

Panel 4: Benefits of Nicotine

Prof. Riccardo Polosa



- Nicotine substitution for smoking cessation and relapse prevention
- Beneficial health effects of switching
- Nicotine and disease management
- Absolute health risks of nicotine consumption
- Nicotine dependence

Panel 4: Benefits of Nicotine

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- Nicotine substitution for smoking cessation and relapse prevention

e-cigarettes help quitting smoking: the evidence

The NEW ENGLAND JOURNAL of MEDICINE



Cochrane Database of Systematic Reviews

Electronic cigarettes for smoking cessation (Review)

Hartmann-Boyce J, McRobbie H, Butler AR, Lindson N, Bullen C, Begh R, Theodoulou A, Notley C, Rigotti NA, Turner T, Fanshawe TR, Hajek P

ORIGINAL ARTICLE

A Randomized Trial of E-Cigarettes versus Nicotine-Replacement Therapy

Peter Hajek, Ph.D., Anna Phillips-Waller, B.Sc., Dunja Przulj, Ph.D., Francesca Pesola, Ph.D., Katie Myers Smith, D.Psych., Natalie Bisal, M.Sc., Jinshuo Li, M.Phil., Steve Parrott, M.Sc., Peter Sasieni, Ph.D., Lynne Dawkins, Ph.D., Louise Ross, Maciej Goniewicz, Ph.D., Pharm.D., Qi Wu, M.Sc., and Hayden J. McRobbie, Ph.D.

RESEARCH

 OPEN ACCESS

BMJ

¹Department of Family Medicine and Public Health, University

E-cigarette use and associated changes in population smoking cessation: evidence from US current population surveys

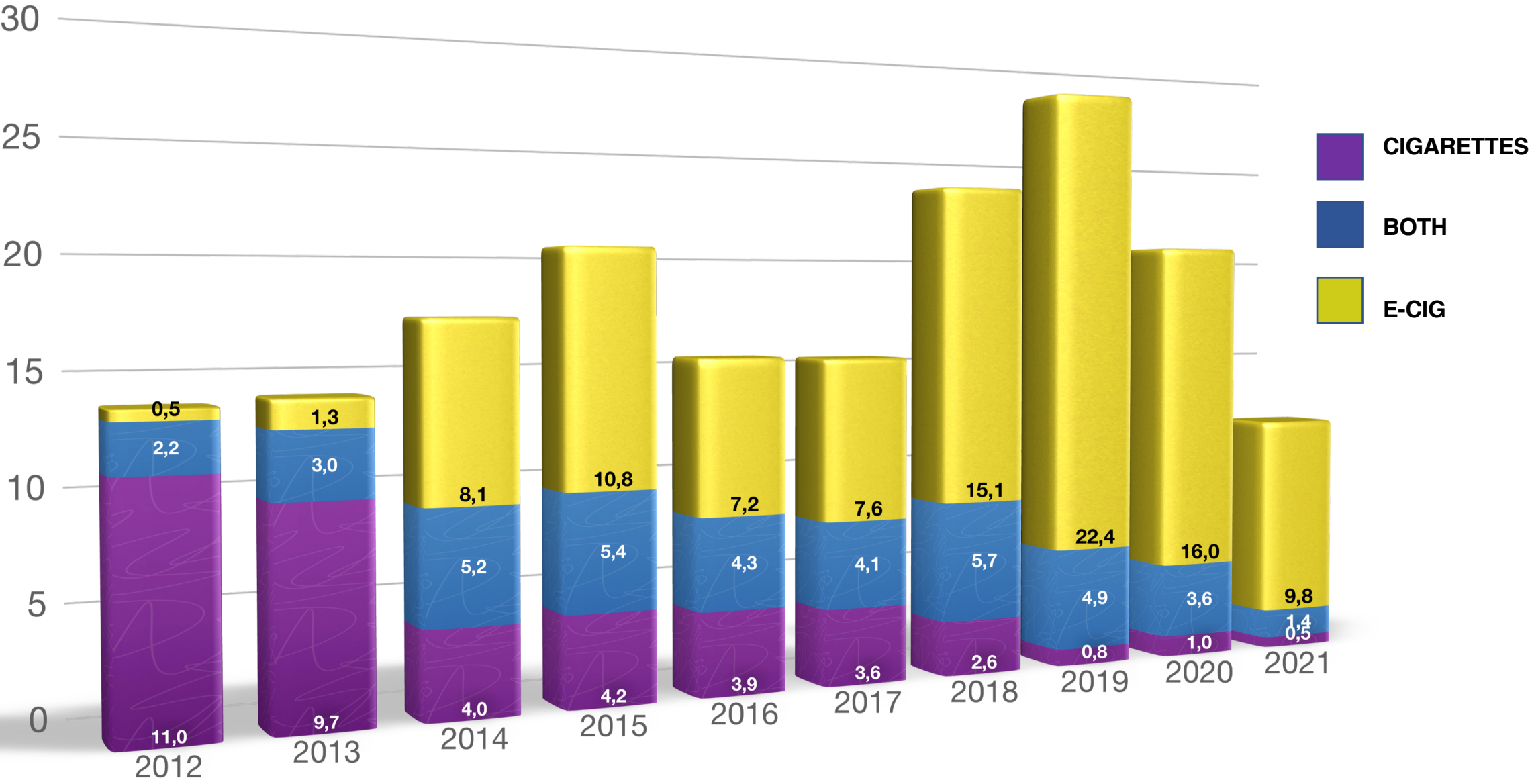
Shu-Hong Zhu,^{1,2} Yue-Lin Zhuang,² Shiushing Wong,² Sharon E Cummins,^{1,2} Gary J Tedeschi²

ABSTRACT
OBJECTIVE

cessation rate for 2014-15 was significantly higher than that for 2010-11: 5.6% (4.5% (1.1% (0.6% to

BMJ: first publis


Current (Past 30 Days) e-cigarettes and tobacco cigarettes use in the U.S.among youth
NYTS 2012-2021



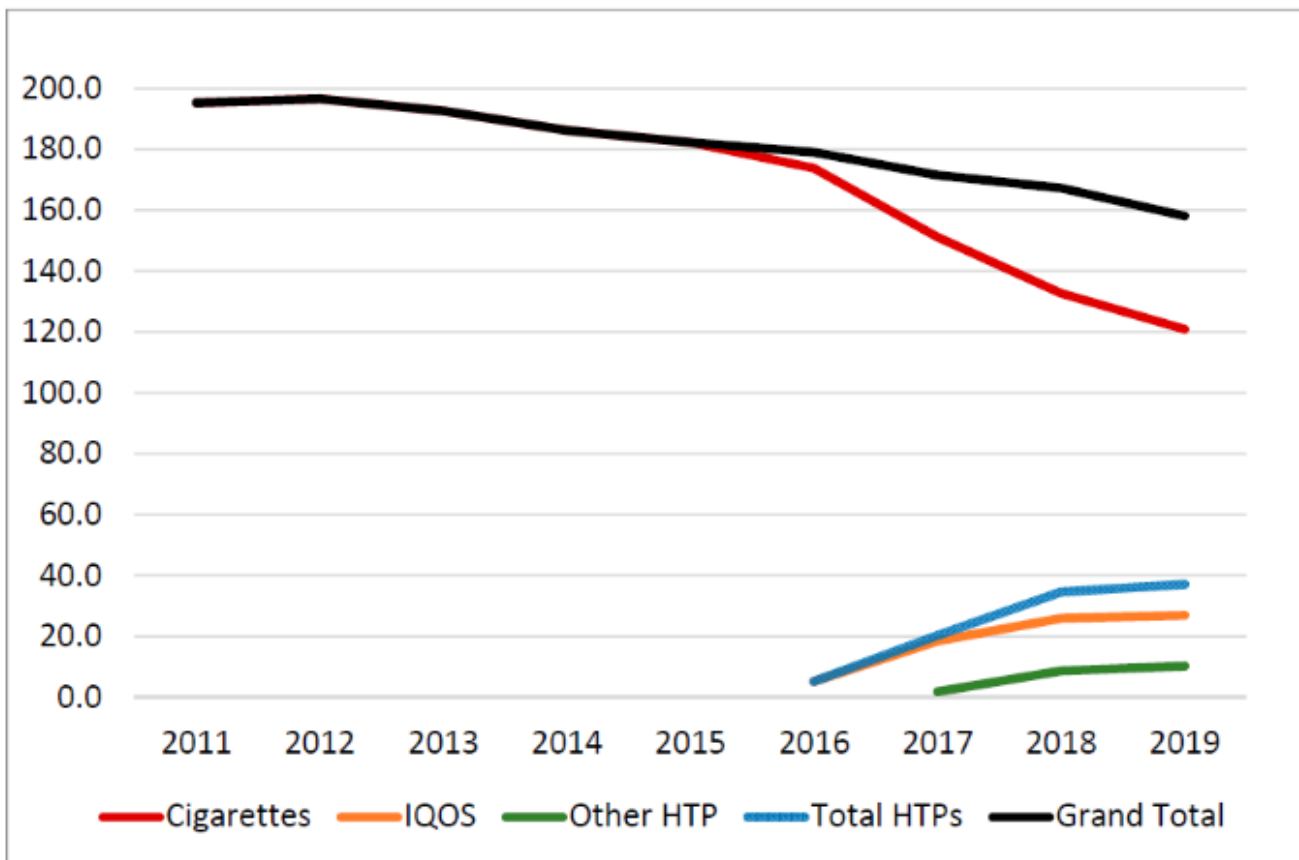


Article

What Is Accounting for the Rapid Decline in Cigarette Sales in Japan?

K. Michael Cummings ^{1,*} , Georges J. Nahhas ¹ and David T. Sweanor ²

Sales of cigarettes, IQOS and other THPs (billion sticks)



**34% reduction in cigarette sales
in 4 years!**



Panel 4: Benefits of Nicotine

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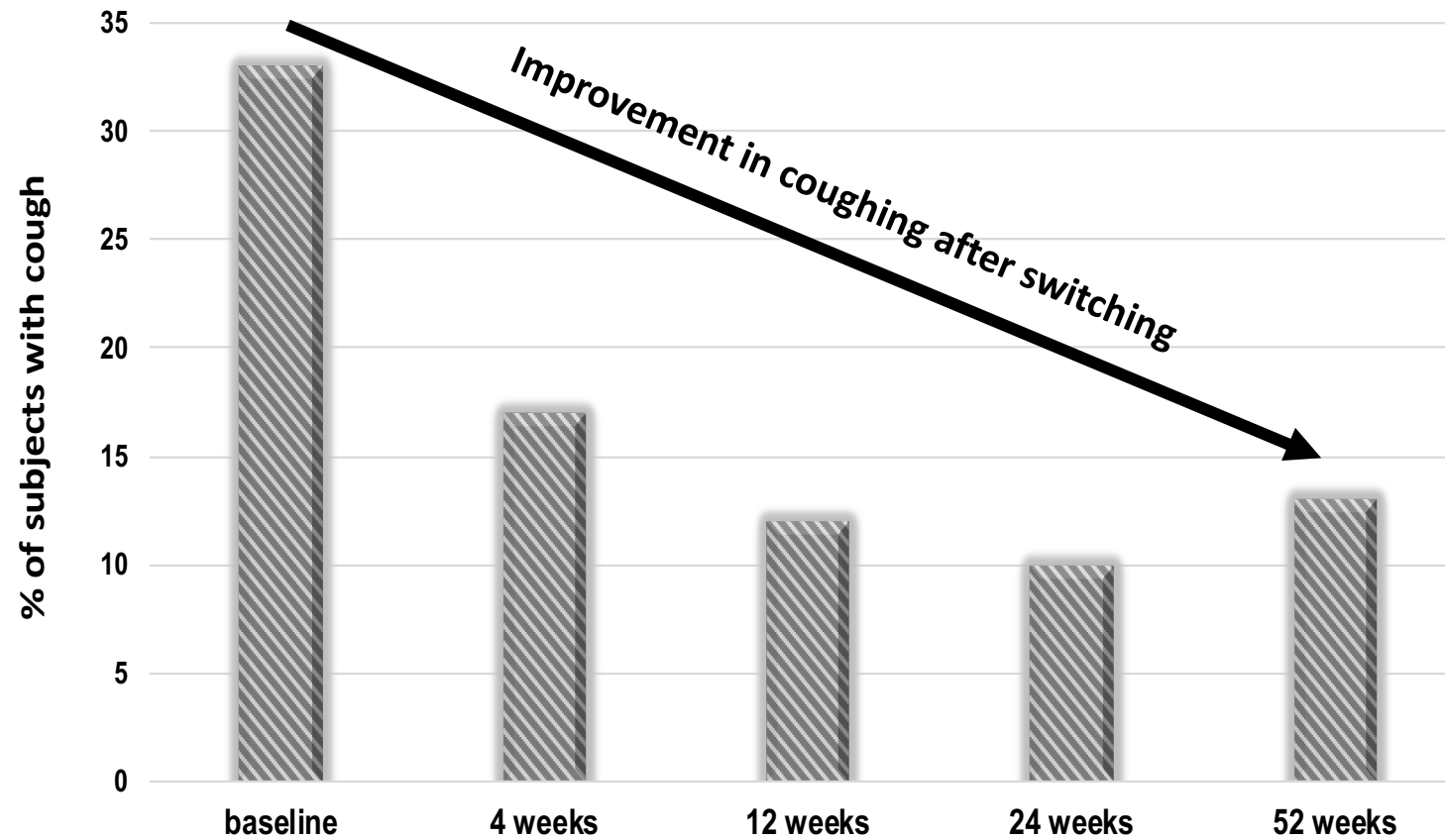


- Beneficial health effects of switching

Self-reported health changes after regular ECIG use

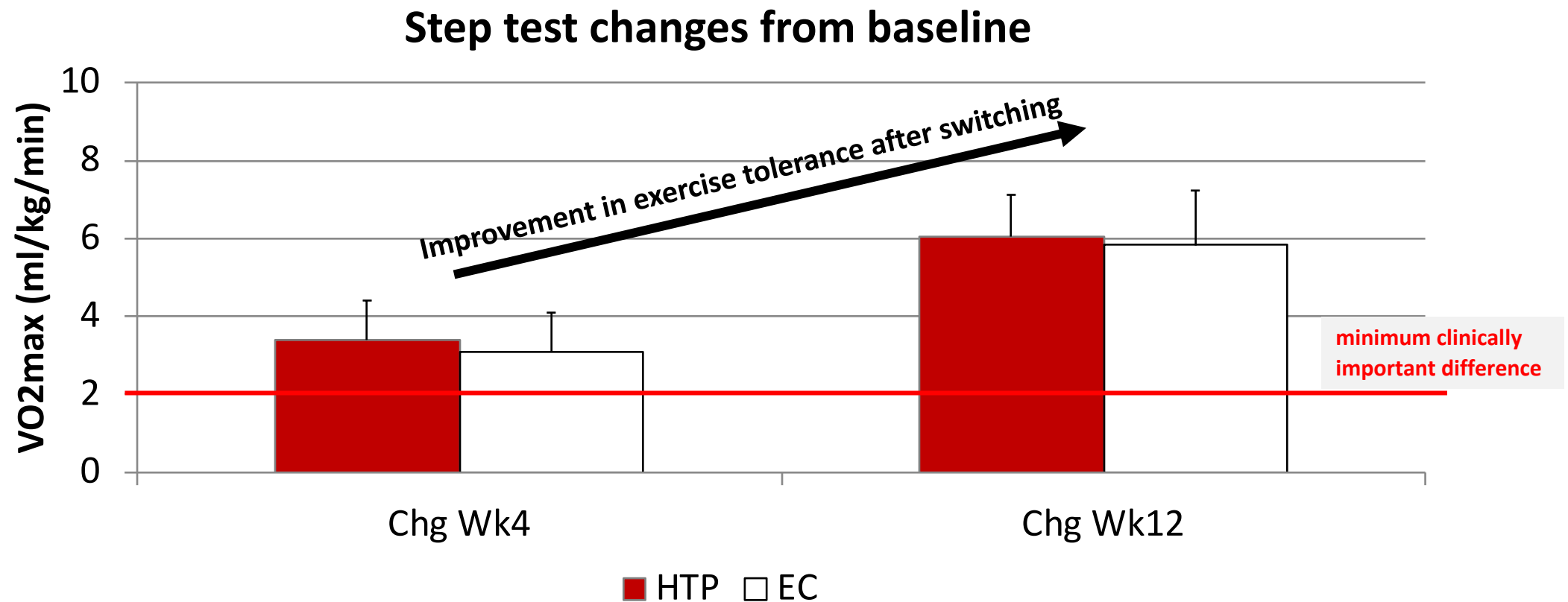
Changes	Total (n = 19,353)	Current smokers (n = 3682)	Former smokers (n = 15,671)	Statistic	p value
After initiating EC use, have you experienced any changes in:					
Physical status in general					
Worse	79 (0.4)	24 (0.7)	55 (0.4)	$\chi^2 = 308.6$	<0.001
No change	4769 (24.6)	1309 (35.6)	3460 (22.1)		
Better	14,409 (74.5)	2316 (62.9)	12,093 (77.2)		
Breathing					
Worse	137 (0.7)	40 (1.1)	97 (0.6)	$\chi^2 = 304.0$	<0.001
No change	2497 (12.9)	784 (21.3)	1713 (10.9)		
Better	16,641 (86.0)	2824 (76.7)	13,817 (88.2)		
Endurance					
Worse	84 (0.4)	31 (0.8)	53 (0.3)	$\chi^2 = 294.0$	<0.001
No change	4945 (25.6)	1326 (36.0)	3619 (23.1)		
Better	14,231 (73.5)	2287 (62.1)	11,944 (76.2)		

Reduction in cough by regular EC users who abstained from tobacco smoking after switching





Improvement in exercise tolerance by regular EC users who abstained from tobacco smoking after switching





COPD smokers who switched to e-cigarettes: health outcomes at 5-year follow up

Ricardo Polosa*^{ORCID}, Jaymin B Morjaria*^{ORCID}, Umberto Prosperini, Barbara Busà, Alfio Pennisi, Mario Malerba, Marilena Maglia and Pasquale Caponnetto

Ther Adv Chronic Dis

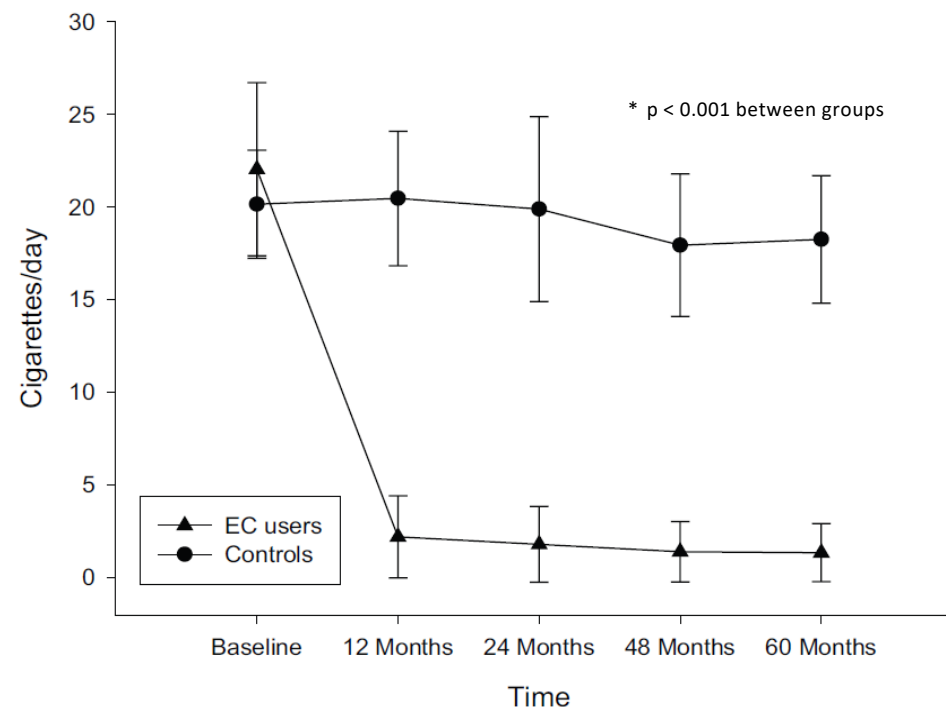
2020, Vol. 11: 1–15

DOI: 10.1177/
2040622320961617

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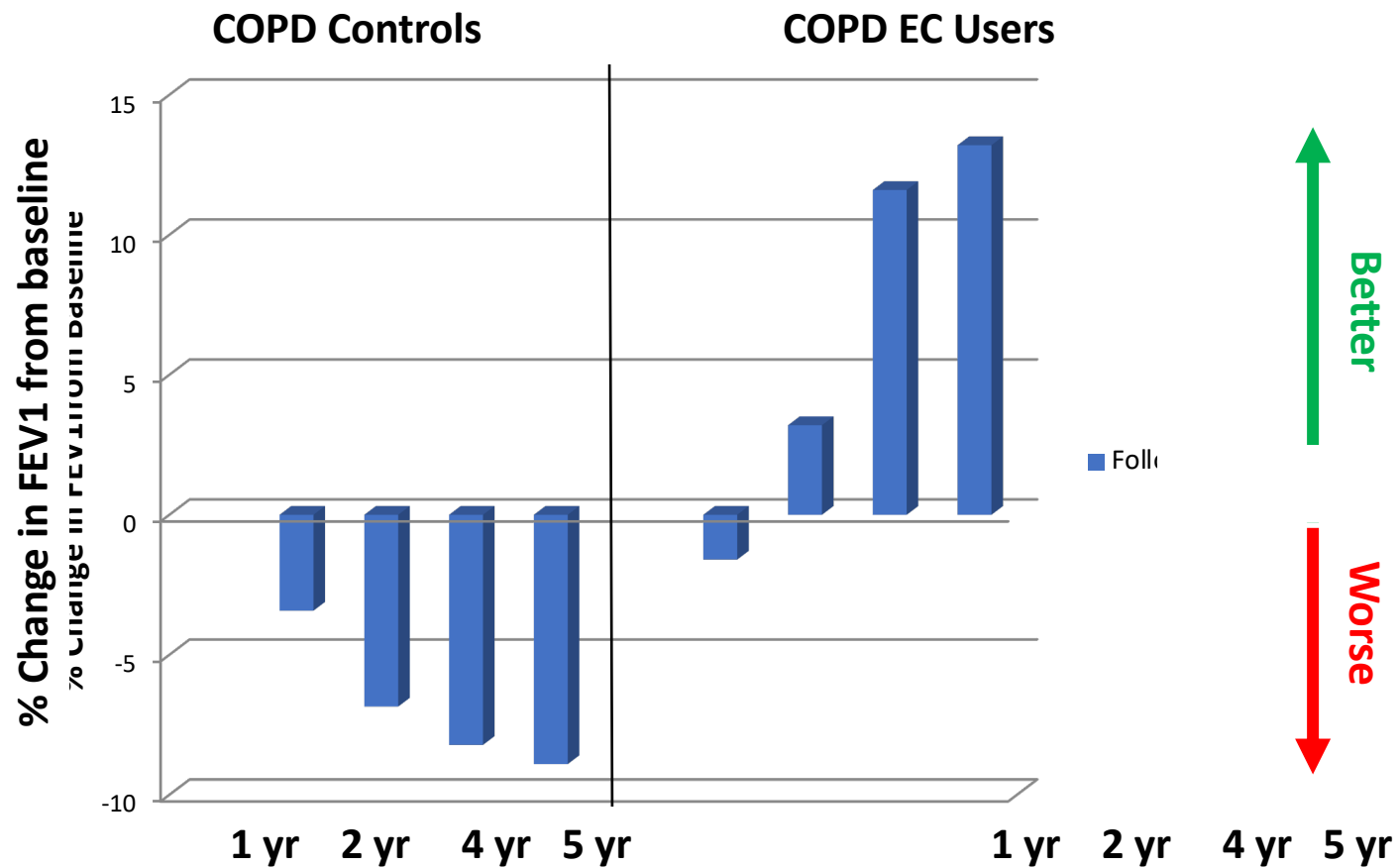
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**Marked reduction in
cigarettes consumption!**



Impact of EC use on lung function: 5 yr follow-up of COPD patients

Improved lung function

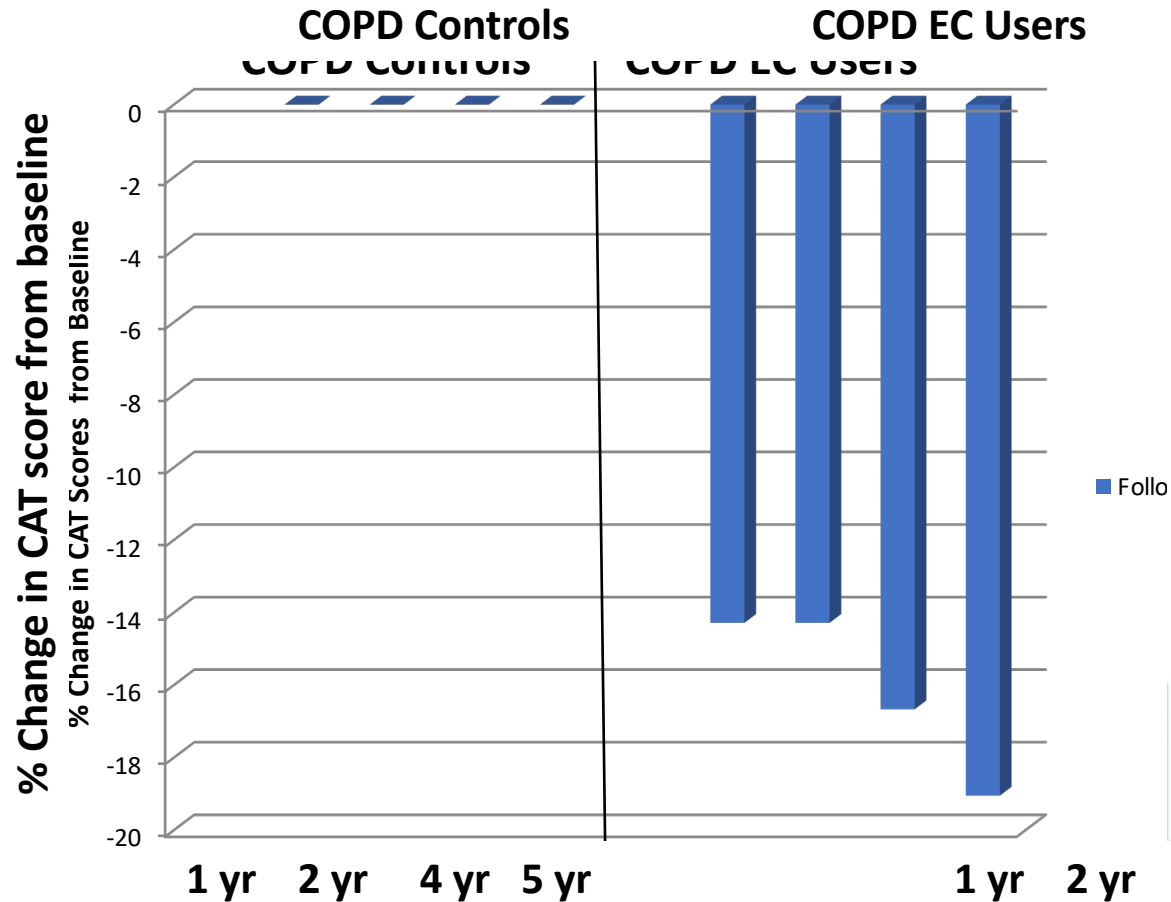


Spirometry



Impact of EC use on QoL: 5 yr follow-up of COPD patients

Better quality of life



CAT SCORE

How is your COPD? Take the COPD Assessment Test™ (CAT)

This questionnaire will help you and your healthcare professional measure the impact COPD (Chronic Obstructive Pulmonary Disease) is having on your wellbeing and daily life. Your answers, and test score, can be used by you and your healthcare professional to help improve the management of your COPD and get the greatest benefit from treatment.

For each item below, place a mark (X) in the box that best describes you currently. Be sure to only select one response for each question.

Example: I am very happy (0) (1) (2) (3) (4) (5) I am very sad

Example: I never cough (0) (1) (2) (3) (4) (5) I cough all the time

Example: I have no phlegm (mucus) in my chest at all (0) (1) (2) (3) (4) (5) My chest is completely full of phlegm (mucus)

Example: My chest does not feel tight at all (0) (1) (2) (3) (4) (5) My chest feels very tight

Example: When I walk up a hill or one flight of stairs I am not breathless (0) (1) (2) (3) (4) (5) When I walk up a hill or one flight of stairs I am very breathless

Example: I am not limited doing any activities at home (0) (1) (2) (3) (4) (5) I am very limited doing activities at home

Example: I am confident leaving my home despite my lung condition (0) (1) (2) (3) (4) (5) I am not at all confident leaving my home because of my lung condition

Example: I sleep soundly (0) (1) (2) (3) (4) (5) I don't sleep soundly because of my lung condition

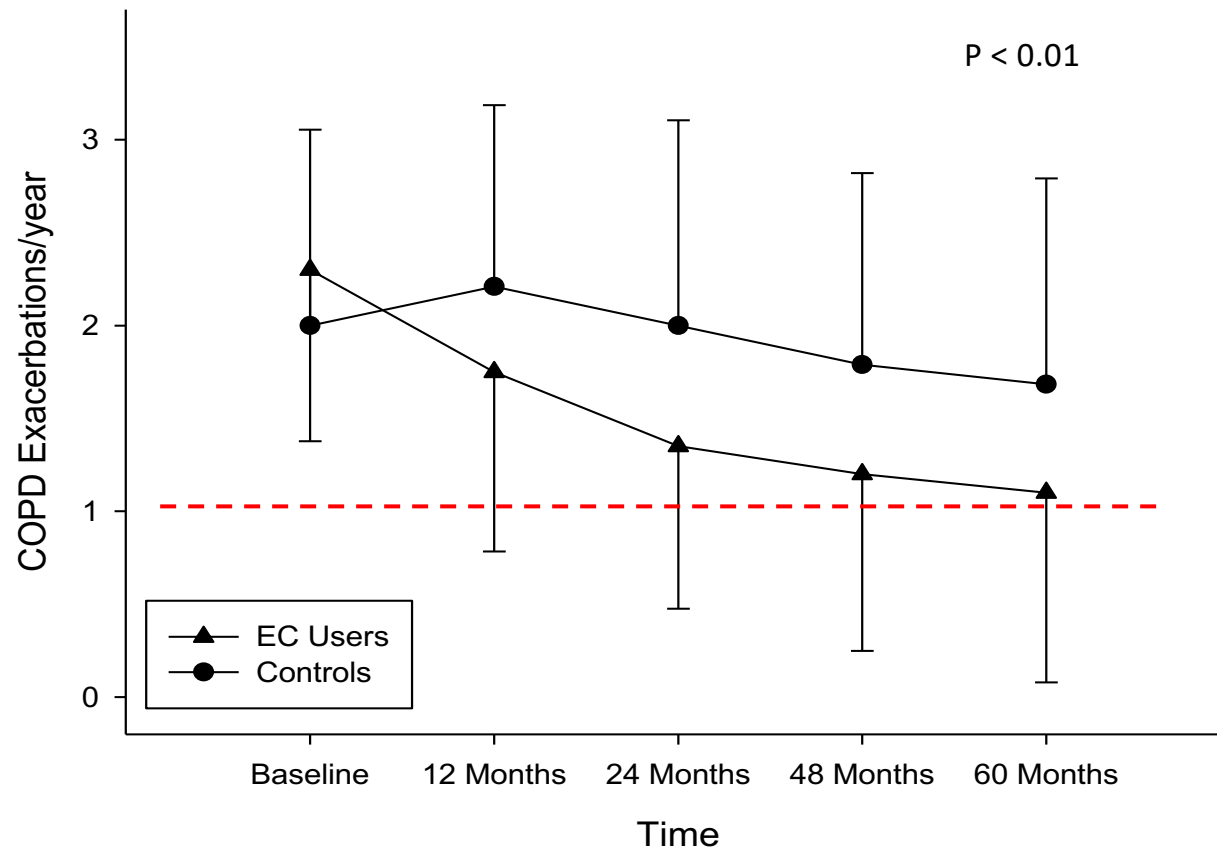
Example: I have lots of energy (0) (1) (2) (3) (4) (5) I have no energy at all

TOTAL SCORE

COPD Assessment Test and the CAT logo is a trade mark of the GlaxoSmithKline group of companies. © 2005 GlaxoSmithKline group of companies. All rights reserved. Last updated: February 24, 2012

Impact of EC use on clinical outcomes: 5 yr follow-up of COPD patients

Less respiratory exacerbations



Exacerbation leads to hospitalization



OPEN ACCESS

Potential deaths averted in USA by replacing cigarettes with e-cigarettes

David T Levy,¹ Ron Borland,² Eric N Lindblom,³ Maciej L Goniewicz,⁴ Rafael Meza,⁵ Theodore R Holford,⁶ Zhe Yuan,⁷ Yuying Luo,⁷ Richard J O'Connor,⁴ Raymond Niaura,⁸ David B Abrams^{1,8}

Findings

Compared with the Status Quo, replacement of cigarette by EC use over a 10-year period yields:

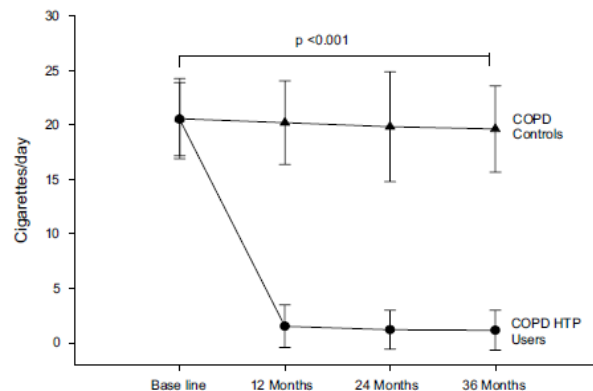
- ***6.6 million fewer premature deaths***
- ***86.7 million fewer life years lost***



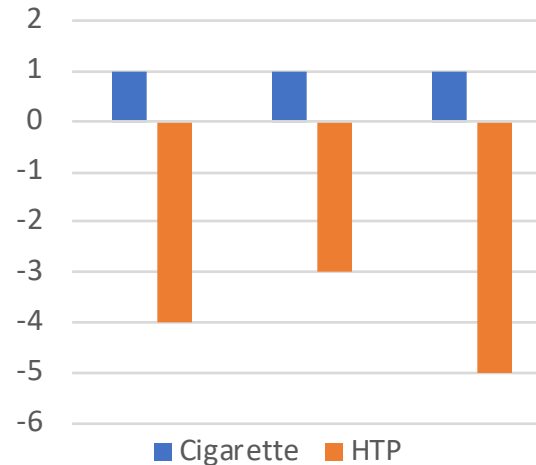
Health outcomes in COPD smokers using heated tobacco products: a 3-year follow-up

Riccardo Polosa^{1,2,3,9} · Jaymin B. Morjaria⁴ · Umberto Prosperini⁵ · Barbara Busà⁶ · Alfio Pennisi⁷ ·
Gualberto Gussoni⁸ · Sonja Rust³ · Marilena Maglia^{1,2} · Pasquale Caponnetto^{1,2,3}

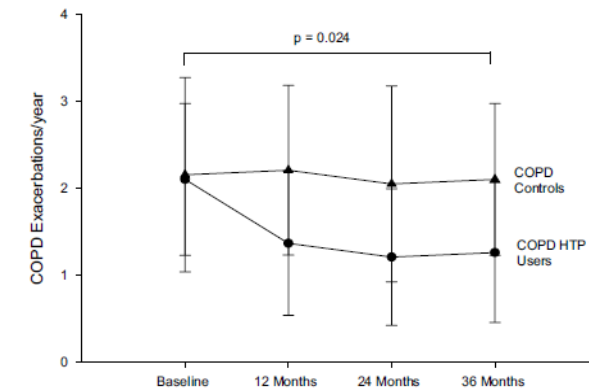
Cigarettes smoked per day



Change of CAT score over time



COPD exacerbations per year



Influence of HTP on COPD (real-world data)

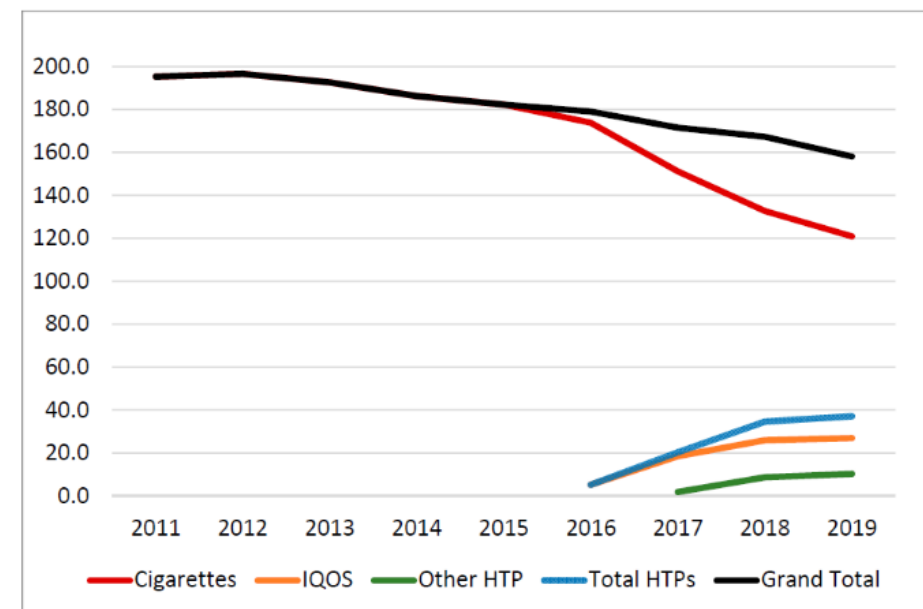
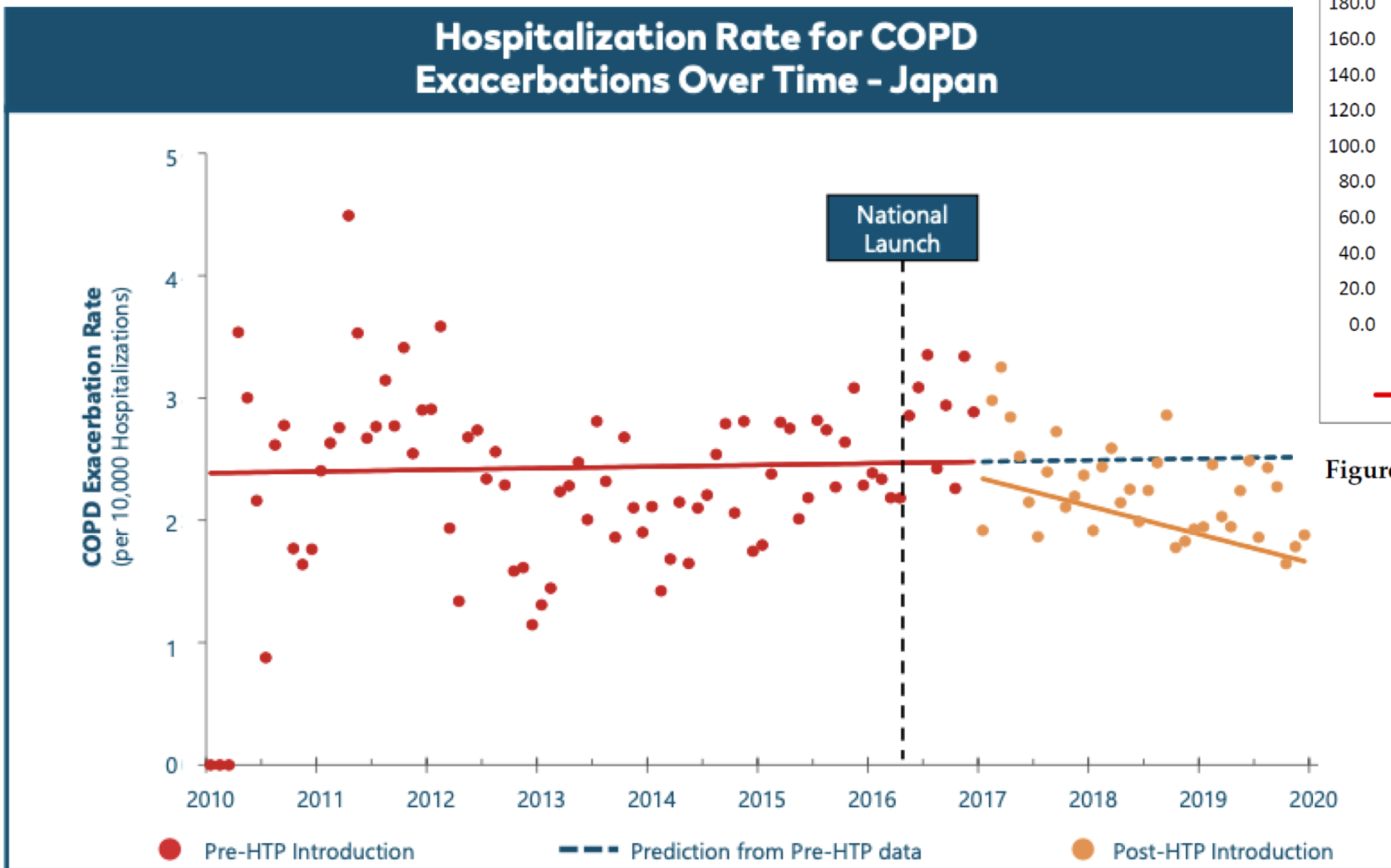


Figure 1. Sales of cigarettes, IQOS, and other HTPs (billion sticks).



Panel 4: Benefits of Nicotine

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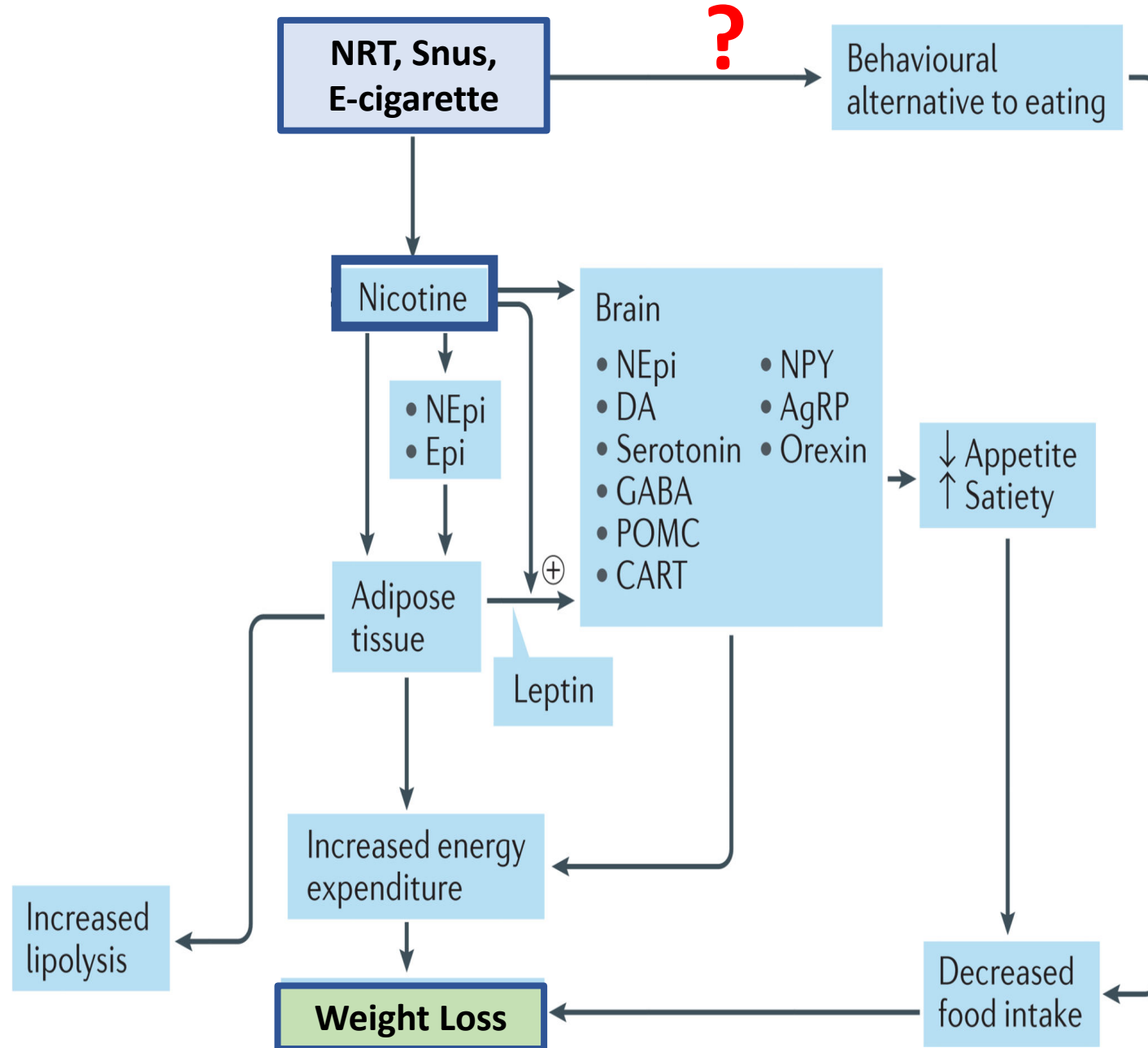


- Nicotine and disease management

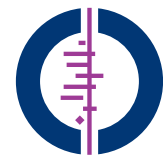
Therapeutic Nicotine for Medical Conditions

- ❑ Management of neurodegenerative diseases:
 - ❑ Parkinson's disease (Thiriez et al., 2011)
 - ❑ Alzheimer (Newhouse et al. 2012)
- ❑ Management of inflammatory bowel diseases:
 - ❑ Ulcerative colitis (Sandborn, 1999)
 - ❑ Chron's disease (?)
- ❑ Management of mental conditions:
 - ❑ Major depression (McClernon, Hiott, Westman, Rosse, & Levin, 2006)
 - ❑ Schizophrenia (Barr et al., 2008)
 - ❑ Attention deficit hyperactivity disorder (Gehricke, Hong, Whalen, Steinhoff & Wigal, 2009)
- ❑ Management of metabolic conditions:
 - ❑ Weight management, obesity (Audrain-McGovern, 2011)

Mechanisms by which nicotine may decrease body weight



Nicotine for preventing post cessation weight gain? NRT data



Cochrane
Library

Cochrane Database of Systematic Reviews

Farley AC, Hajek P, Lycett D, Aveyard P.

Cochrane Database of Systematic Reviews 2012

Issue 1. Art. No.: CD006219. DOI: 10.1002/14651858

**Interventions for preventing weight gain after smoking
cessation (Review)**

62 studies included (of which 33 NRT trials)

Conventional Therapy for Preventing PCWG

Cochrane Summary

	Effects at end of treatment		Effects at one year	
	Estimate of effect	Certainty	Estimate of effect	Certainty
Fluoxetine	1.0kg	Y	No data	
Bupropion	0.8kg	Y	0.4kg	N
NRT	0.5kg	Y	0.4kg	N
Varenicline	0.5kg	Y?	No data	

Nicotine for preventing post cessation weight gain?

Snus data

Hansson *et al. BMC Public Health* 2011, **11**:371
<http://www.biomedcentral.com/1471-2458/11/371>

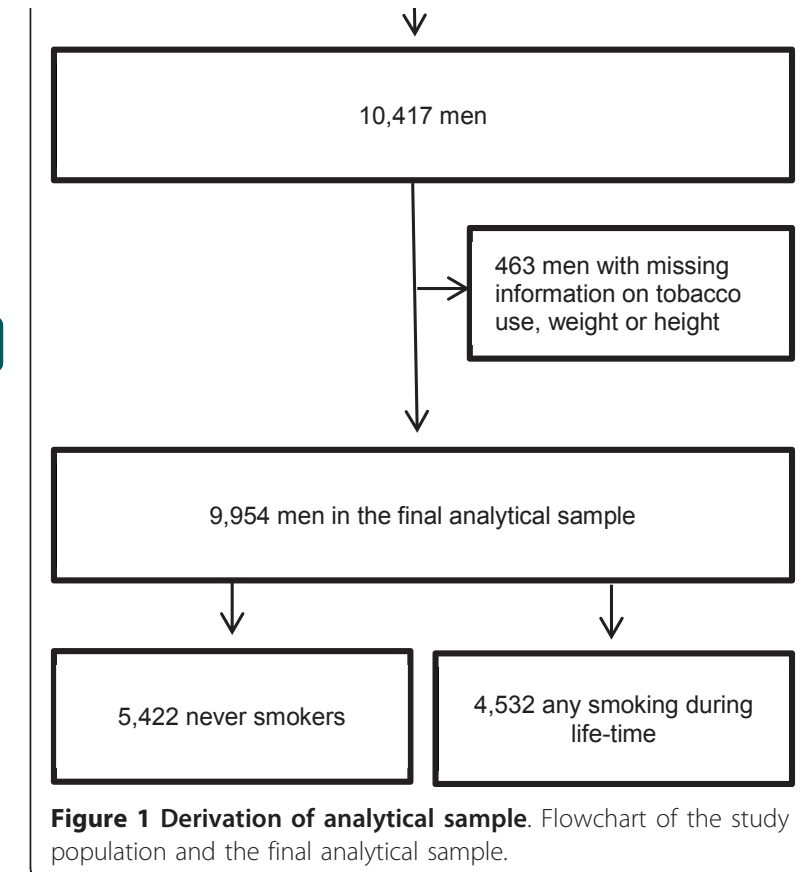


RESEARCH ARTICLE

Open Access

Weight gain and incident obesity among male snus users

Jenny Hansson¹, Maria Rosaria Galanti¹, Cecilia Magnusson¹ and Maria-Pia Hergens^{1,2*}

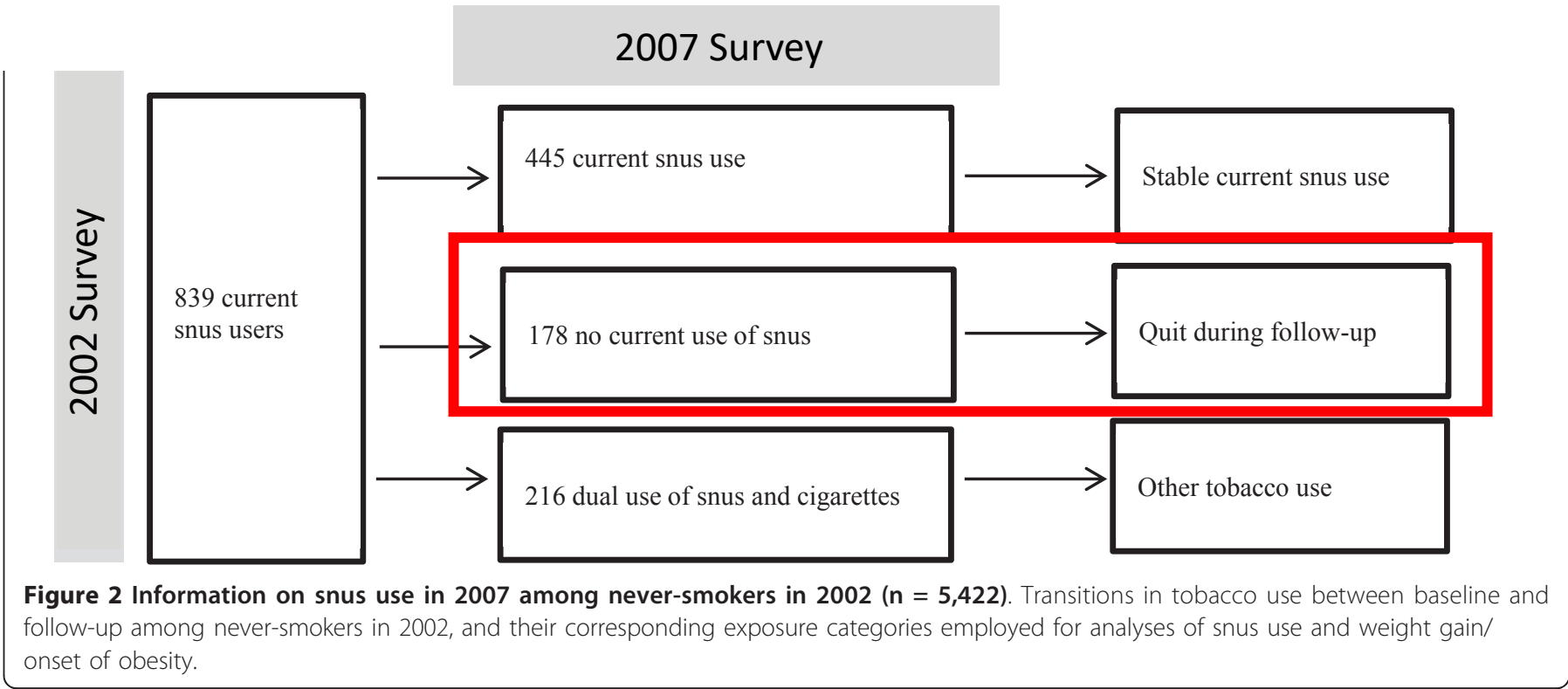


RESEARCH ARTICLE

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Weight gain and incident obesity among male snus users

Jenny Hansson¹, Maria Rosaria Galanti¹, Cecilia Magnusson¹ and Maria-Pia Hergens^{1,2*}



Level of weight control daily smoking vs. snus consumption

Table 2 Odds Ratios and 95% Confidence Intervals for Increase in Body Weight ≥5% in Relation to Tobacco use

Tobacco use 2002 and 2007		Weight gain ≥5% (n/N)	OR (95% CI) ¹	OR (95% CI) ²	OR (95% CI) ³
Never tobacco	No tobacco use	790/3877	Referent	Referent	Referent
Daily snus use	Stable current use	139/445	1.39 (1.12-1.73)	1.41 (1.13-1.75)	1.31 (1.04-1.65)
	Stable former use	31/126	1.24 (0.82-1.89)	1.29 (0.85-1.95)	1.36 (0.89-2.10)
	Quit during follow-up	51/178	1.21 (0.86-1.69)	1.24 (0.88-1.74)	1.25 (0.88-1.77)
	Began during follow-up	14/52	0.98 (0.52-1.82)	0.98 (0.53-1.84)	0.97 (0.50-1.86)
Daily smoking	Stable current use	174/729	1.52 (1.25-1.84)	1.50 (1.24-1.82)	1.24 (1.00-1.54)
	Stable former use	235/1541	1.10 (0.93-1.31)	1.13 (0.95-1.34)	1.04 (0.87-1.25)
	Quit during follow-up	120/284	3.43 (2.65-4.42)	3.44 (2.66-4.44)	3.15 (2.39-4.15)
	Began during follow-up	9/56	0.93 (0.45-1.93)	0.93 (0.45-1.94)	0.70 (0.29-1.67)
Other	Including combined snus use and smoking	676/2666	1.46 (1.29-1.64)	1.50 (1.33-1.69)	1.34 (1.17-1.53)

**Weight change?
NO**

**Weight change?
YES**

Nicotine for preventing post cessation weight gain? E-cigarette data

SCIENTIFIC REPORTS

OPEN

Evaluation of Post Cessation Weight Gain in a 1-Year Randomized Smoking Cessation Trial of Electronic Cigarettes

Received: 13 May 2015

Accepted: 20 November 2015

Published: 05 January 2016

Cristina Russo^{1,2}, Fabio Cibella³, Pasquale Caponnetto^{1,2}, Davide Campagna^{1,2},
Marilena Maglia^{1,2}, Evelise Frazzetto², Enrico Mondati², Massimo Caruso² & Riccardo Polosa^{1,2}



International Journal of
*Environmental Research
and Public Health*



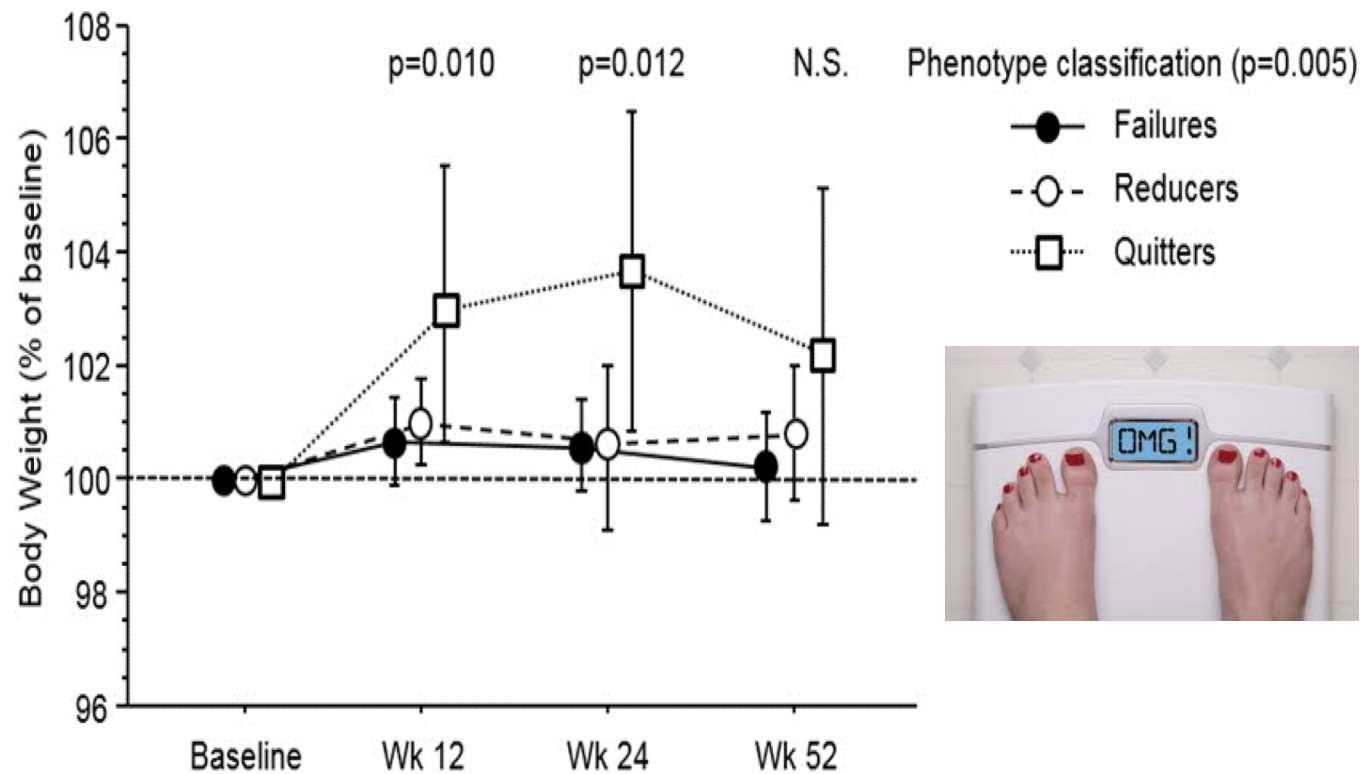
Article

Lack of Substantial Post-Cessation Weight Increase in Electronic Cigarettes Users

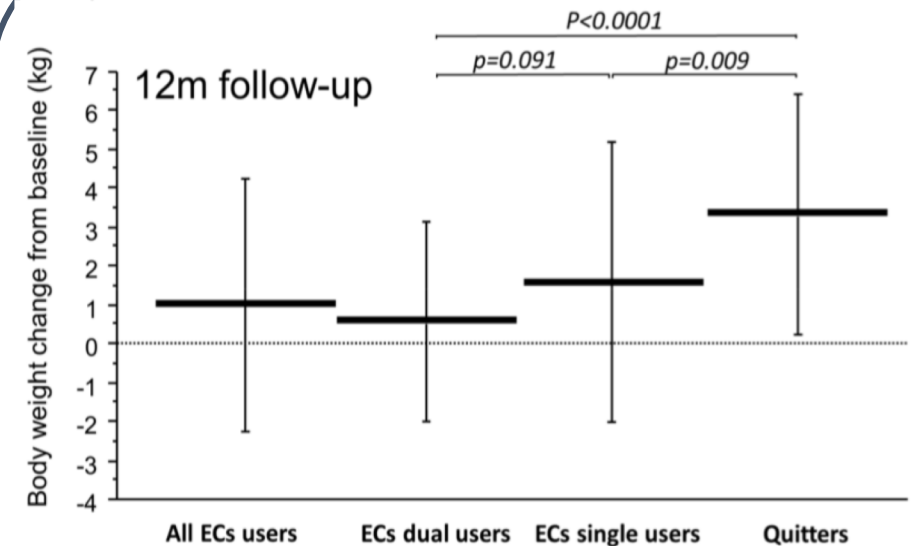
Cristina Russo¹, Fabio Cibella² , Enrico Mondati^{3,4}, Pasquale Caponnetto^{4,5},
Evelise Frazzetto^{3,4}, Massimo Caruso^{3,4} , Grazia Caci³ and Riccardo Polosa^{3,4,5,*} 

Minimal post-cessation weight changes after switching to ECs

Post Cessation Weight Gain

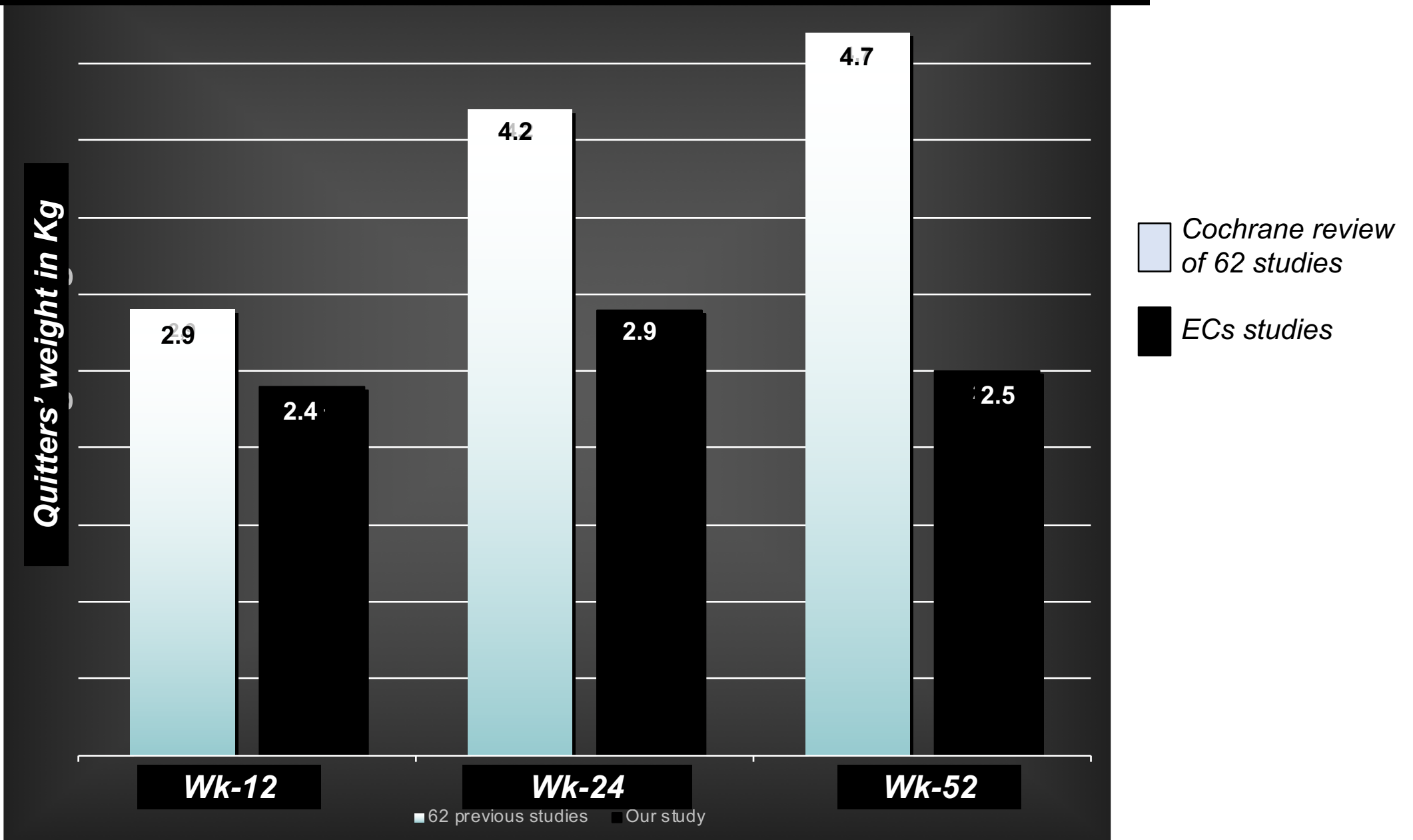


Russo C, Cibella F, Caponnetto P, et al. *Sci Rep.* 2016



Russo C, Cibella F, Mondati E, et al.
Int J Environ Res Public Health. 2018

Post Cessation Weight Gain in Quitters: Cochrane vs ECs studies



Panel 4: Benefits of Nicotine

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- Absolute health risks of nicotine consumption

RESPIRATORY EFFECTS

LONG-TERM

- PROSPECTIVE 3.5-YEAR STUDY
- DAILY E-CIG USERS
- NEVER SMOKED IN THEIR LIFE
- **NO LONG-TERM HEALTH CONCERNS**

www.nature.com/scientificreports

SCIENTIFIC REPORTS

OPEN

Health impact of E-cigarettes: a prospective 3.5-year study of regular daily users who have never smoked

Received: 16 June 2017

Accepted: 3 October 2017

Published online: 17 November 2017

Riccardo Polosa^{1,2,3}, Fabio Cibella⁴, Pasquale Caponnetto^{1,3}, Marilena Maglia^{1,3},
Umberto Prosperini⁵, Cristina Russo⁶ & Donald Tashkin⁷

Although electronic cigarettes (ECs) are a much less harmful alternative to tobacco cigarettes, there is concern as to whether long-term ECs use may cause risks to human health. We report health outcomes (blood pressure, heart rate, body weight, lung function, respiratory symptoms, exhaled breath nitric

RESPIRATORY EFFECTS

LONG-TERM

high resolution CT of the lung

Of note, no early pathological signs were observed in subjects with the highest e-liquid consumption (i.e. 5 mls/day) and longest overall vaping hx (i.e. 57 months)



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- Nicotine dependence

Nicotine Dependence in Naive Nicotine Consumers: Uncharted Territory

- Statements about the risk of addiction from nicotine vaping draw from the existing literature on cigarette smoking – and not nicotine vaping.
 - By equating findings obtained from conventional cigarettes smoking to EC vaping, a comparable risk is ultimately portrayed.
 - The sharp decline in nicotine vaping among youth does not support the notion that nicotine vaping is as addictive as cigarette smoking.
 - Moreover, youth exclusive EC use (in never smokers) is not stable over time and there are very few regular every day users.
 - Although ECs have been shown to perpetuate the already existing addiction in former or current smokers concurrently using these combustion-free products, the current consensus is that ECs are less addictive than cigarettes.
 - Smoke contains other chemicals which enhance the addictiveness of smoke and these are absent from EC emission aerosols.
 - No data is available in exclusive EC users who never smoked before (people without previous nicotine addiction as in former cigarette smokers).
-