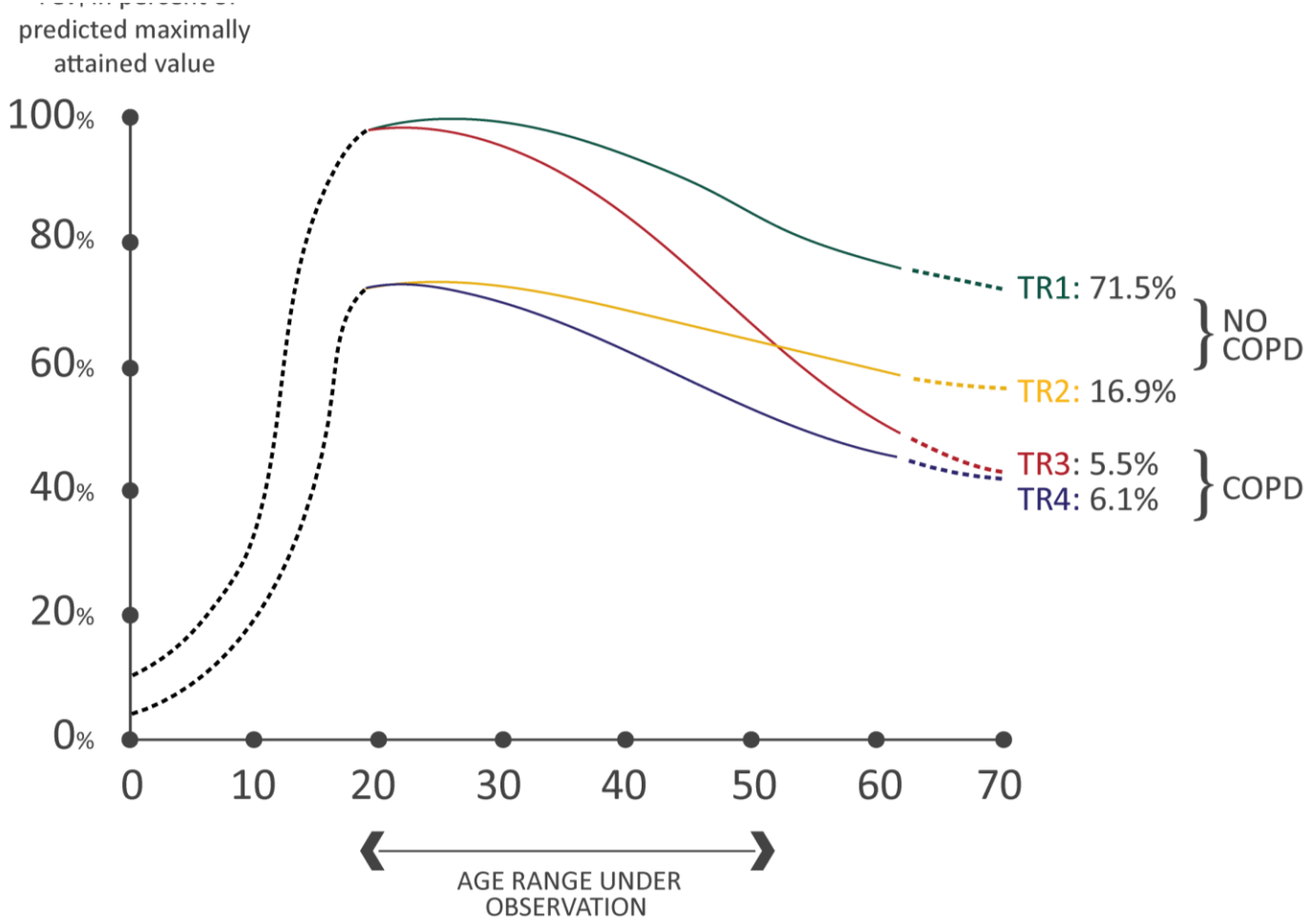
ESTABLISHED IN 1812 JULY 9, 2015 VOL. 373 NO. 2

Lung-Function Trajectories Leading to Chronic Obstructive Pulmonary Disease

Peter Lange, M.D., Dr. Med. Sc., Bartolome Celli, M.D., Alvar Agustí, M.D., Ph.D., Gorm Boje Jensen, M.D., Dr. Med. Sc., Miguel Divo, M.D., Rosa Faner, Ph.D., Stefano Guerra, M.D., Ph.D., Jacob Louis Marott, M.Sc., Fernando D. Martinez, M.D., Pablo Martinez-Camblor, Ph.D., Paula Meek, R.N., Ph.D., Caroline A. Owen, M.D., Ph.D., Hans Petersen, Ph.D, Victor Pinto-Plata, M.D., Peter Schnohr, M.D., Dr. Med. Sc., Akshay Sood, M.D., M.P.H., Joan B. Soriano, M.D., Yohannes Tesfaigzi, Ph.D., and Jørgen Vestbo, M.D., Dr. Med. Sc.

Framingham Off-spring Cohort
Copenhagen City Heart Study
Lovelace Smokers Cohort

n=4417
22 years follow-up



118-2023-MARK

The NEW ENGLAND JOURNAL of MEDICINE

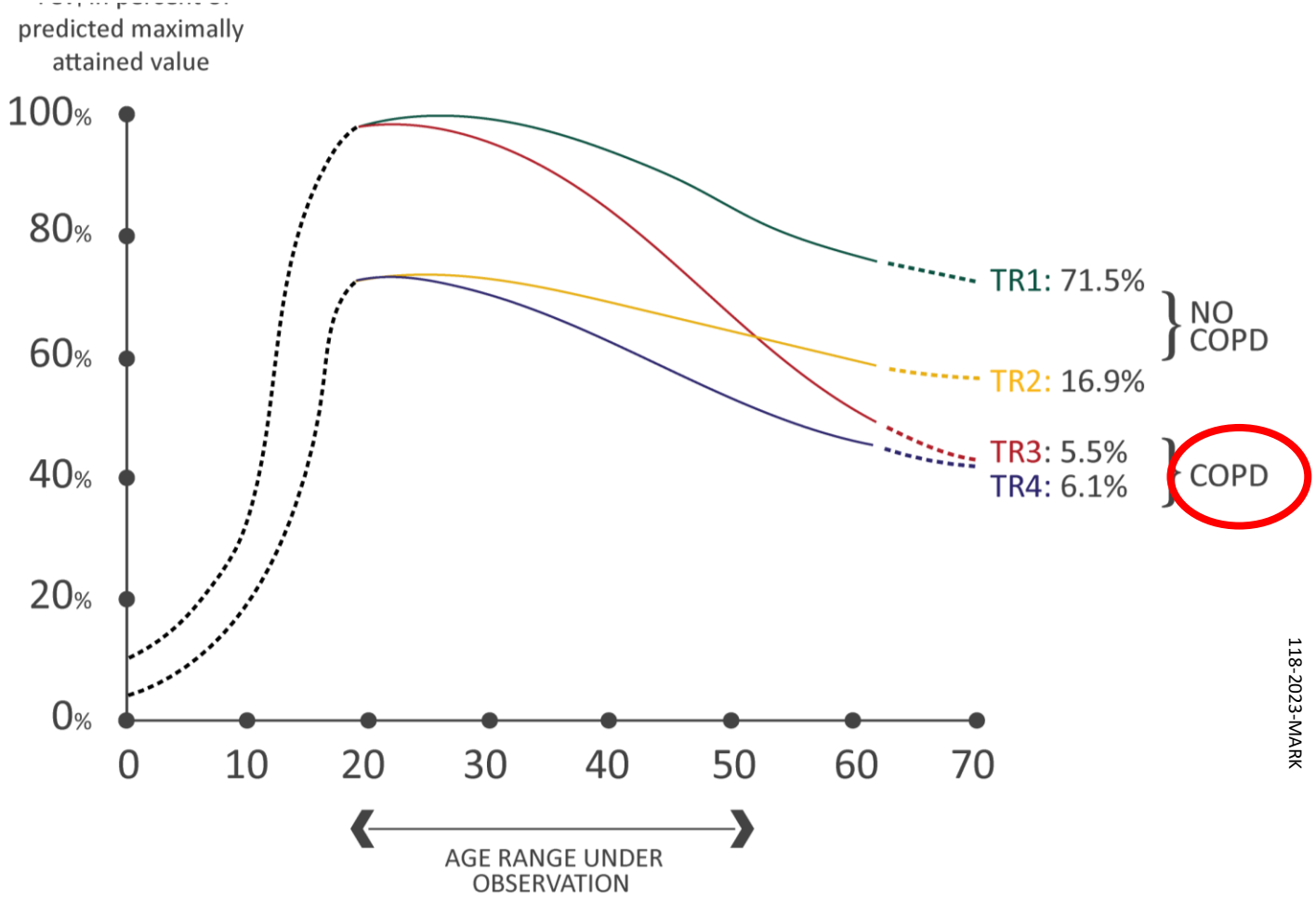
ESTABLISHED IN 1812 JULY 9, 2015 VOL. 373 NO. 2

Lung-Function Trajectories Leading to Chronic Obstructive Pulmonary Disease

Peter Lange, M.D., Dr. Med. Sc., Bartolome Celli, M.D., Alvar Agustí, M.D., Ph.D., Gorm Boje Jensen, M.D., Dr. Med. Sc., Miguel Divo, M.D., Rosa Faner, Ph.D., Stefano Guerra, M.D., Ph.D., Jacob Louis Marott, M.Sc., Fernando D. Martinez, M.D., Pablo Martinez-Camblor, Ph.D., Paula Meek, R.N., Ph.D., Caroline A. Owen, M.D., Ph.D., Hans Petersen, Ph.D, Victor Pinto-Plata, M.D., Peter Schnohr, M.D., Dr. Med. Sc., Akshay Sood, M.D., M.P.H., Joan B. Soriano, M.D., Yohannes Tesfaigzi, Ph.D., and Jørgen Vestbo, M.D., Dr. Med. Sc.

Framingham Off-spring Cohort
Copenhagen City Heart Study
Lovelace Smokers Cohort

n=4417
22 years follow-up



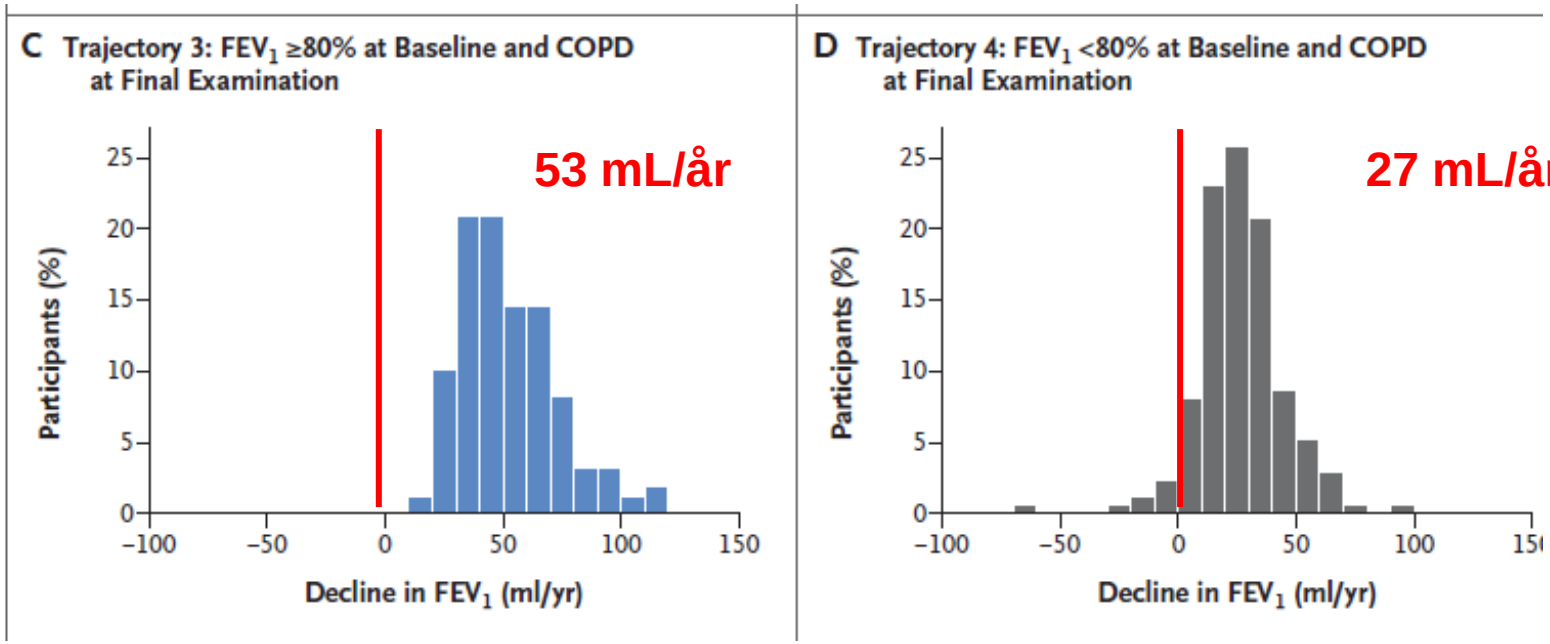
118-2023-MARK

The NEW ENGLAND JOURNAL of MEDICINE
ESTABLISHED IN 1812 JULY 9, 2015 VOL. 373 NO. 2

Lung-Function Trajectories Leading to Chronic Obstructive Pulmonary Disease

Peter Lange, M.D., Dr. Med. Sc., Bartolome Celli, M.D., Alvar Agustí, M.D., Ph.D., Gorm Boje Jensen, M.D., Dr. Med. Sc., Miguel Divo, M.D., Rosa Faner, Ph.D., Stefano Guerra, M.D., Ph.D., Jacob Louis Marott, M.Sc., Fernando D. Martinez, M.D., Pablo Martinez-Camblor, Ph.D., Paula Meek, R.N., Ph.D., Caroline A. Owen, M.D., Ph.D., Hans Petersen, Ph.D, Victor Pinto-Plata, M.D., Peter Schnohr, M.D., Dr. Med. Sc., Akshay Sood, M.D., M.P.H., Joan B. Soriano, M.D., Yohannes Tesfaigzi, Ph.D., and Jørgen Vestbo, M.D., Dr. Med. Sc.

Lungfunktionsförlust per år hos de som utvecklade KOL



118-2023-MARK

Lange P et al. NEJM 2015; 373: 111-122

KOL: DEFINITION

KOL DEFINITION (GOLD 2022)

- Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable and treatable disease that is characterized by **persistent respiratory symptoms** and **airflow limitation** that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases and influenced by host factors including abnormal lung development. Significant comorbidities may have an impact on morbidity and mortality

118-2023-MARK

KOL DEFINITION (GOLD 2022)

- Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable and treatable disease that is characterized by **persistent respiratory symptoms** and **airflow limitation** that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases and influenced by host factors including abnormal lung development. Significant comorbidities may have an impact on morbidity and mortality

DIAGNOS KOL BYGGER PÅ TRE DELAR

-luftvägsobstruktion

-symtom

-exponering

118-2023-MARK

GOLD 2023

WHAT IS COPD?

Definition

Chronic Obstructive Pulmonary Disease (COPD) is a heterogeneous lung condition characterized by chronic respiratory symptoms (dyspnea, cough, sputum production) due to abnormalities of the airways (bronchitis, bronchiolitis) and/or alveoli (emphysema) that cause persistent, often progressive, airflow obstruction.[1]

118-2023-MARK

GOLD 2023

WHAT IS COPD?

Definition

Chronic Obstructive Pulmonary Disease (COPD) is a heterogeneous lung condition characterized by chronic respiratory symptoms (dyspnea, cough, sputum production) due to abnormalities of the airways (bronchitis, bronchiolitis) and/or alveoli (emphysema) that cause persistent, often progressive, airflow obstruction.[1]

Causes and risk factors

COPD results from gene(G)-environment(E) interactions occurring over the lifetime(T) of the individual (GETomics) that can damage the lungs and/or alter their normal development/aging processes.[2]

118-2023-MARK

GOLD 2023

WHAT IS COPD?

Definition

Chronic Obstructive Pulmonary Disease (COPD) is a heterogeneous lung condition characterized by chronic respiratory symptoms (dyspnea, cough, sputum production) due to abnormalities of the airways (bronchitis, bronchiolitis) and/or alveoli (emphysema) that cause persistent, often progressive, airflow obstruction.[1]

Causes and risk factors

COPD results from gene(G)-environment(E) interactions occurring over the lifetime(T) of the individual (GETomics) that can damage the lungs and/or alter their normal development/aging processes.[2]

The main environmental exposures leading to COPD are tobacco smoking and the inhalation of toxic particles and gases from household and outdoor air pollution, but other environmental[3] and host factors (including abnormal lung development and accelerated lung aging) can also contribute.[2]

ITE

118-2023-MARK

Proposed Taxonomy (Etiotypes) for COPD

Table 1.1

Classification	Description
Genetically determined COPD (COPD-G)	Alpha-1 antitrypsin deficiency (AATD) Other genetic variants with smaller effects acting in combination
COPD due to abnormal lung development (COPD-D)	Early life events, including premature birth and low birthweight, among others
Environmental COPD	
Cigarette smoking COPD (COPD-C)	• Exposure to tobacco smoke, including *in utero* or via passive smoking • Vaping or e-cigarette use • Cannabis
Biomass and pollution exposure COPD (COPD-P)	Exposure to household pollution, ambient air pollution, wildfire smoke, occupational hazards
COPD due to infections (COPD-I)	Childhood infections, tuberculosis-associated COPD, WHIV-associated COPD
COPD & asthma (COPD-A)	Particularly childhood asthma
COPD of unknown cause (COPD-U)	

*Adapted from Celli et al. (2022) and Stolz et al. (2022)

© 2022, 2023 Global Initiative for Chronic Obstructive Lung Disease

118-2023-MARK

SCAPIS

Swedish CArdioPulmonary bioImage Study

118-2023-MARK

SCAPIS

30 154 kvinnor och män, 50 - 64 år,

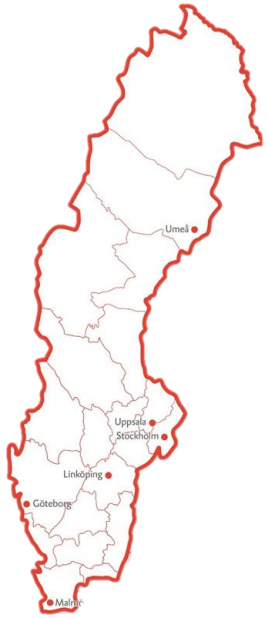
Undersöktes 2013 - 2018

Slumpvist utvalda

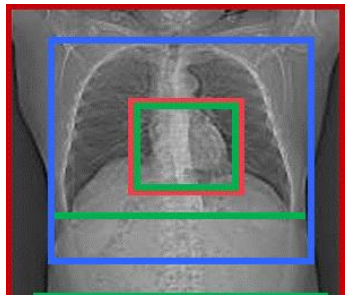
Sex universitet

www.scapis.org

“Minska risken för hjärt-kärl och lungsjukdomar för framtida generationer”



SCAPIS SWEDISH CARDIOPULMONARY BIOIMAGE STUDY



Identification of vulnerable plaques

- ✓ CTA
- ✓ Ultrasound (carotid artery)
- ✓ MRI (carotid artery)

Visceral adipose tissue, epicardial and liver fat

- ✓ CT

Structural changes in lung tissue

- ✓ CT

Baseline survey includes:

- ✓ Blood tests (Hb, HbA1c, glucos, TG, Chol, HDL, LDL, hsCRP and creatinin)
- ✓ Anthropometry
- ✓ Blood pressure, ankle-arm index
- ✓ Activity measurement (Actigraph)
- ✓ Lung function tests (spirometry, CO-diff)
- ✓ ECG
- ✓ Detailed questionnaire - Environmental and socioeconomic factors, diet

Local and central biobank for blood and urine analyses

Follow-up via national registries

- ✓ Morbidity
- ✓ Mortality

Hjärt-Lungfonden
Huvudfinansiär av SCAPIS

118-2023-MARK

SCAPIS

30 154 kvinnor och män, 50 - 64 år,

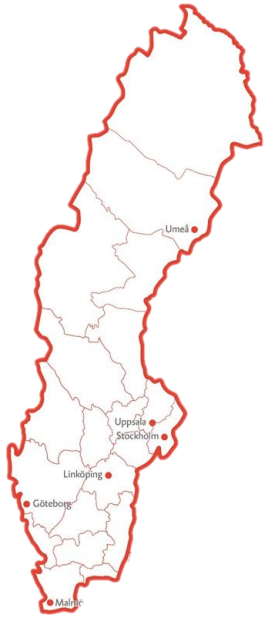
Undersöktes 2013 - 2018

Slumpvist utvalda

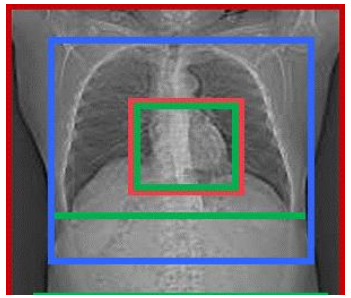
Sex universitet

www.scapis.org

“Minska risken för hjärt-kärl och lungsjukdomar för framtida generationer”



SCAPIS SWEDISH CARDIOPULMONARY BIOIMAGE STUDY



Identification of vulnerable plaques

- ✓ CTA
- ✓ Ultrasound (carotid artery)
- ✓ MRI (carotid artery)

Visceral adipose tissue, epicardial and liver fat

- ✓ CT

Structural changes in lung tissue

- ✓ CT

Baseline survey includes:

- ✓ Blood tests (Hb, HbA1c, glucos, TG, Chol, HDL, LDL, hsCRP and creatinin)
- ✓ Anthropometry
- ✓ Blood pressure, ankle-arm index
- ✓ Activity measurement (Actigraph)
- ✓ Lung function tests (spirometry, CO-diff)
- ✓ ECG
- ✓ Detailed questionnaire - Environmental and socioeconomic factors, diet

Local and central biobank for blood and urine analyses

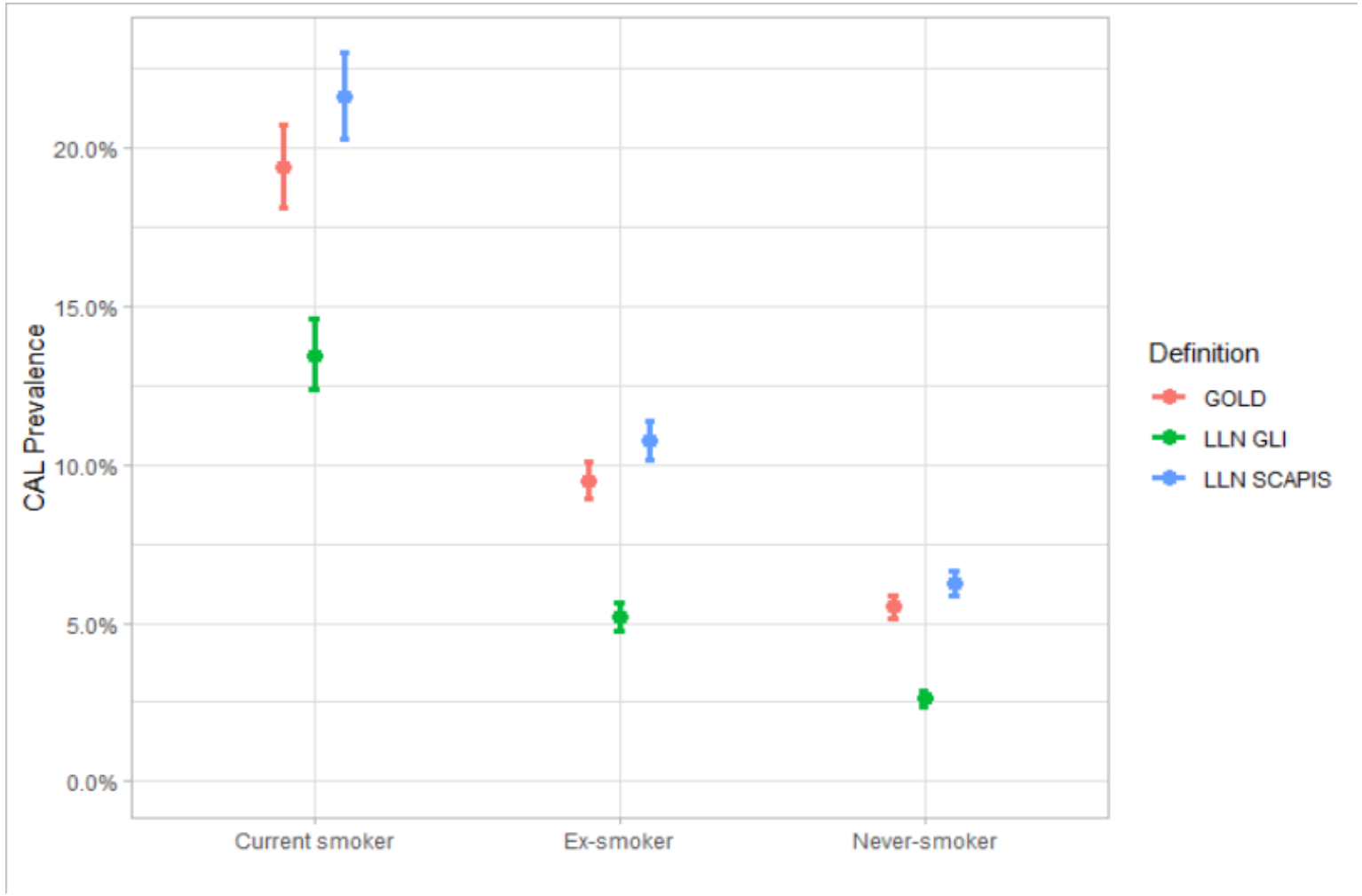
Follow-up via national registries

- ✓ Morbidity
- ✓ Mortality

Hjärt-Lungfonden
Huvudfinansiär av SCAPIS

118-2023-MARK

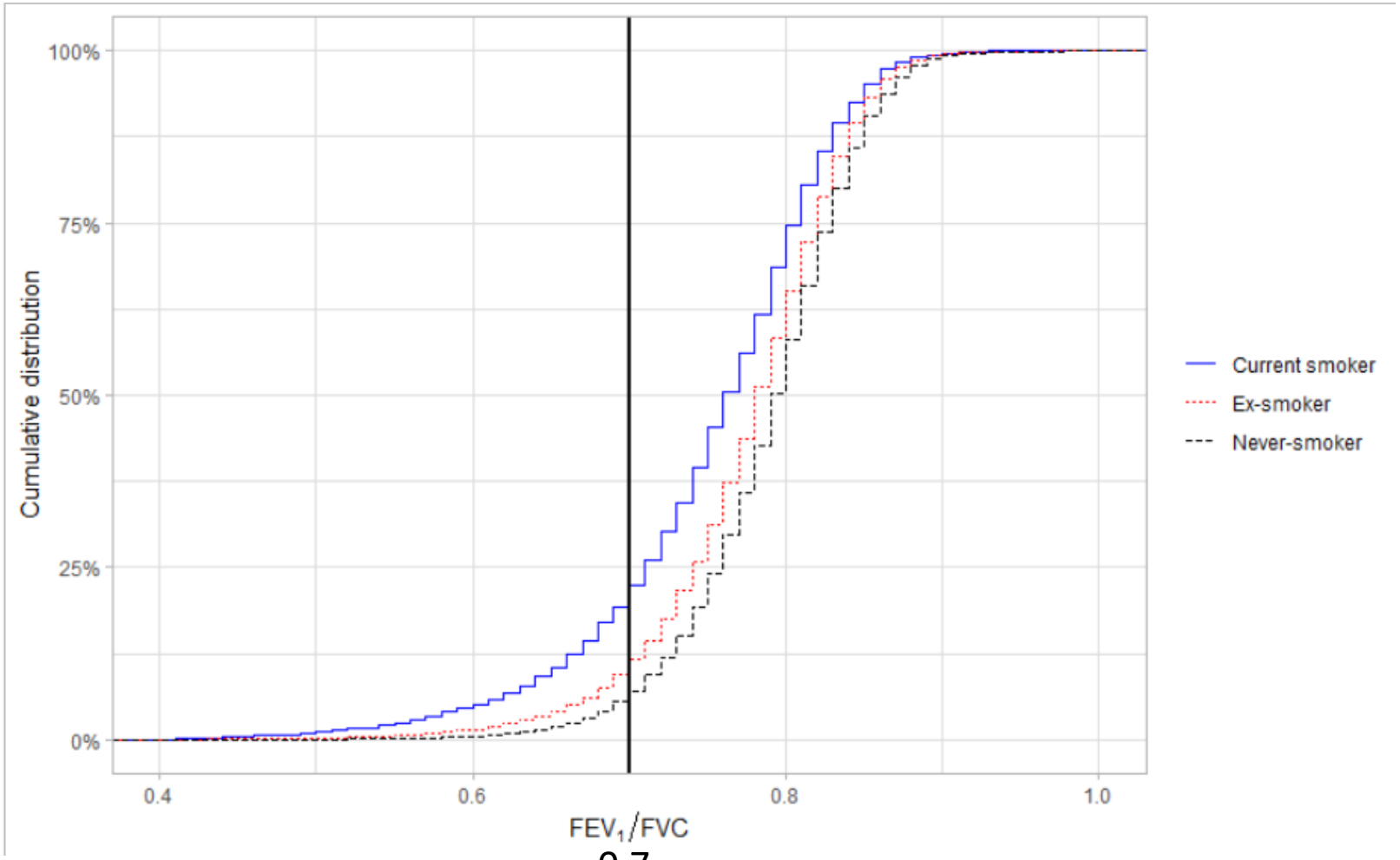
PREVALENS AV KOL – DATA FRÅN SCAPIS



118-2023-MARK

SCAPIS, Blomberg A. et al. Manuskript

KUMULATIV DISTRIBUTION AV FEV_1/FVC I SCAPIS

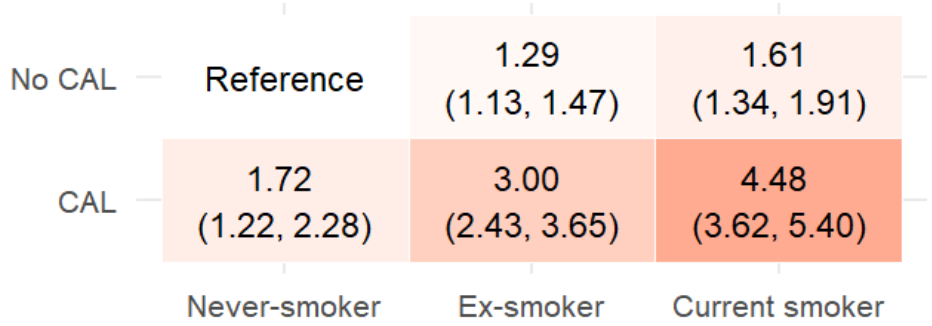


0.7

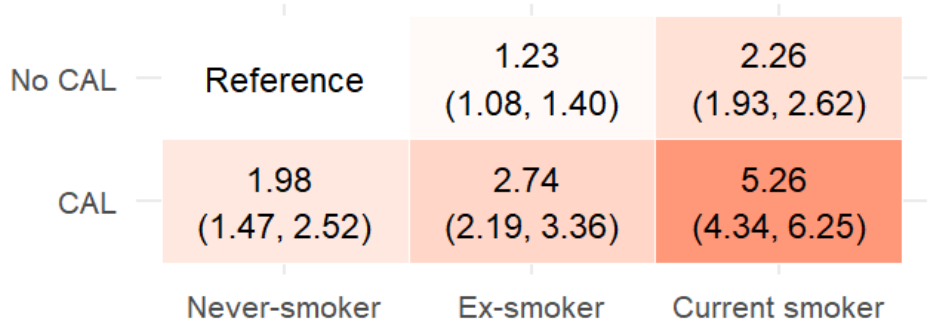
118-2023-MARK

SCAPIS, Blomberg A. et al. Manuskript

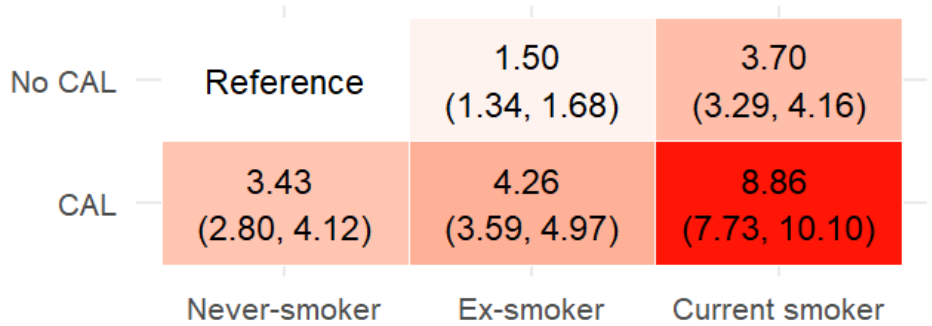
Breathlessness



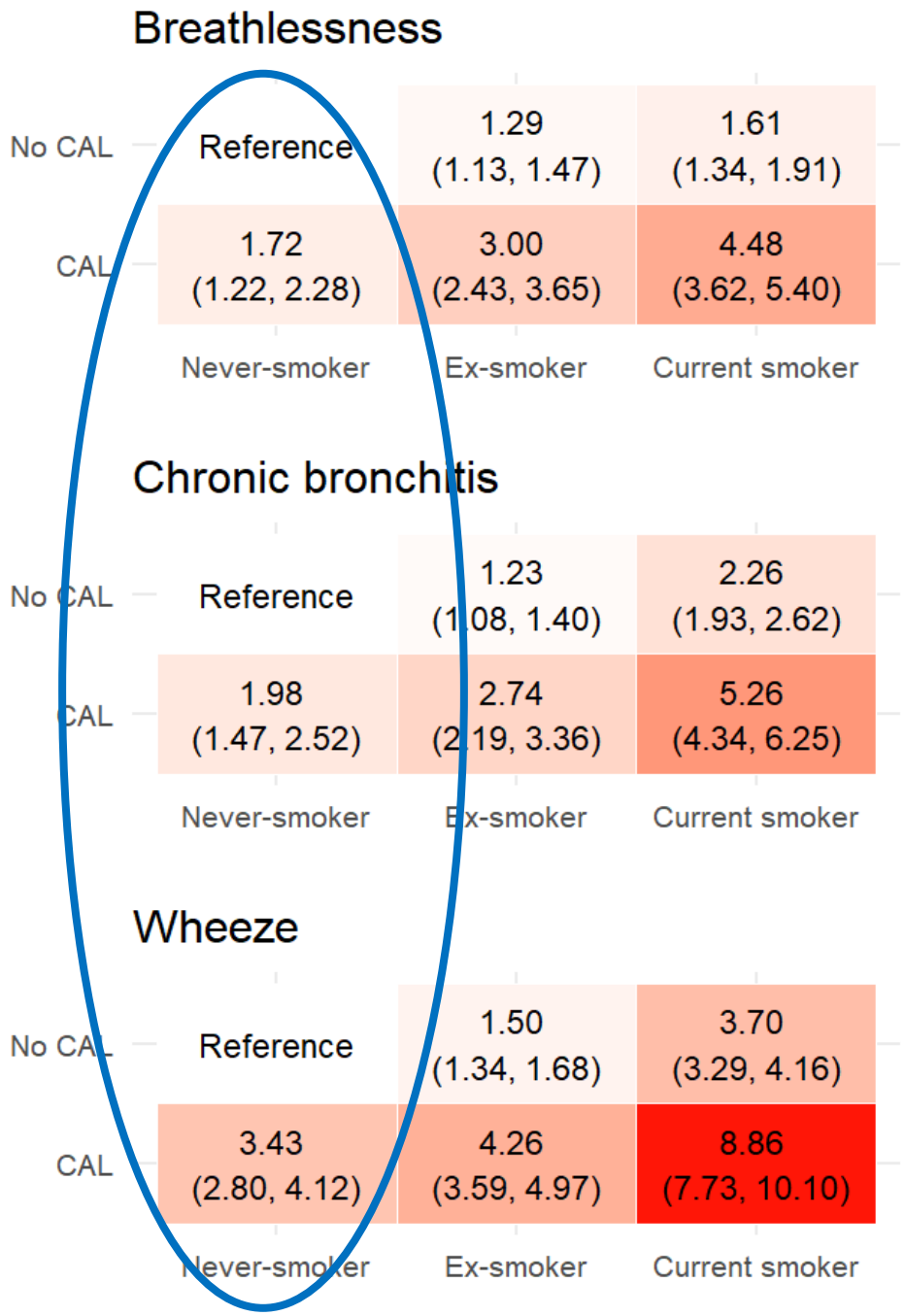
Chronic bronchitis

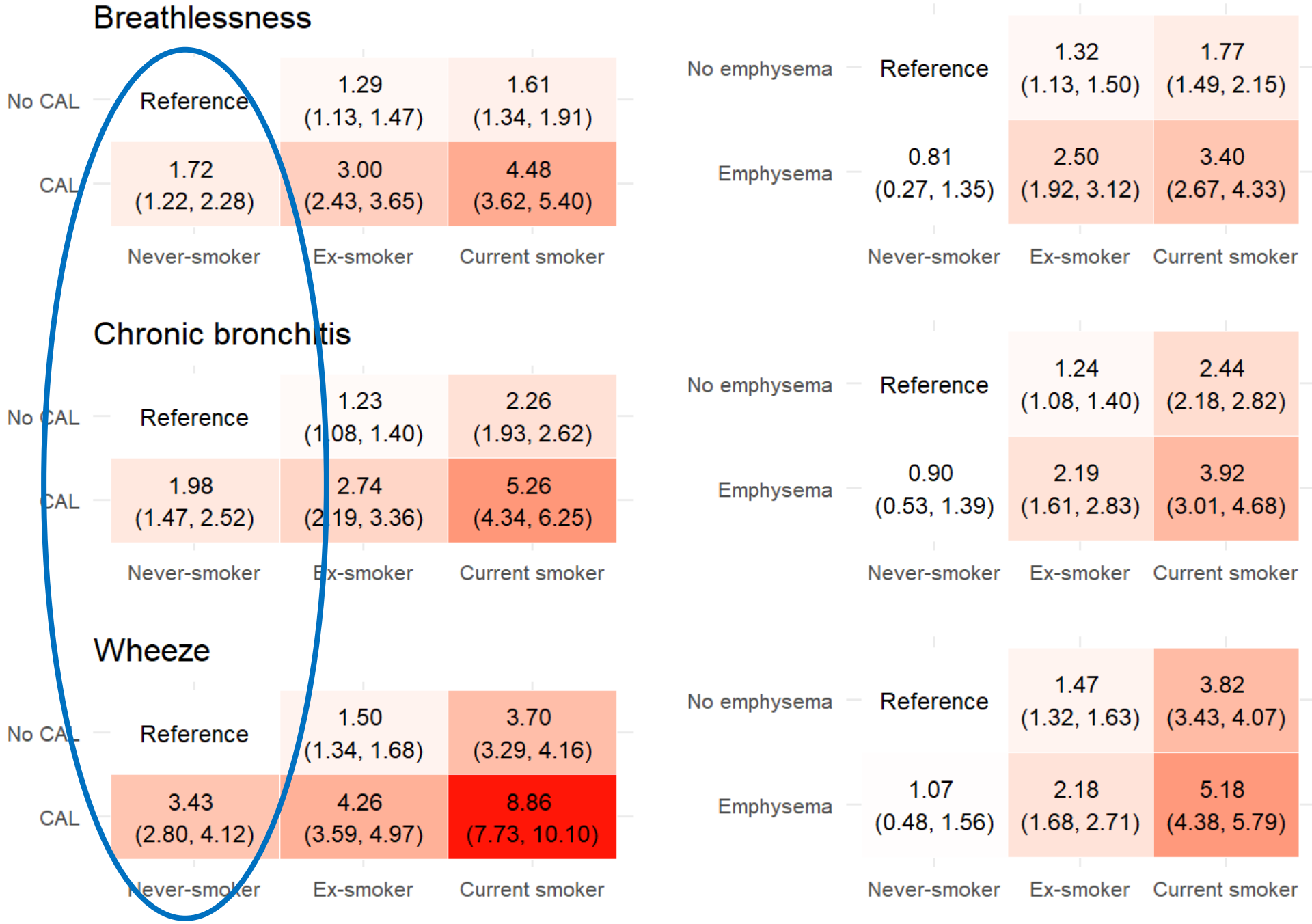


Wheeze



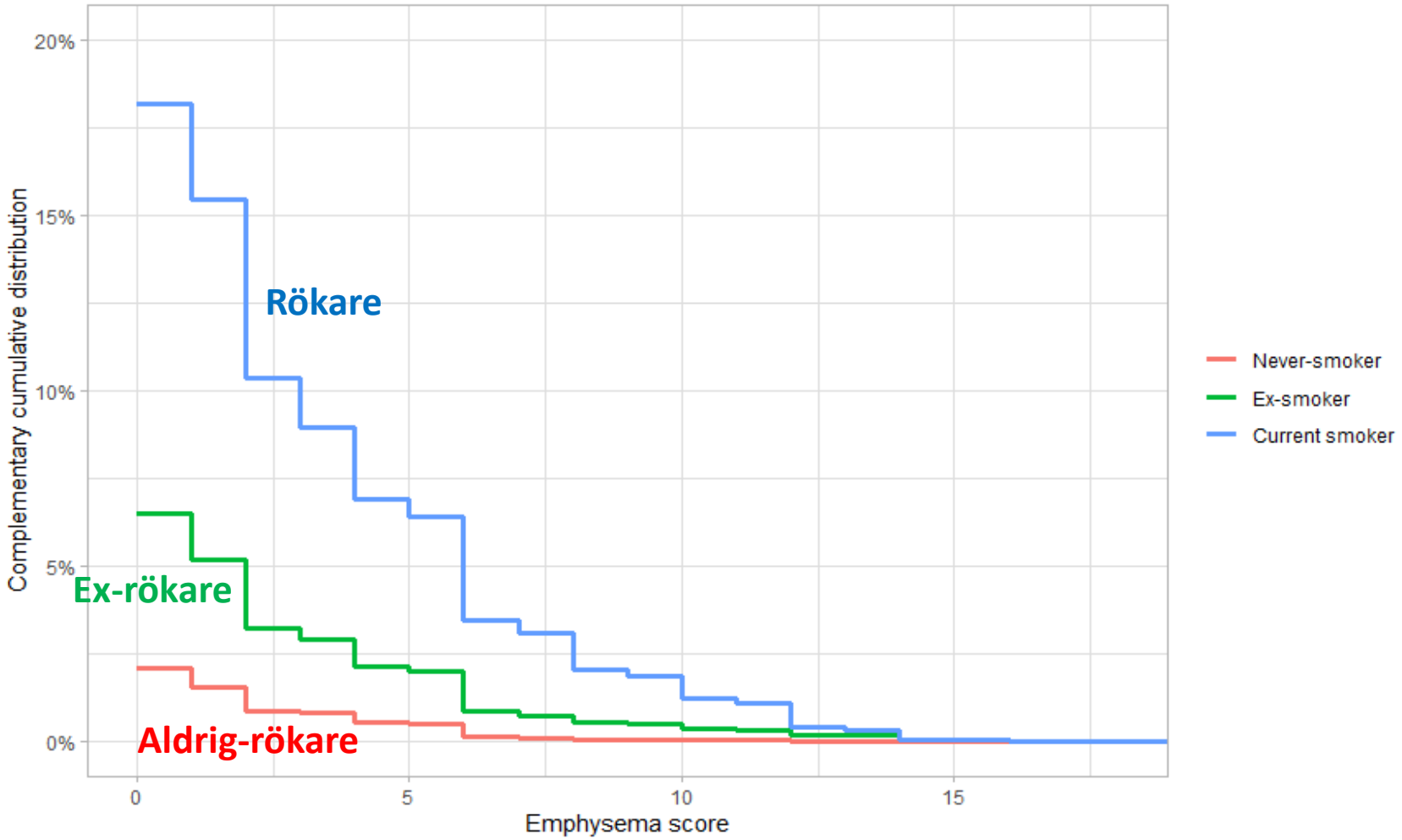
118-2023-MARK


Breathlessness
No CAL
CAL
Reference
1.29 (1.13, 1.47)
1.61 (1.34, 1.91)
1.72 (1.22, 2.28)
3.00 (2.43, 3.65)
4.48 (3.62, 5.40)
Never-smoker
Ex-smoker
Current smoker
Chronic bronchitis
No CAL
CAL
Reference
1.23 (1.08, 1.40)
2.26 (1.93, 2.62)
1.98 (1.47, 2.52)
2.74 (2.19, 3.36)
5.26 (4.34, 6.25)
Never-smoker
Ex-smoker
Current smoker
Wheeze
No CAL
CAL
Reference
1.50 (1.34, 1.68)
3.70 (3.29, 4.16)
3.43 (2.80, 4.12)
4.26 (3.59, 4.97)
8.86 (7.73, 10.10)
Never-smoker
Ex-smoker
Current smoker



118-2023-MARK

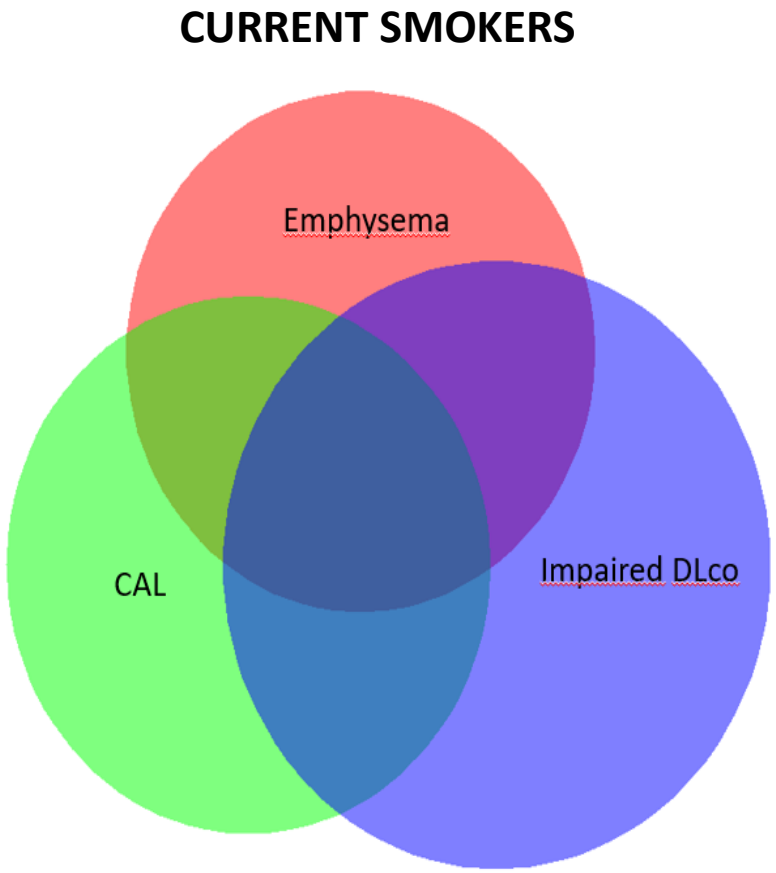
EMFYSEM OCH RÖKHISTORIK I SCAPIS



118-2023-MARK

SCAPIS, Blomberg A. et al. Manuskript

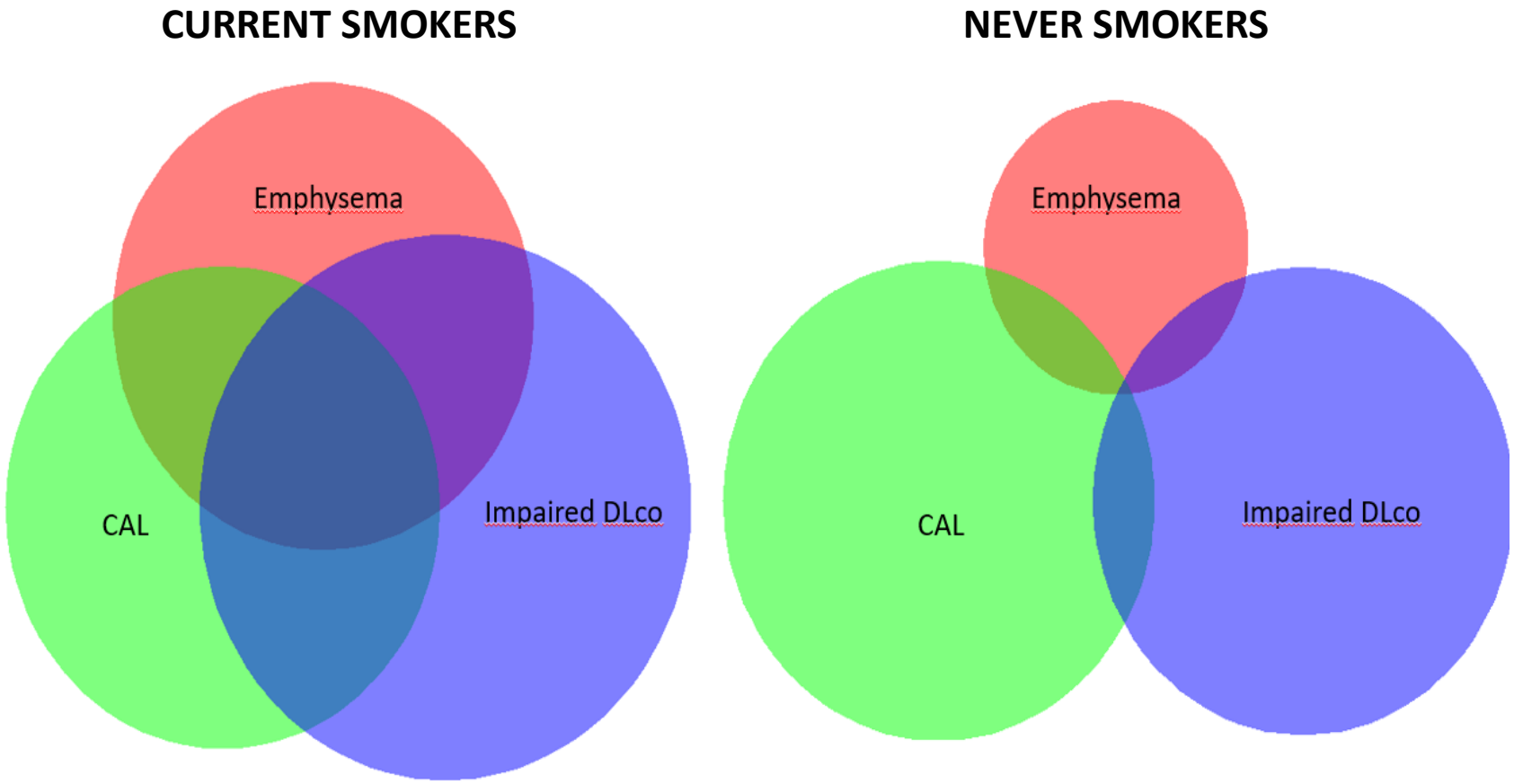
FÖRHÅLLANDE MELLAN EMFYSEM, CAL OCH NEDSATT DLCO



118-2023-MARK

SCAPIS, Blomberg A. et al. Manuskript

FÖRHÅLLANDE MELLAN EMFYSEM, CAL OCH NEDSATT DLCO



118-2023-MARK

SCAPIS, Blomberg A. et al. Manuskript

KOL hos aldrig-rökare

	Setting (study name)	Never-smokers (n)	Definition of COPD	Prevalence of COPD in never-smokers	Prevalence of never-smokers among people with COPD
Zhou et al (2009)[7]	China (CESCOPD)	12 471	Post-bronchodilator FEV_1/FVC <0·7	5%	39%
Lamprecht et al (2011)[8]	14 countries (BOLD)	4291	Post-bronchodilator FEV_1/FVC <0·7	12%	28%
Hagsted et al (2012)[9]	Sweden (OLIN)	770	Post-bronchodilator FEV_1/FVC <0·7	7%	20%
Perez-Padilla et al (2012)[10]	Five Latin American cities (PLATINO)	2278	Post-bronchodilator FEV_1/FVC <0·7	4%	26%
Thomsen et al (2013)[11]	Denmark (Copenhagen General Population Study)	26 005	FEV_1/FVC <LLN	6%	22%
Smith et al (2014)[12]	China Kadoorie Biobank	317 000	Pre-bronchodilator FEV_1/FVC <0·7 and <LLN	4% (females); 5% (males)	Not measured
Tan et al (2015)[13]	Canada (CanCOLD)	2295	Pre-bronchodilator FEV_1/FVC <0·7 and <LLN	6%	29%
Lee et al (2016)[14]	Korea (KNHANES IV and V)	8984	Post-bronchodilator FEV_1/FVC <0·7	7%	31%
Terzikhan et al (2016)[15]	The Netherlands (Rotterdam Study)	4997	Post-bronchodilator FEV_1/FVC <0·7	6%	27% (females); 7% (males)
Wang et al (2018)[16]	China (China Pulmonary Health study)	36 429	Post-bronchodilator FEV_1/FVC <0·7	6%	51%
Warkentin et al (2019)[17]	UK Biobank cohort	218 892	FEV_1/FVC <0·7 or FEV_1 <80% of Global Lung Initiative predicted FEV_1 reference value	16%	Not measured

Studies published since the 2009 *Lancet* Review of COPD in non-smokers.[3] BOLD=Burden of Obstructive Lung Disease. CanCOLD=Canadian Cohort of Obstructive Lung Disease. CESCOPD=Chinese Epidemiological Survey of COPD. COPD=chronic obstructive pulmonary disease. FVC=forced vital capacity. KNHANES=Korea National Health and Nutrition Examination Survey. LLN=lower limit of normal. OLIN=Obstructive Lung Disease in Northern Sweden. PLATINO=Latin American Project for the Investigation of Obstructive Lung Disease.

Table 1: **Large-scale studies of COPD prevalence in never-smokers**

118-2023-MARK

Yang IA et al. Lancet Respir Med 2022; 10: 497–511

PREVALENS KOL
HOS ALDRIGRÖKARE
4-16 %

	Setting (study name)			Prevalence of COPD in never-smokers	Prevalence of never-smokers among people with COPD
Zhou et al (2009)[7]	China (CESCOPD)		<0·7	5%	39%
Lamprecht et al (2011)[8]	14 countries (BOLD)	4291	Post-bronchodilator <0·7	12%	28%
Hagsted et al (2012)[9]	Sweden (OLIN)	770	Post-bronchodilator FEV$_1$/FV 0·7	7%	20%
Perez-Padilla et al (2012)[10]	Five Latin American cities (PLATINO)	2278	Post-bronchodilator FEV$_1$/FVC <0·7	4%	26%
Thomsen et al (2013)[11]	Denmark (Copenhagen General Population Study)	26 005	FEV$_1$/FVC <LLN	6%	22%
Smith et al (2014)[12]	China Kadoorie Biobank	317 000	Pre-bronchodilator FEV$_1$/FVC <0·7 and <LLN	4% (females); 5% (males)	Not measured
Tan et al (2015)[13]	Canada (CanCOLD)	2295	Pre-bronchodilator FEV$_1$/FVC <0·7 and <LLN	6%	29%
Lee et al (2016)[14]	Korea (KNHANES IV and V)	8984	Post-bronchodilator FEV$_1$/FVC <0·7	7%	31%
Terzikhan et al (2016)[15]	The Netherlands (Rotterdam Study)	4997	Post-bronchodilator FEV$_1$/FVC <0·7	6%	27% (females); 7% (males)
Wang et al (2018)[16]	China (China Pulmonary Health study)	36 429	Post-bronchodilator FEV$_1$/FVC <0·7	6%	51%
Warkentin et al (2019)[17]	UK Biobank cohort	218 892	FEV$_1$/FVC <0·7 or FEV$_1$ <80% of Global Lung Initiative predicted FEV$_1$ reference value	16%	Not measured

Studies published since the 2009 *Lancet* Review of COPD in non-smokers.[3] BOLD=Burden of Obstructive Lung Disease. CanCOLD=Ca
Disease. CESCOPD=Chinese Epidemiological Survey of COPD. COPD=chronic obstructive pulmonary disease. FVC=forced vital capacit
Nutrition Examination Survey. LLN=lower limit of normal. OLIN=Obstructive Lung Disease in Northern Sweden. PLATINO=Latin Am
Obstructive Lung Disease.

Table 1: **Large-scale studies of COPD prevalence in never-smokers**

PREVALENS ALDRIGRÖKARE
HOS DE MED KOL
7-51 %

Yang IA et al. Lancet Respir Med 2022; 10: 497–511

118-2023-MARK

HUR VANLIGT?

• **KOL**	**10%**
• **KOL aldrig-rökare**	**2-3%**
• Hjärtsvikt	2%
• Förmaksflimmer	2-3%
• Ledgångsreumatism	1%
• Inflammatorisk tarmsjukdom	<1%

118-2023-MARK

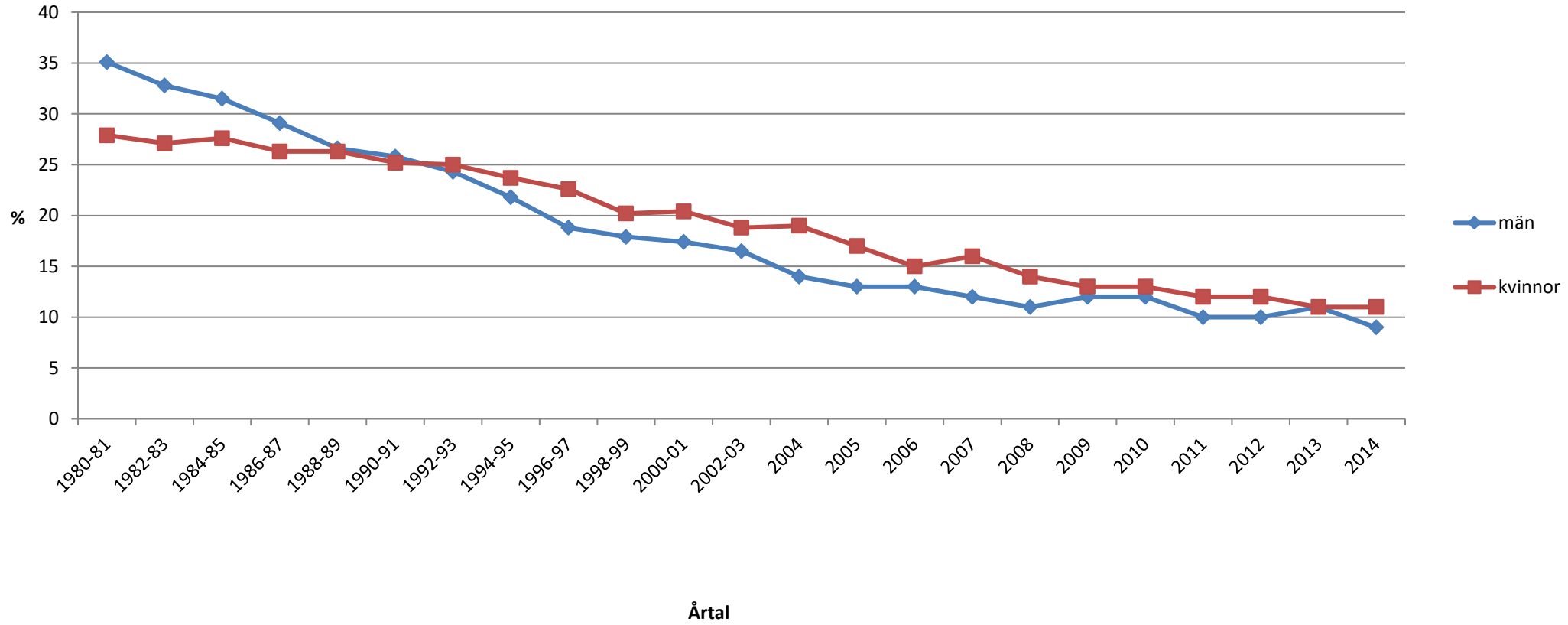
JÄMFÖRELSE KOL RÖKARE/EXRÖKARE - ALDRIGRÖKARE

	KOL rökare/ex rökare	KOL aldrig rökare
Ålder	> 40 år	> 30 år
Symtom - hosta	+	+
- sputum	++	+
- dyspne	++	+
Exacerbationer	++	++
Samsjuklighet	++	+
Lungfunktion - luftvägsobstruktion	+++	++
- hyperinflation	++	+
- små luftvägar	+	++
- DLCO	sänkt	normalt
Skiktröntgen - emfysem	++	0
- air trapping	+	++
Inflammation	neutrofiler	neutrofiler/eosinofiler
Läkemedelseffekter	bronkdilaterare, ICS	okänt

118-2023-MARK

Modifierad efter Yang IA et al. Lancet Respir Med 2022; 10: 497–511

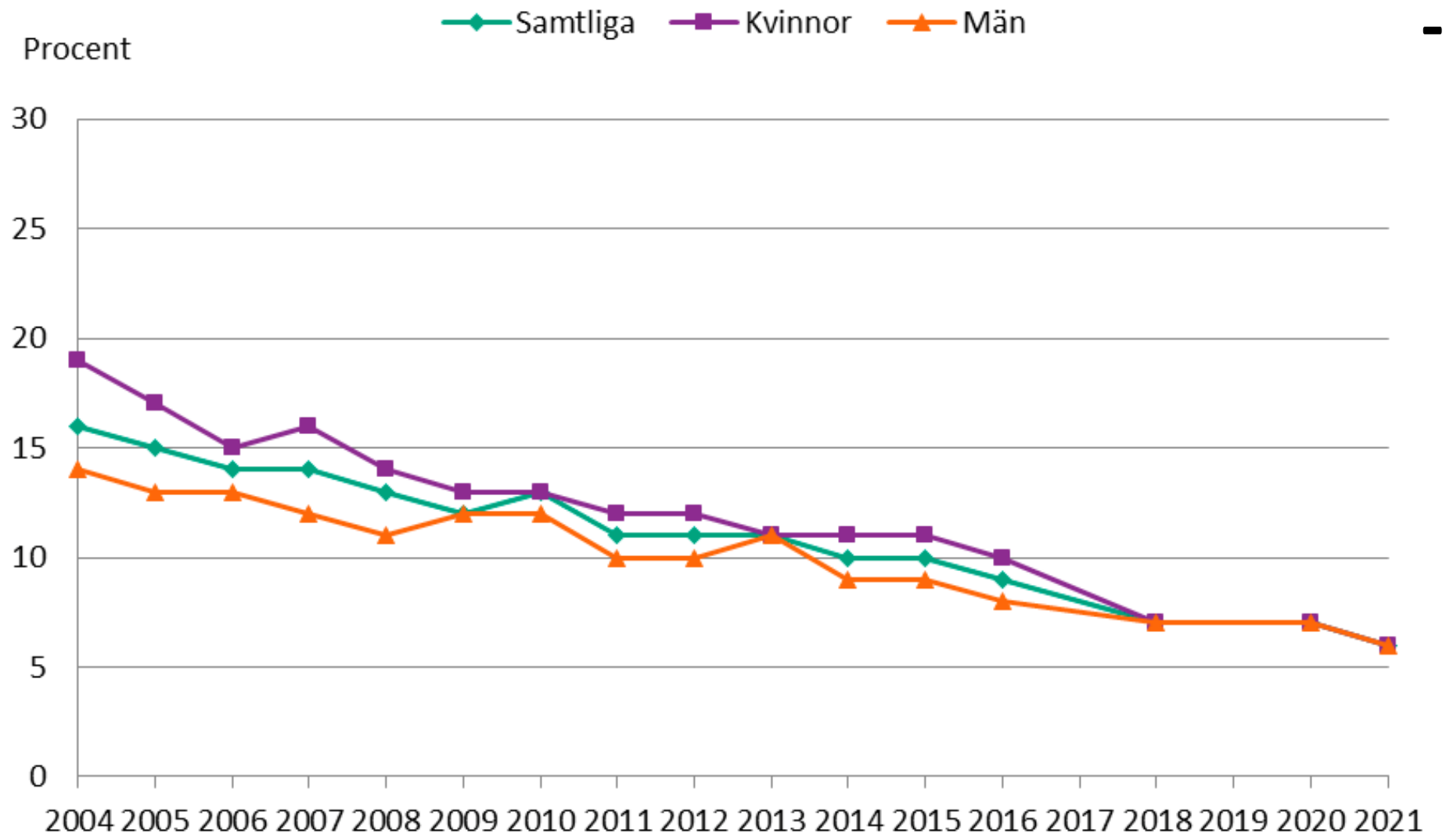
DAGLIGRÖKARE I SVERIGE 1980-2014



Källa: SCB, Folkhälsomyndigheten

118-2023-MARK

- 2021


Samtliga
Kvinnor
Män
Procent
30
25
20
15
10
5
0
2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021

Om SLMF
Stadgar
Styrelsen
Verksamhetsberättelse
Mötesprotokoll
Hedersmedlemmar
Hur blir jag medlem?
Nya medlemmar i SLMF
Lungmedicinska enheter
Besvarade remisser
Historik
Miljöpolicy
Tobakspolicy

SLMFs tobakspolicy

SLMF verkar för ett tobaksfritt samhälle genom att stödja förslag och åtgärder som avser

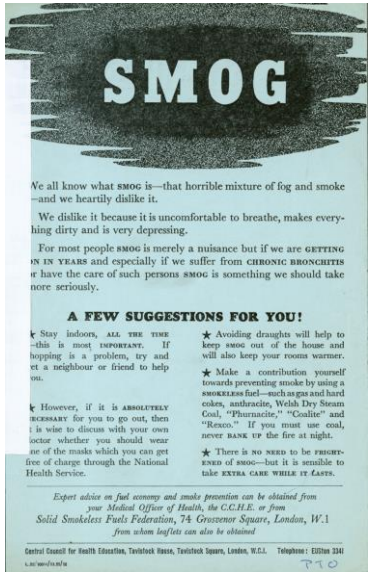
- förhindra att individer exponeras för tobaksrök
- förbud eller begränsningar av tillsatser i tobaksprodukter
- kontroll av tobaksbruk, exempelvis genom ökad beskattning
- tillförande av ökade resurser för tobakspreventivt arbete och tobaksavvänjning
- stärka forskning om tobaksprevention och tobaksavvänjning
- att ej acceptera direkt eller indirekt stöd för tobaksindustrin i sin verksamhet
- ett totalt stopp för allt tobaksbruk år 2025

Dela den här sidan

“ett totalt stopp för allt tobaksbruk år 2025”

118-2023-MARK

VILKA VÄGAR LEDER DIT?



SMOG

We all know what SMOG is—that horrible mixture of fog and smoke —and we heartily dislike it.

We dislike it because it is uncomfortable to breathe, makes everything dirty and is very depressing.

For most people SMOG is merely a nuisance but if we are GETTING ON IN YEARS and especially if we suffer from CHRONIC BRONCHITIS or have the care of such persons SMOG is something we should take more seriously.

A FEW SUGGESTIONS FOR YOU!

★ Stay indoors, ALL THE TIME —this is most IMPORTANT. If shopping is a problem, try and get a neighbour or friend to help you.

★ However, if it is ABSOLUTELY NECESSARY for you to go out, then it is wise to discuss with your own doctor whether you should wear one of the masks which you can get free of charge through the National Health Service.

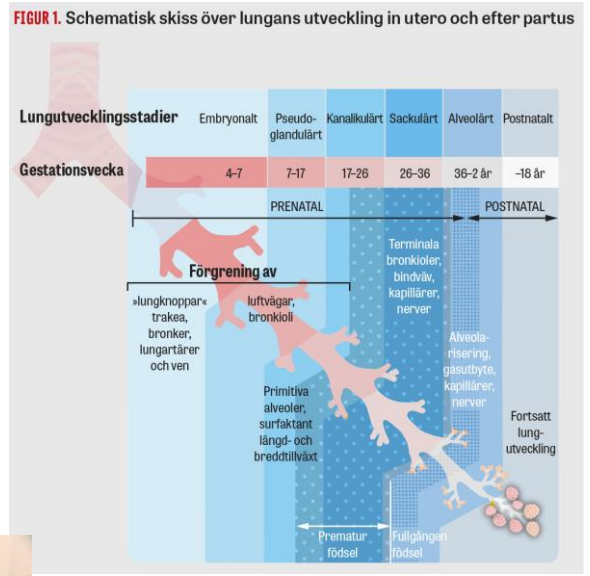
★ Avoiding draughts will help to keep SMOG out of the house and will also keep your rooms warmer.

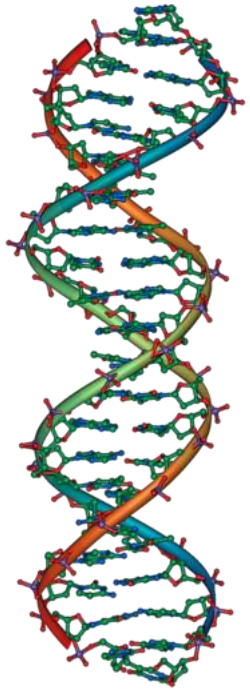
★ Make a contribution yourself towards preventing smoke by using a SMOKELESS fuel—such as gas and hard cokes, anthracite, Welsh Dry Steam Coal, "Phurnacite," "Coalite" and "Rexco." If you must use coal, never BANK UP the fire at night.

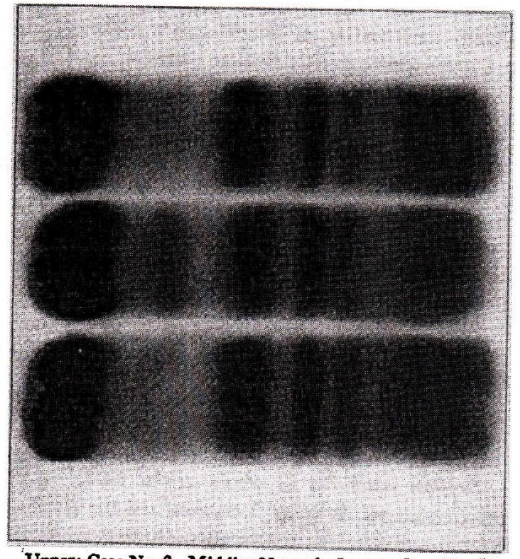
★ There is NO NEED to be FRIGHTENED of SMOG—but it is sensible to take EXTRA CARE WHILE IT LASTS.

Expert advice on fuel economy and smoke prevention can be obtained from your Medical Officer of Health, the C.C.H.E. or from
Solid Smokeless Fuels Federation, 74 Grosvenor Square, London, W.1
from whom leaflets can also be obtained

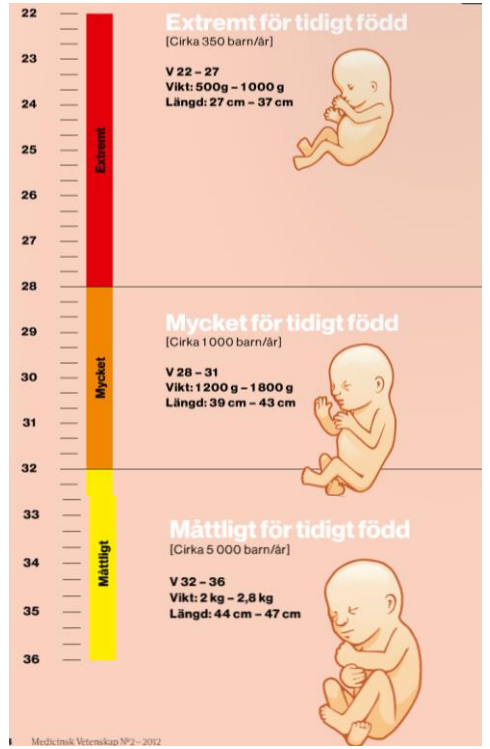
Central Council for Health Education, Tavistock House, Tavistock Square, London, W.C.1. Telephone: EUSton 3341







Upper: Case No. 2. Middle: Normal. Lower: Case No. 5.



118-2023-MARK

SAMMANFATTNING

- Flera vägar leder till kronisk luftvägsobstruktion
  - ibland av händelser mycket tidigt i livet
- Accelererad förlust av lungfunktion vid KOL är inte obligat
- Hos cirka hälften av alla KOL-patienter kan orsaken till luftflödesbegränsningen finnas i tidiga år
- Rökning vanligaste riskfaktorn **men**
- KOL hos aldrig-rökare utgör en betydande del
  - andelen kommer sannolikt att öka i framtiden
- Hos dessa patienter bör tidiga händelser efterfrågas
- Mekanismer okända men sannolikt multipla
- Evidens för behandling av KOL hos aldrig-rökare saknas

118-2023-MARK

KRONISK LUFTVÄGSOBSTRUKTION HOS VUXNA
VILKA VÄGAR LEDER DIT?
LUNGAN GENOM LIVET
Stockholm 230329
TACK!

LUNAPRE
Eva Berggren Broström
Petra Um Bergström
Jenny Hallberg
Margitha Dahl
Gunnel de Forest
Helene Blomqvist
Åsa Wheelock
Riitta Kaarhteenaho
Marika Ström
Benita Engvall
Heta Merikallio
Sven Nyren
Christina Ebersjö
Maria Eriksson
Bettina Levänen
Johan Kolmert
Anders Linden
Craig Wheelock
Erik Melen
Diogo Furentes
Giorgios Rassidakis
Cristian Ortiz Villalon

SCAPIS
Gunnar Engström
Göran Berglund
Anders Blomberg
Andrei Malinovschi
Lars Lind
Margareta Persson
Stefan Söderberg
Tomas Jernberg
Emil Haglund
Carl-Johan Östgren
Annika Rosengren
Charlotte Lundström

BRONCHO-SCAPIS
Anders Blomberg
Christer Janson
Lennart Persson
Anders Andersson
Leif Bjermer
Jonas Erjefält
Sara Tengvall
Helene Blomqvist
Jamshid Pourazar
Benita Dahlberg
Linda Vanikkala
Shoumi Omar
Ellen Tufvesson
Annika Johansson
Åsa Wheelock
Jonas Olsson
Apostolos Soiutas
Frida Holmström
Margitha Dahl
Gunnel de Forest
Petra Jacobsson
Gustav Broman

FORSKARGRUPP
Lisa Carlson
Sandra Karlsson
Eva-Marie Karlsson
Melvin Pourbazargan
Ida Pesonen
Dimitrios Kalafatis
Maria Diakopoulou
Jing Gao
Pernilla Sönnerfors
Helene Blomqvist
Simon Scherp
Margitha Dahl
Susanne Schedin

Hjärt-Lungfonden
Vetenskapsrådet
Karolinska Institutet
Region Stockholm
Astma-Allergiförbundet
Svensk Lungmedicinsk Förening
Hesselmans Stiftelse
Nybergs Fond
Karolinska Universitetssjukhuset
Cancerfonden

118-2023-MARK

KRONISK LUFTVÄGSOBSTRUKTION HOS VUXNA VILKA VÄGAR LEDER DIT?

LUNGAN GENOM LIVET

Stockholm 230329

Magnus Sköld

118-2023-MARK