Cigarette smoking and Surroundings

live fit

- ✓ **Introduction**
- ✓ Cigarette smoking in pregnancy
- ✓ Smoking in pregnancy surroundings
- ✓ Passive smoking
- ✓ Passive smoking surroundings
- ✓ Active smoking
- ✓ Active smoking surroundings
- ✓ The e-cigarettes' problem
- ✓ What can we do?
- ✓ Conclusions

Attilio Boner
University of Verona, Italy
attilio.boner@univr.it

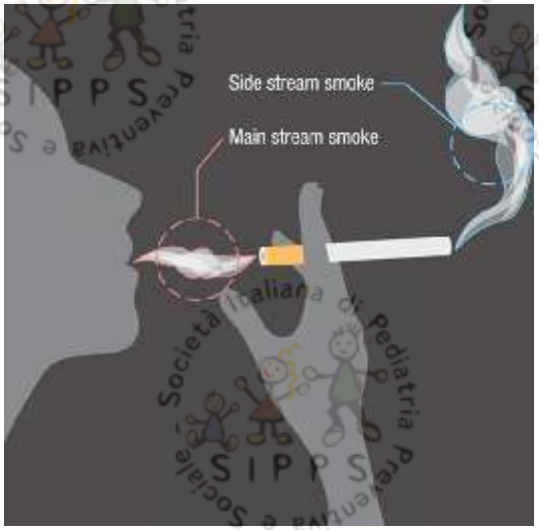
Hazardous Compounds in Tobacco Smoke

Talhout R, Int J Environ Res Public Health. 2011;8(2):613-628.

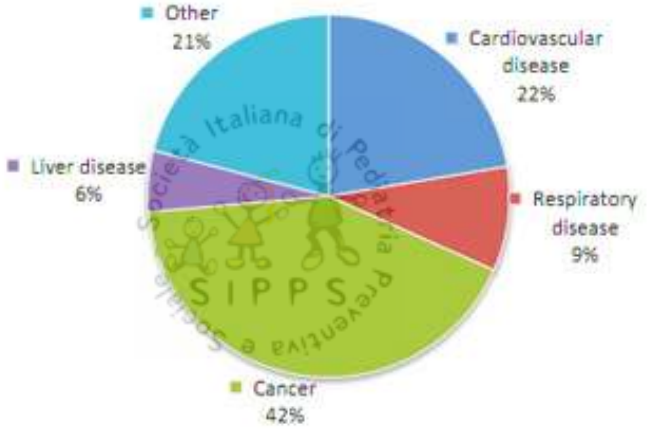
- Tobacco smoke is a toxic and carcinogenic mixture of more than 5,000 chemicals.

- Emission levels in mainstream smoke have been found for 542 of the components and a human inhalation risk value for 98 components.

- PAHs (Polycyclic Aromatic Hydrocarbons)
- Nitrosamines
- Carbon monoxide
- Nicotine
- Ammonia
- Acrolein
- Isoprene
- Benzene
- Toluene……



- As components with potential carcinogenic, cardiovascular and respiratory effects have been included, the 3 major smoke-related causes of death.



Tobacco Smoke Epidemiology: First Hand

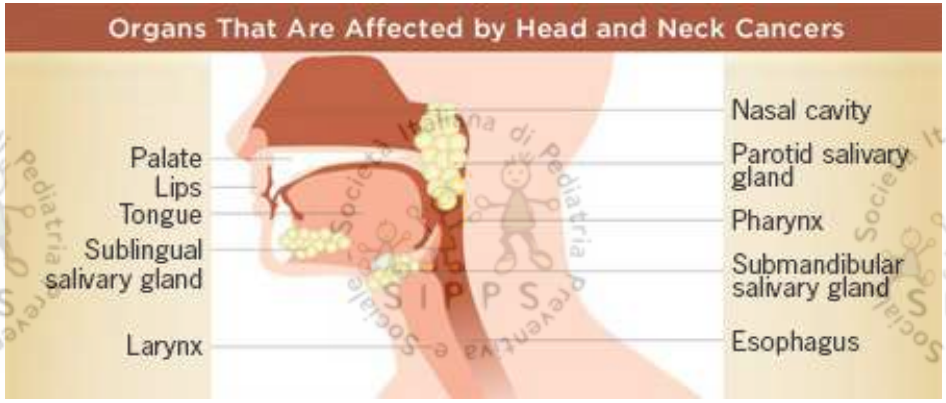
- Epidemiological survey found out that one billion men and 250 million women smoke ubiquitously.

- According to World Health Organization, because of smoking habit and unhealthy lifestyle, presently annual death toll exceeds 12 million and will increase over a 15 million by 2020.

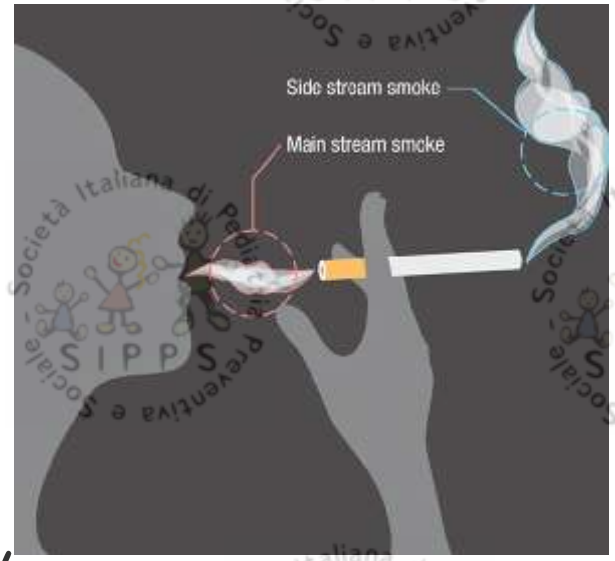
World Health Organization

- Cigarette smoking is one of the major causes of head and neck cancer worldwide.

Xue J, Cancers 2014;6:1138-56.



Tobacco Smoke Epidemiology: Second Hand 2nd



- Second hand smoke (SHS) is a type of smoking mixture of side stream smoke and main stream smoke exhaled from the lungs of smokers.

- The smoke is inhaled by the nonsmokers directly from other people's smoking. SHS releases more than 4000 chemicals like ammonia, carbon monoxide, hydrogen cynide, nicotine, polyhroxycarbons, and sulfur diaoxide.

- 11 of these are considered as group I carcinogens.

- According to some studies, there is a strong association of SHS exposure in non smoking adults and occurrence of lung cancer and is responsible for around 50,000 deaths per year in USA. (323.1 millions)

Ganjre AP, Oral Oncol. 2016;54:e3-4.

Tobacco Smoke Epidemiology: Third Hand

3rd

- Recently, a new concept of involuntary smoking has emerged. The concept of "third hand" smoke (THS) was first mentioned in 2006 but thoroughly researched in 2009 by a pediatrician.

Winickoff JP. Pediatrics 2009;123(1):e74-9

- When a smoker smokes, he exhales out several nicotine-like contaminants. These contaminants settle down on various household surfaces and objects (carpets, table tops, utensils, food, etc.) and remain there for weeks to months together.

- Complex oxidative physiochemical reactions take place between the environmental pollutants and emitted tobacco compounds [nicotine adsorbed onto the surfaces reacts with nitrous acid (HONO) and form tobacco specific-N-nitrosoamine (TSNA).

Ganjre AP, Third hand smoke--A hidden demon. Oral Oncol. 2016;54:e3-4.

Tobacco Smoke Epidemiology: Third Hand

Nicotine adsorbed onto the surfaces reacts with nitrous acid (HONO) and form tobacco specific-N-nitrosoamine (TSNA)

NICOTINE —HONO→ TOBACCO SPECIFIC NITROSAMINE (TSNA)

TSNA: NNA, NNK, NNN

THS → TSNA → continuous exposure by ingestion/adsorption/inhalation → NNA,NNK → Genotoxicity → DNA adducts & mutation → Cancer in tissue which are continuously in contact

Ganjre AP, Third hand smoke--A hidden demon. Oral Oncol. 2016;54:e3-4.

Cigarette smoking and Surroundings

live fit

- ✓ Introduction
- ✓ **Cigarette smoking in pregnancy**
- ✓ Smoking in pregnancy surroundings
- ✓ Passive smoking
- ✓ Passive smoking surroundings
- ✓ Active smoking
- ✓ Active smoking surroundings
- ✓ The e-cigarettes' problem
- ✓ What can we do?
- ✓ Conclusions

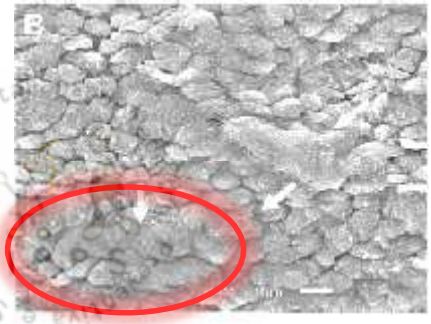
Attilio Boner
University of Verona, Italy
attilio.boner@univr.it

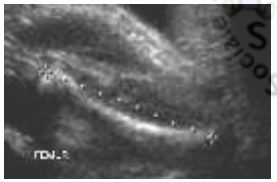
Smoking in Pregnancy:

The smoking fetus

Smoking during pregnancy: increased risk on the Child for:

- Spontaneous Preterm Birth and Small for Gestational Age infants. *McCowan LM, BMJ 2009;338:b1081.*
- SIDS *Friedmann I. J Matern Fetal Neonatal Med. 2016 Nov 24:1-9*.
- Wheeze/Asthma/COPD. *Hollams EM, AJRCCM 2014;189:401*
- Child overweight. *Oken E, Int J Obes (Lond) 2008;32(2):201-210.*
- Umbilical arteries endothelial dysfunction and early atherogenesis. *Messner B, Arterioscler Thromb Vasc Biol. 2014; 34:509-15*
- Reduced femur length. *Prabhu Thorax 2010;65:235-240*





Smoking during pregnancy: increased risk on the Child for:

- Increased Infant Irritability. *Stroud LR, Pediatrics 2009;123:e842-e848.*
- Impaired Reading Performance *Cho K, J Ped 2013;162:713*

- ADHD. *Braun JM, Environ Health Perspect 2006;114:1904-1909.*
- Reduced neurodevelopment. *Herrmann M, Curr Opin Pediatr 2008;20:184-190*
- Reduced Frontal lobe and Cerebellum volumes.
Ekblad J Pediatr 2010;156:185

- Criminal, antisocial behavior, anger temperament in adult offspring
Paradis AD, Epidemiol Community Health 2011;65:1145-50
Paradis AD, J Psychiatr Res. 2015;68:363-370
Liu T, J Psychiatr Res. 2011;45:1648-1654

The independent role of prenatal and postnatal exposure to active and passive smoking on the development of early wheeze in children. *Vardavas CI, ERJ 2016;48:115-124*

- ✓ Examined the association of maternal passive smoking during pregnancy and wheeze in children aged ≤2 years.
- ✓ 27993 mother-child pairs from 15 European birth cohorts.

OR of developing wheeze up to the age of 2 years

Children with maternal exposure to passive smoking during pregnancy and no other smoking exposure compared with unexposed children

The independent role of prenatal and postnatal exposure to active and passive smoking on the development of early wheeze in children. *Vardavas CI, ERJ 2016;48:115-124*

- ✓ Examined the association of maternal passive smoking during pregnancy and wheeze in children aged ≤2 years.
- ✓ 27993 mother-child pairs from 15 European birth cohorts.

OR of developing wheeze up to the age of 2 years

Children with maternal exposure to passive smoking during pregnancy and postnatally compared with unexposed children

The independent role of prenatal and postnatal exposure to active and passive smoking on the development of early wheeze in children. *Vardavas CI, ERJ 2016;48:115-124*

Risk of wheeze was further increased by children's postnatal passive smoke exposure in addition to their mothers' passive exposure during pregnancy *(OR 1.29)*

OR of developing wheeze up to the age of 2 years

Children with maternal exposure to passive smoking during pregnancy and postnatally compared with unexposed children

Prenatal Second-Hand Smoke Exposure Measured with Urine Cotinine May Reduce Gross Motor Development at 18 Months of Age

Evlampidou I, J Pediatr 2015;167:246-52

- ✓175 mothers with singleton pregnancies, had never smoked
- ✓Cotinine measurements in pregnancy

Gross motor developmental milestone	
Age	Milestone
3 months	Neck Holding
5 months	Rolls over
6 months	Sits in tripod fashion
8 months	Sitting without support
9 months	Stands with support
12 Months	Creeps well; walks but falls; stands without support
15 months	Walks alone; creeps upstairs
18 months	Runs; explores drawers
2 years	Walks up and downstairs; jumps
3 years	Rides tricycle; alternate feet going upstairs
4 years	Hops on one foot; alternate feet going downstairs

Prenatal Second-Hand Smoke Exposure Measured with Urine Cotinine May Reduce Gross Motor Development at 18 Months of Age

Evlampidou I, J Pediatr 2015;167:246-52

✓175 mothers with singleton pregnancies, had never smoked

✓Cotinine measurements in pregnancy

1. Reported passive smoking from different sources was strongly associated with urine cotinine levels.

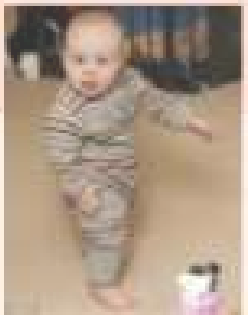
2. A negative association was observed between cotinine levels in pregnancy and child's gross motor function at age 18 mo.

Prenatal Second-Hand Smoke Exposure Measured with Urine Cotinine May Reduce Gross Motor Development at 18 Months of Age

Evlampidou I, J Pediatr 2015;167:246-52

GROSS MOTOR MILESTONES

AGE	GROSS MOTOR MLESTONES
Birth – 2 months	Raises head slightly off floor or bed when on stomach. Holds head momentarily when supported
3 – 5 months	Lifts head & chest when on stomach Rolls from side to side Pushes with feet Sits briefly with arm supported Makes crawling movement
6 – 8 months	Sits alone briefly Rolls from back to stomach Stands with support
9 – 11 months	Sits alone with trunk rotation Creeps or crawl Pulls to stand Stand alone momentarily



Prenatal Second-Hand Smoke Exposure Measured with Urine Cotinine May Reduce Gross Motor Development at 18 Months of Age

Evlampidou I, J Pediatr 2015;167:246-52

AGE	GROSS MOTOR MILESTONES
12 – 15 months 	Walks alone Creeps up stairs Crawls up on chair Able to stand without support
16 – 18 months 	Creeps downstairs Walk sideway & backway Stands on one foot with help Kick large ball forward
19 – 24 months 	Squats in play & stand back up Jumps in place Walks up & down stairs alone Runs well

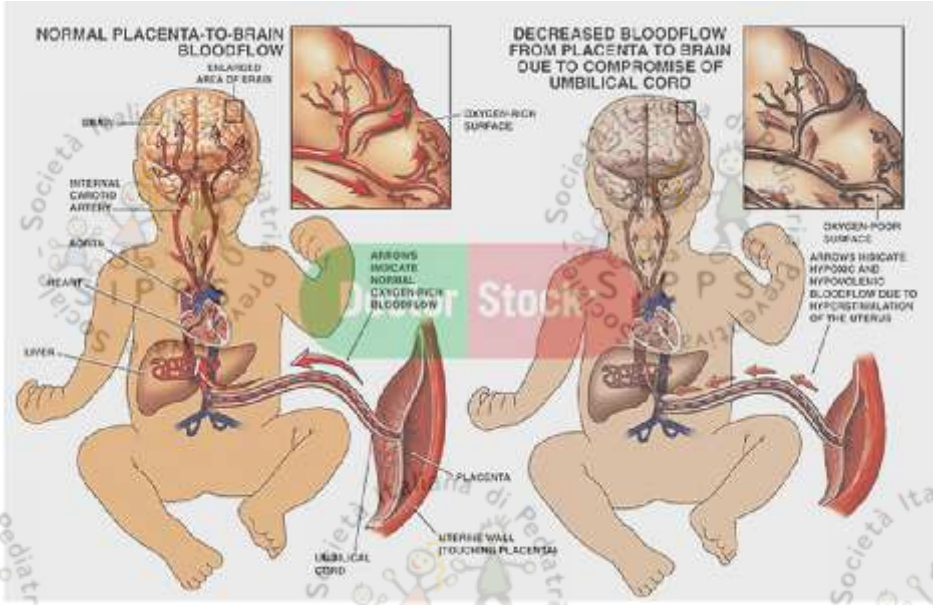
- There is normal variation between individual. The ages mentioned in the table are average of the child but may have early or some delay in acquisition of new motor skills.
- There are also sex differences as girls usually have early development as a whole from boys

Prenatal Second-Hand Smoke Exposure Measured with Urine Cotinine May Reduce Gross Motor Development at 18 Months of Age

Evlampidou I, J Pediatr 2015;167:246-52

- The underlying mechanisms affecting motor and cognitive development because of Second-hand Smoke (SHS) exposure during pregnancy are not yet clear.

- Many tobacco constituents cross the placenta, and some may cause fetal brain hypoxia.

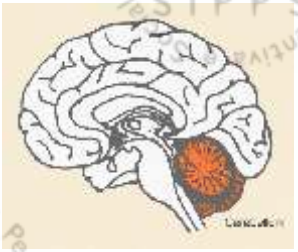


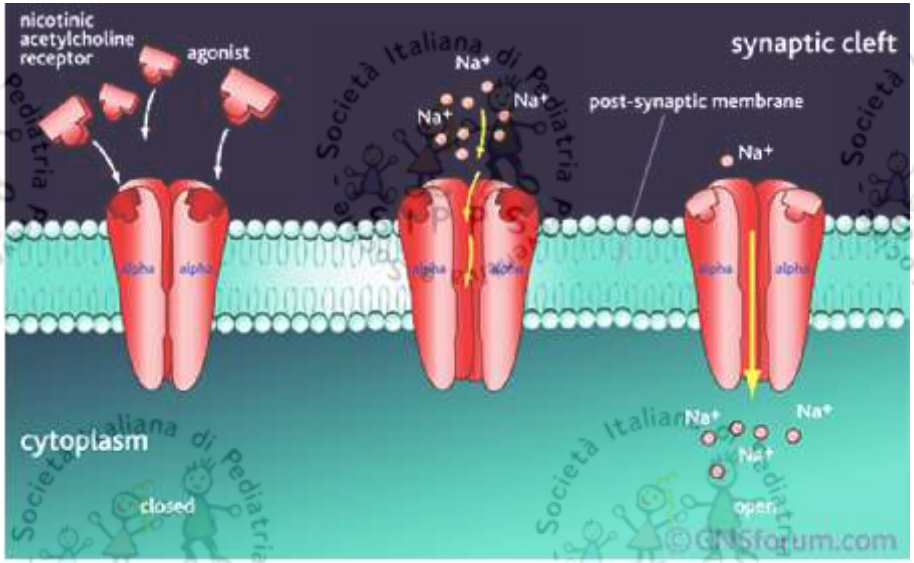
- In addition, nicotine is a major agonist of nicotinic receptors in the human brain.

Prenatal Second-Hand Smoke Exposure Measured with Urine Cotinine May Reduce Gross Motor Development at 18 Months of Age

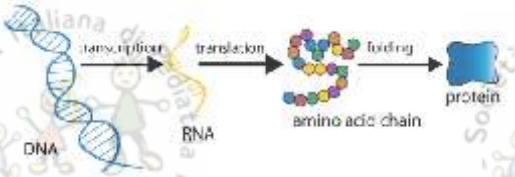
Evlampidou I, J Pediatr 2015;167:246-52

- Studies have shown that motor function and cognition are related to each other and that the prefrontal cortex and the cerebellum may play an important role in both.





- The cerebellum, rich in nicotinic receptors, is responsible for the general coordination of the movements and balance of the body.

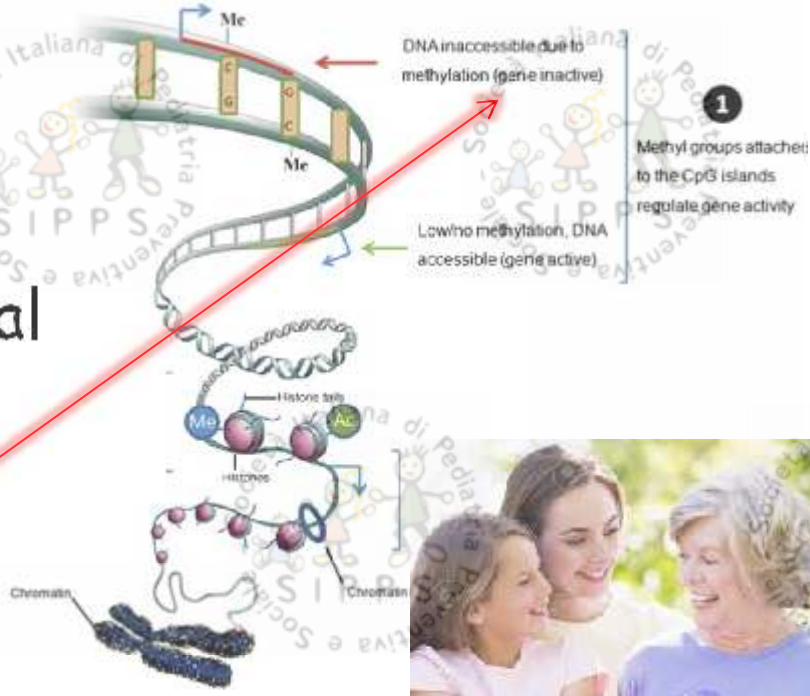


- Early prenatal nicotine exposure from smoking mothers may alter the gene expression pattern and the binding of nicotinic receptors in the cerebellum.

Harm of in utero tobacco smoke exposure a heritable trait?

Farber HJ, Chest 2014;145:1182

- Tobacco smoke is a complex mixture of toxicants, mutagens, and carcinogens
- There is ample evidence that it can have an impact on genes and gene expression
- In utero exposure is associated with altered DNA methylation patterns, with the degree of alteration proportional to the cord blood cotinine levels.
- DNA methylation patterns influence gene expression for > than 1 generation !



Environment-induced epigenetic reprogramming in genomic regulatory elements in smoking mothers and their children. *Bauer T, Mol Syst Biol. 2016;12(3):861.*

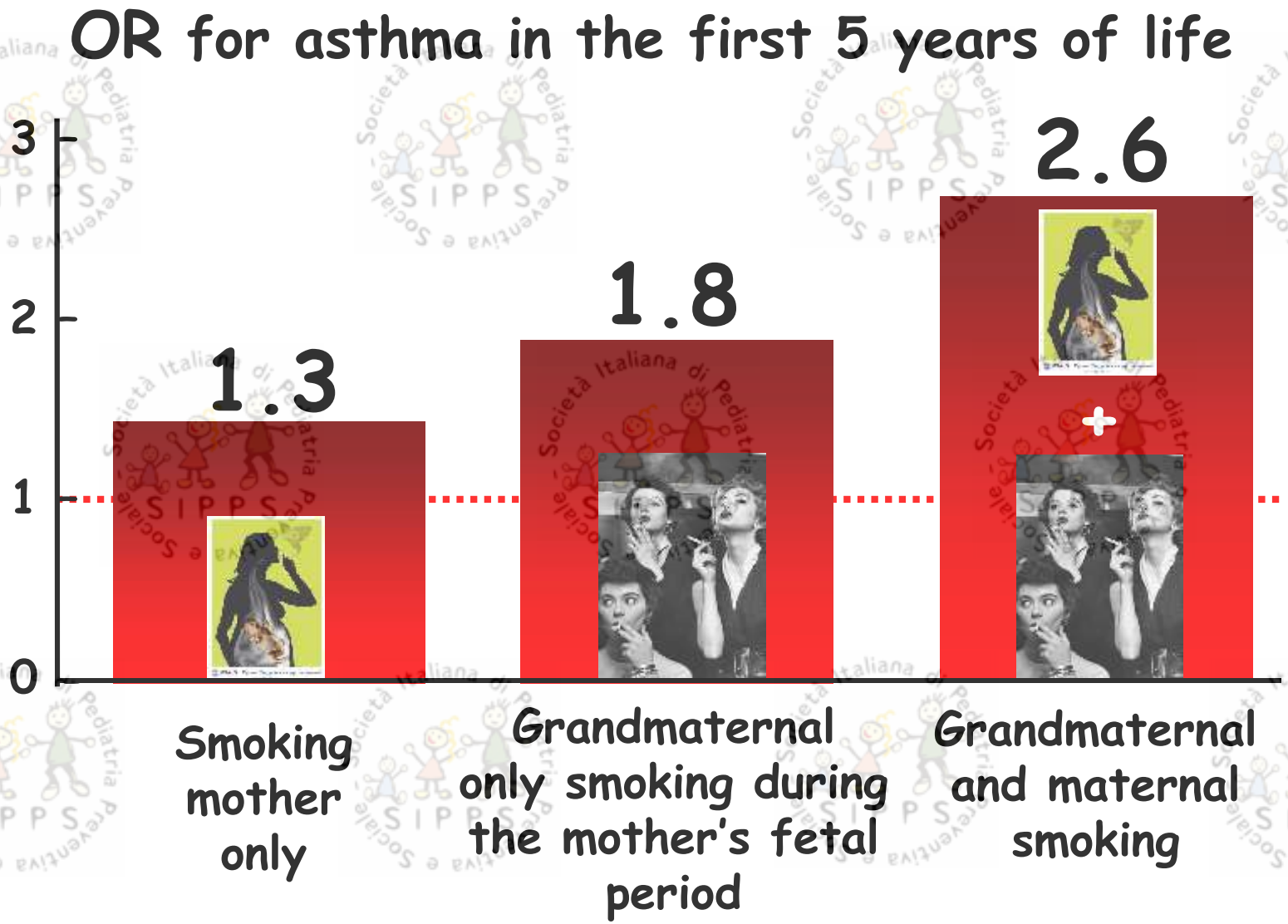
✓ epigenetic changes associated with maternal smoking at DNA nucleotide resolution by mapping methylation, histone modifications, and transcription in expectant mothers and their newborn children.

- Extensive global differential methylation;
- DNA methylation changes associated with maternal smoking persist over years;
- More than 400 enhancers affected by tobacco smoke, which regulate genes that play a role in a variety of diseases, such as diabetes, adiposity, or even cancer, were identified.

Maternal and grandmaternal smoking patterns are associated with early childhood asthma.

Li YF, Chest. 2005;127(4):1232-41.

- ✓ 338 children with asthma diagnosed in the first 5 years of life
- ✓ 570 control subjects



Cigarette smoking and Surroundings

live fit

- ✓ Introduction
- ✓ Cigarette smoking in pregnancy
- ✓ **Smoking in pregnancy surroundings**
- ✓ Passive smoking
- ✓ Passive smoking surroundings
- ✓ Active smoking
- ✓ Active smoking surroundings
- ✓ The e-cigarettes' problem
- ✓ What can we do?
- ✓ Conclusions

Attilio Boner
University of Verona, Italy
attilio.boner@univr.it

Smoking in Pregnancy:

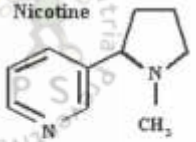
The smoking fetus

The Role of Nicotine in the Effects of Maternal Smoking during pregnancy on lung development and Childhood Respiratory Disease

Spindel E.R. Am J Respir Crit Care Med 2016;193:5:486-494

- Use of e-cigarettes, especially among the young, is increasing at near-exponential rates.

- This is coupled with a perception that e-cigarettes are safe and with unlimited advertising geared toward vulnerable populations, the groups most likely to smoke or vape during pregnancy.



- Recent evidence strongly supports that much of the effect of smoking during pregnancy on offspring lung function is mediated by nicotine, making it highly likely that e-cigarette use during pregnancy will have the same harmful effects on offspring lung function and health as do conventional cigarettes.

The Role of Nicotine in the Effects of Maternal Smoking during pregnancy on lung development and Childhood Respiratory Disease

Spindel E.R. Am J Respir Crit Care Med 2016;193:5:486-494

- This raises concerns about both the combined use of e-cigarettes plus conventional cigarettes by smokers during pregnancy as well as the use of e-cigarettes by e-cigarette–only users who think them safe or by those sufficiently addicted to nicotine to not be able to quit e-cigarette usageduring pregnancy.

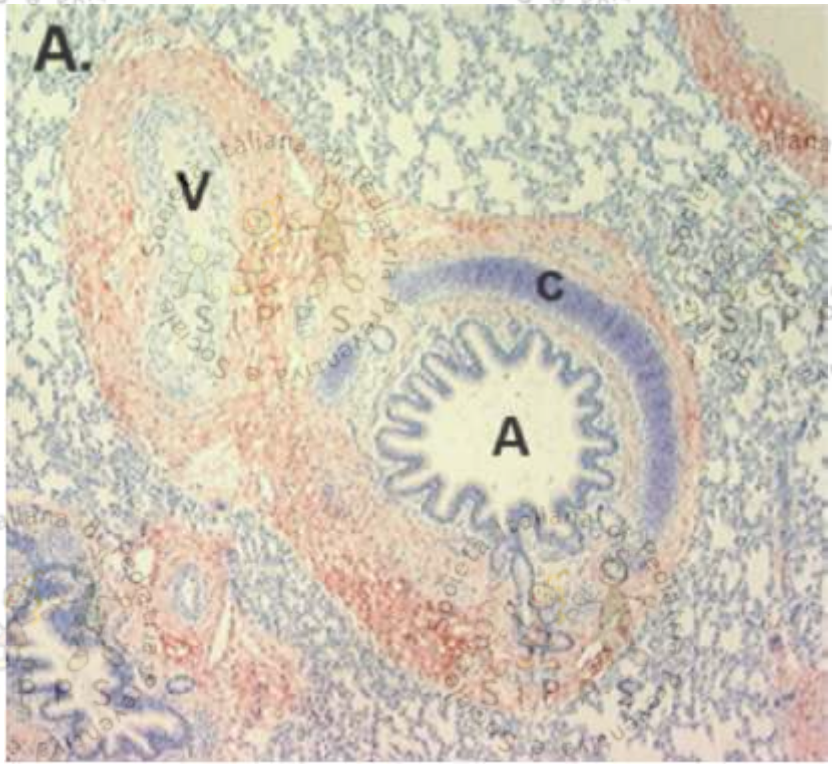
- Recent evidence strongly supports that much of the effect of smoking during pregnancy on offspring lung function is mediated by nicotine, making it highly likely that e-cigarette use during pregnancy will have the same harmful effects on offspring lung function and health as do conventional cigarettes.

The Role of Nicotine in the Effects of Maternal Smoking during pregnancy on lung development and Childhood Respiratory Disease

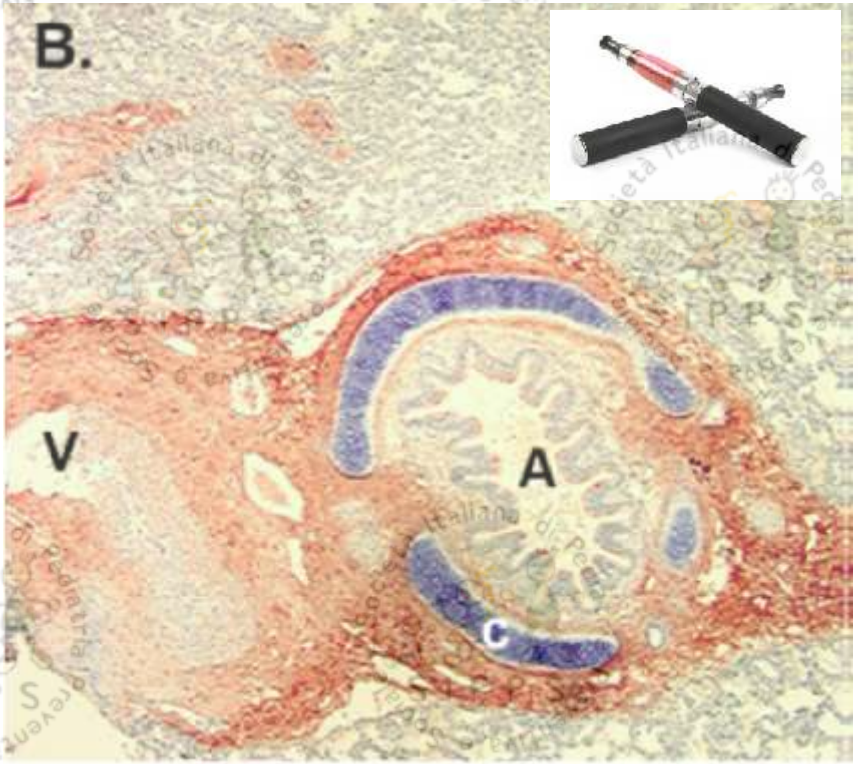
Spindel E.R. Am J Respir Crit Care Med 2016;193:5:486-494

α 7 nicotinic acetylcholine receptors (nAChRs) in lung stained in red

from control
134-day fetal monkey



from nicotine-exposed
134-day fetal monkey



A = airway; aw = airway; c = cartilage; carti = cartilage; V = vessel

The Role of Nicotine in the Effects of Maternal Smoking during pregnancy on lung development and Childhood Respiratory Disease

Spindel E.R. Am J Respir Crit Care Med 2016;193:5:486-494

α 7 nicotinic acetylcholine receptors (nAChRs) in lung stained in red

Neuronal nicotinic acetylcholine receptors comprise
a heterogeneous class of cationic channels
that is present throughout the nervous system.
These channels are involved both in physiological functions
(including cognition, reward, motor activity and analgesia) and
in pathological conditions such as Alzheimer's disease,
Parkinson's disease, some forms of epilepsy, depression,
autism and schizophrenia.
They are also the targets of tobacco-smoking effects and addiction.

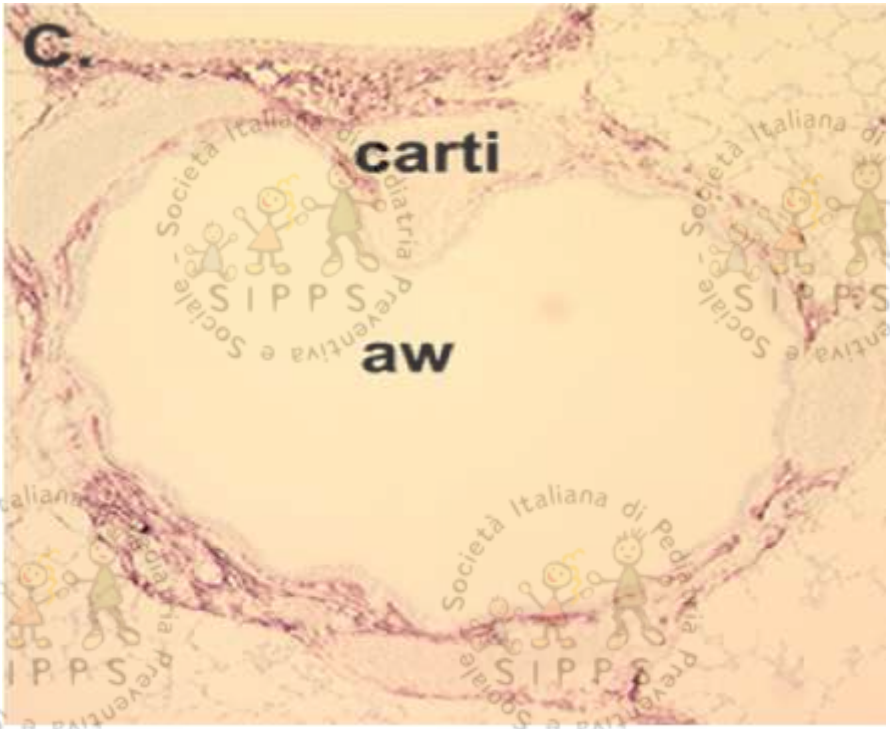
Gotti C. Trends Pharmacol Sci. 2006;27(9):482-91.

The Role of Nicotine in the Effects of Maternal Smoking during pregnancy on lung development and Childhood Respiratory Disease

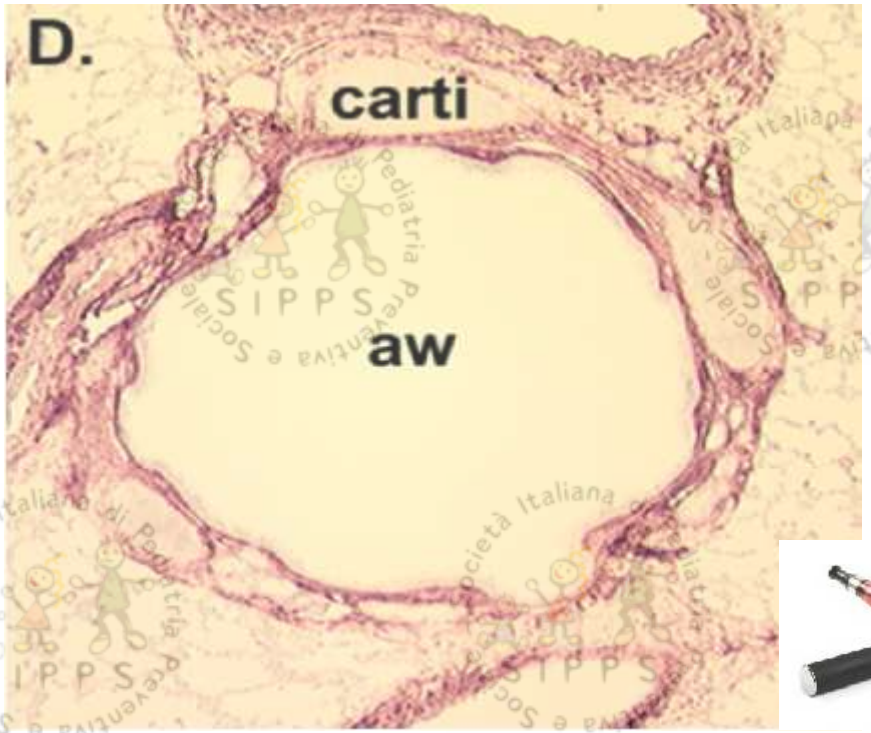
Spindel E.R. Am J Respir Crit Care Med 2016;193:5:486-494

Collagen III immunostaining of

control 134-day
fetal monkey lung



nicotine-treated
134-day fetal monkey lung



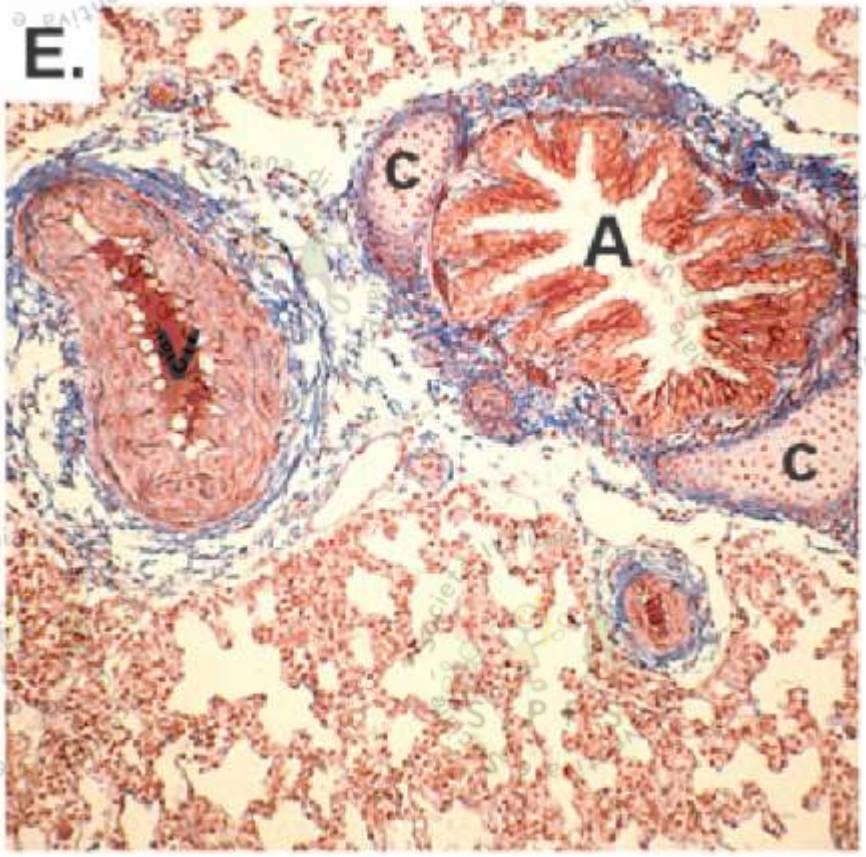
A = airway; aw = airway; c = cartilage; carti = cartilage; V = vessel

The Role of Nicotine in the Effects of Maternal Smoking during pregnancy on lung development and Childhood Respiratory Disease

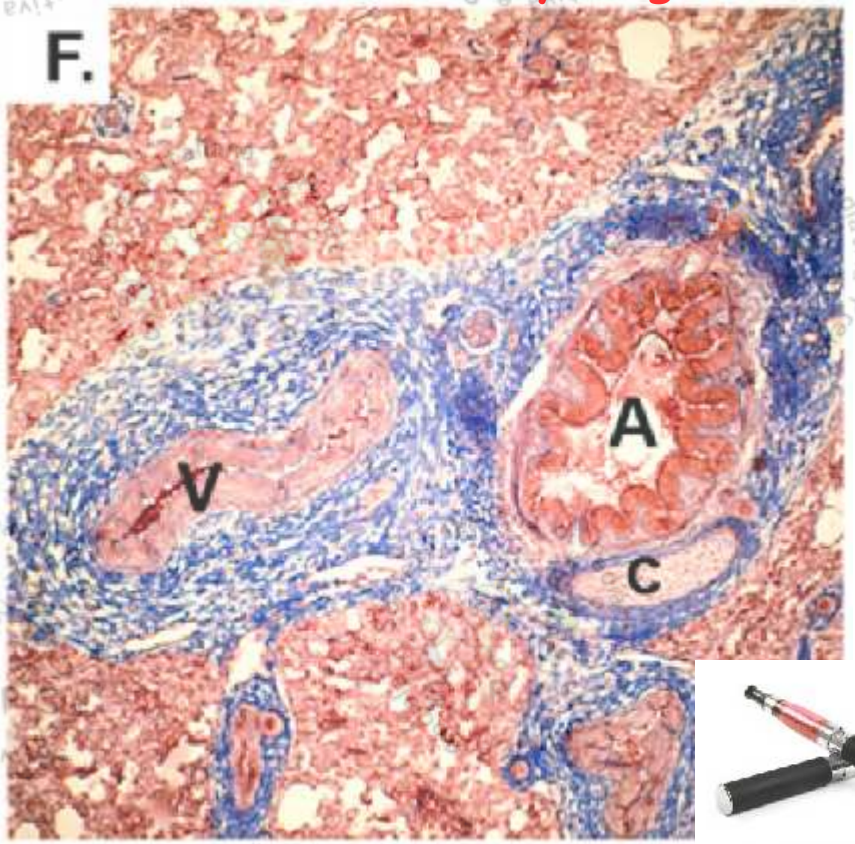
Spindel E.R. Am J Respir Crit Care Med 2016;193:5:486-494

Masson trichrome-stained: connective tissue stained in blue

control 134-day fetal monkey lung.

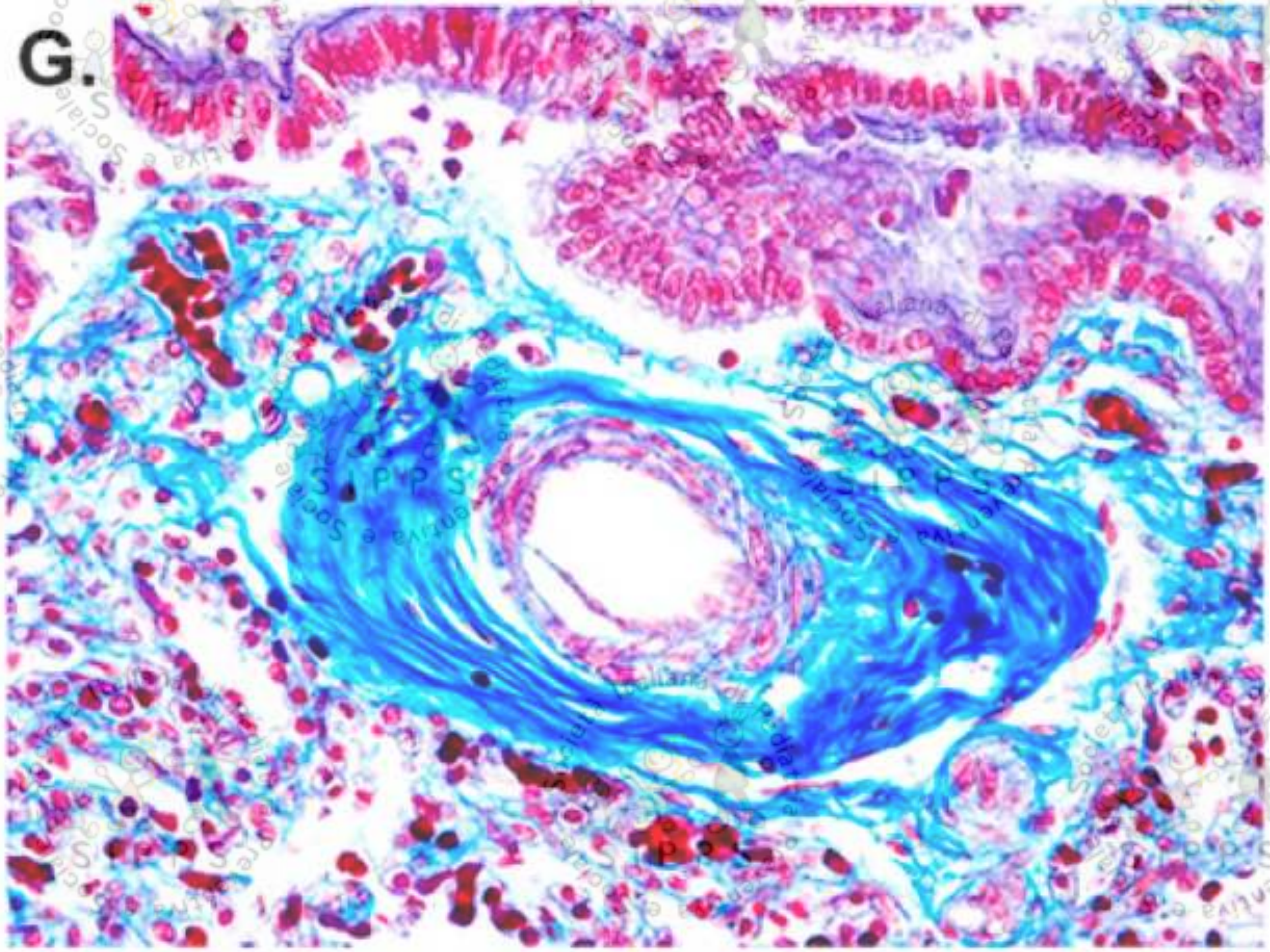


nicotine-exposed 134-day fetal monkey lung



The Role of Nicotine in the Effects of Maternal Smoking during pregnancy on lung development and Childhood Respiratory Disease

Spindel E.R. Am J Respir Crit Care Med 2016;193:5:486-494



(G) Masson-Trichrome-stained human lung from infant who had sudden infant death syndrome whose mother smoked during pregnancy. (connective tissue stained in blue)

The Role of Nicotine in the Effects of Maternal Smoking during pregnancy on lung development and Childhood Respiratory Disease

Spindel E.R. Am J Respir Crit Care Med 2016;193:5:486-494

Treatment of pregnant rhesus monkeys with low levels of nicotine designed to simulate the nicotine exposure of pregnant human smokers caused:

1) increases in collagen and connective tissue,
2) decreased elastin which may underlie the decreased respiratory compliance
3) thickening of walls surrounding airways and pulmonary vessels
4) simplification of the alveoli leading to increased alveolar volume but decreased alveolar surface area

This was also observed in newborn from smoking mothers

Cigarette smoking and Surroundings

live fit

- ✓ Introduction
- ✓ Cigarette smoking in pregnancy
- ✓ Smoking in pregnancy surroundings
- ✓ **Passive smoking**
- ✓ Passive smoking surroundings
- ✓ Active smoking
- ✓ Active smoking surroundings
- ✓ The e-cigarettes' problem
- ✓ What can we do?
- ✓ Conclusions

Attilio Boner
University of Verona, Italy
attilio.boner@univr.it

Protecting children from second-hand smoke

Kuehni CE, Eur Respir J 2015;46:601-603

- Since the 1970s, we have known that second-hand smoke (SHS) makes children sick.

- In 1974, 2 *Lancet* papers found that infants with smoking parents had higher hospital admission rates and higher risks of pneumonia and bronchitis.

Colley JR, Lancet 1974; 2: 1031-1034. *Harlap S, Lancet 1974; 1: 529-532.*

- Since then, an accumulating body of evidence has confirmed a higher incidence of cough, wheeze, asthma, upper and lower respiratory tract infections (RTIs), preterm birth, and sudden infant death.

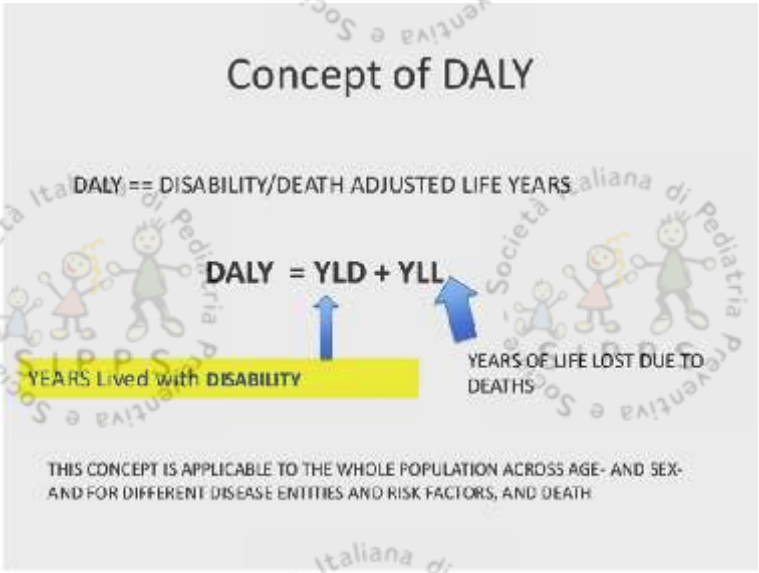
Protecting children from second-hand smoke

Kuehni CE, Eur Respir J 2015;46:601-603

- Globally, ~40% of children are exposed to **SHS**.

- *Oberg et al.* conservatively attributed 603.000 deaths **(1% of all deaths)** and 10.9 million disability-adjusted life years (DALYs) (0.7% of all DALYs) to SHS.

Oberg M, et al. Worldwide burden of disease from exposure to second-hand smoke: a retrospective analysis of data from 192 countries. *Lancet 2011; 377: 139-146.*



- Children accounted for 166.000 (28%) deaths and for 6.6 million (40%) DALYs caused by SHS.

The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General.

Washington, DC: US Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2006

USA population in 2006 126/298.4 millions

- THE 2006 SURGEON General's report on involuntary smoking concluded that more than 126 million people are exposed to secondhand smoke (SHS), 50 000 deaths per year in USA are caused by SHS, and there is no "safe" level of exposure.

- An increasing number of states have created laws on smoking to protect employees in restaurants, bars, and workplaces, but the home remains a place of intense and consistent exposure for nonsmoking children and adults.

- The home is the predominant location for exposure of children and adults to tobacco smoke.

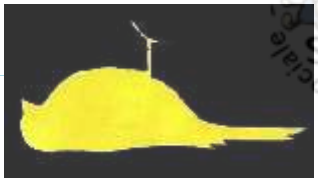
Parental smoking and development of allergic sensitization from birth to adolescence

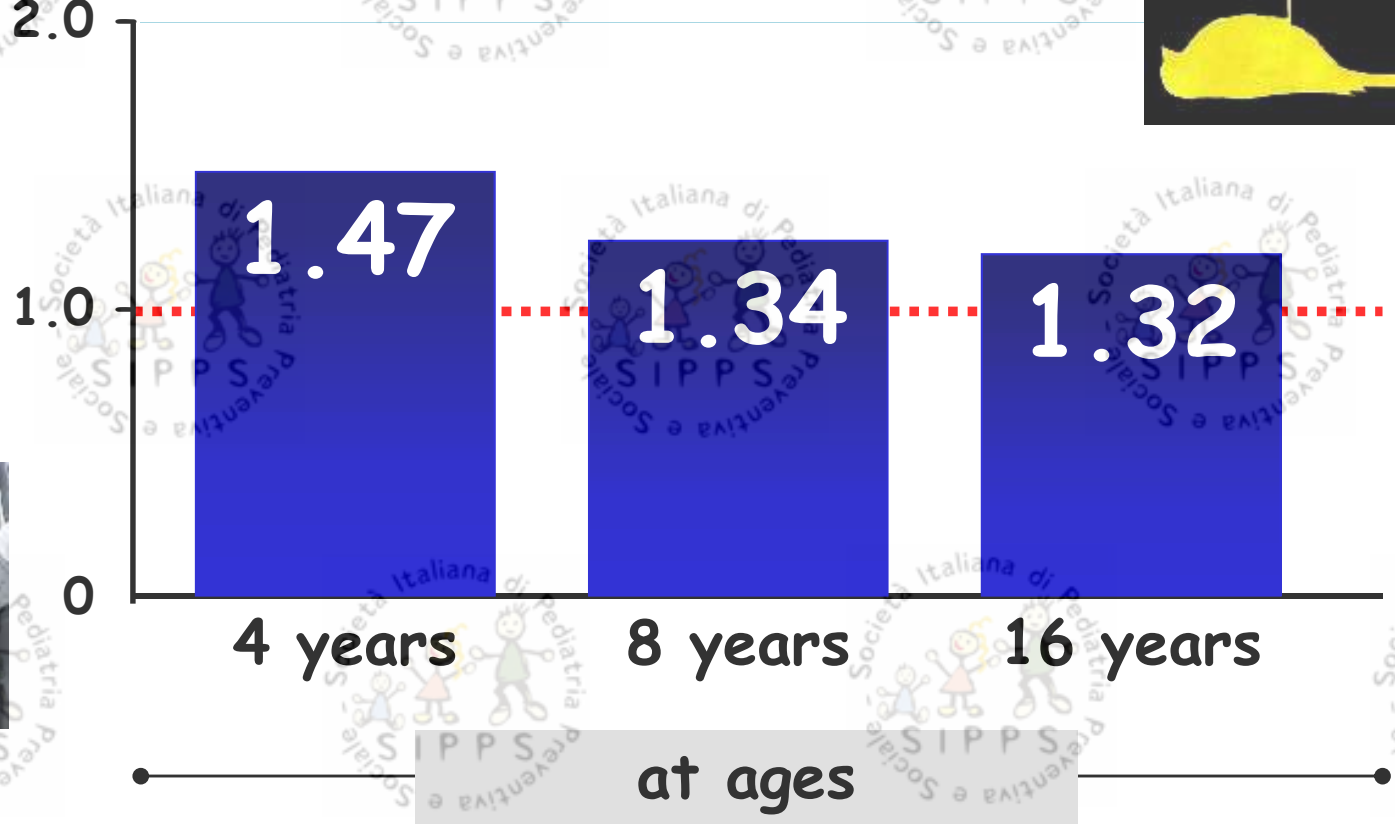
Thacher J D, Allergy 2016;71:239–248

- ✓ 3316 children from a birth cohort.
- ✓ Followed up for 16 years.
- ✓ sIgE against 8 common inhalant and 6 food allergens assessed at ages 4, 8, and 16 years.

In children exposed to secondhand tobacco smoke without prior exposure in utero

***OR for* food sensitization**

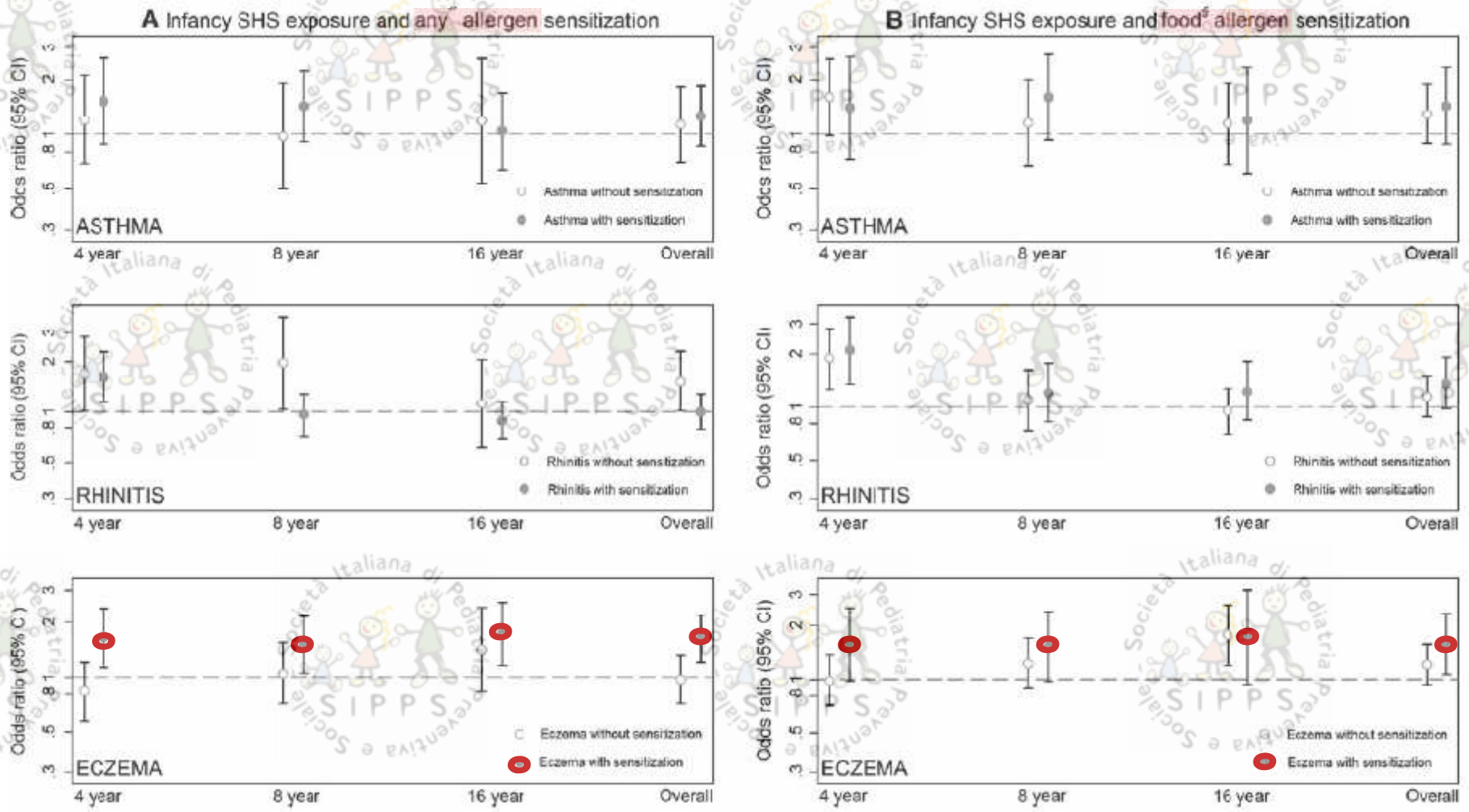




Parental smoking and development of allergic sensitization from birth to adolescence

Thacher J D, Allergy 2016;71:239–248

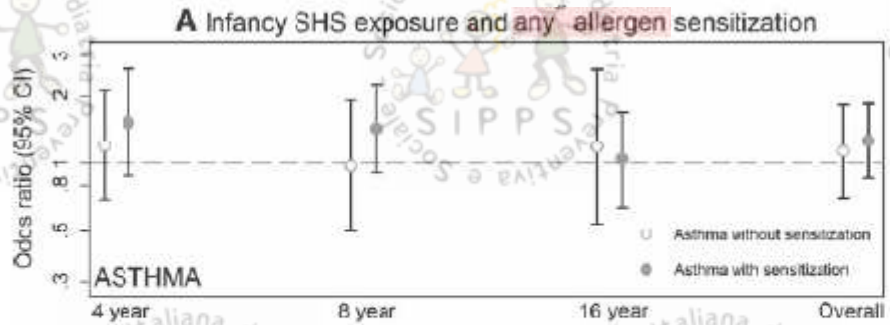
Association between parental smoking during infancy and the risk of any or food sensitization and allergic disease among children in the BAMSE birth cohort

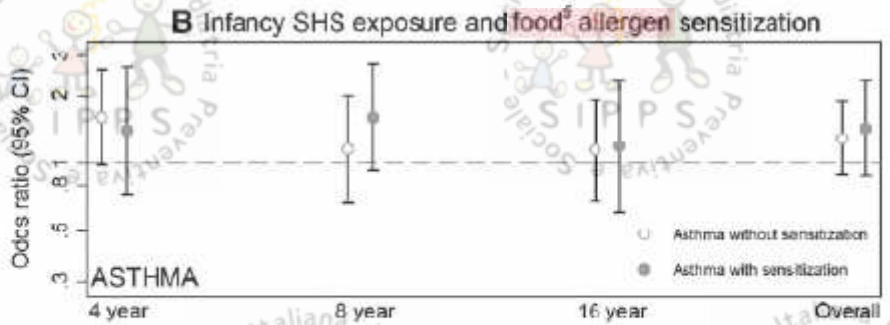


Parental smoking and development of allergic sensitization from birth to adolescence

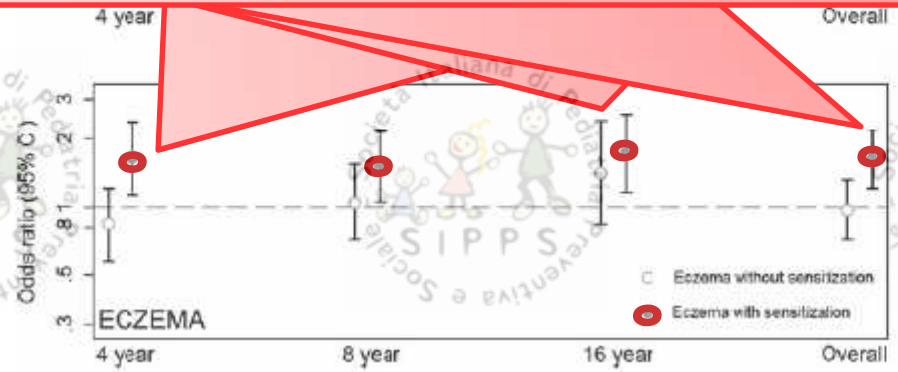
Thacher J D, Allergy 2016;71:239–248

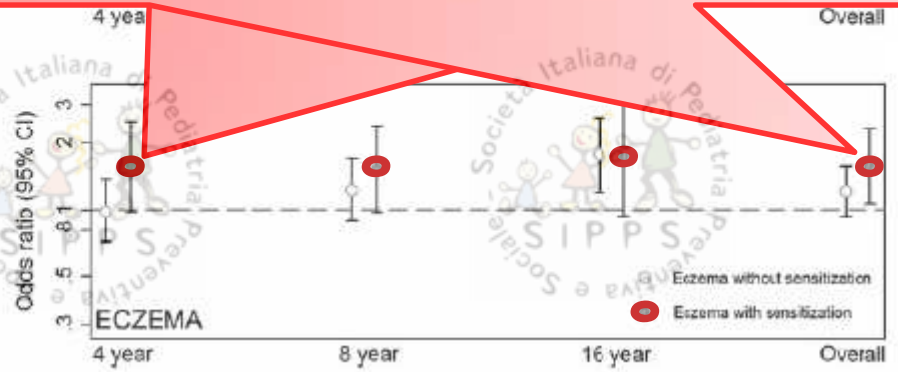
Association between parental smoking during infancy and the risk of any or food sensitization and allergic disease among children in the BAMSE birth cohort





SHS in infancy was associated with an overall elevated risk of eczema with sensitization (OR 1.62, 95% CI 1.20–2.18).





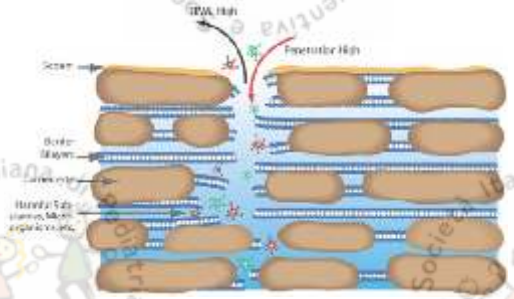
Parental smoking and development of allergic sensitization from birth to adolescence

Thacher J D, Allergy 2016;71:239–248

- Although it may seem puzzling that SHS should increase the risk of sensitization to food allergens, food allergens are frequently found in dust and are likely to be inhaled by infants. Infants often inhale or aspirate while eating and expose both the pharynx and pharyngeal lymphoid tissues to food allergens (as well as to tobacco smoke).

- Alternatively, the dual-allergen-exposure hypothesis suggests that exposure through the skin leads to sensitization, whereas consumption of allergens leads to oral tolerance.

- As tobacco smoke has been shown to negatively affect skin barrier function and the ingress of allergens, food allergen sensitization is possibly influenced by the effect of SHS exposure on the skin.



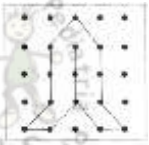
Secondhand Tobacco Smoke Exposure and Neuromotor Function in Rural Children

Yeramaneni S, J Pediatr 2015;167:253-9

✓ 404 children aged 7-9 years exposed to secondhand tobacco smoke (SHS) and other environmental neurotoxicants

Exposure to SHS was significantly associated with motor impairment in children, including:

1. diminished visuomotor coordination (*p=0.01*)



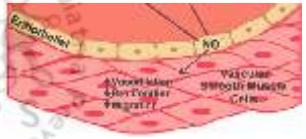
2. fine motor integration (*p=0.01*)

3. balance (*p=0.02*)

4. strength (*p=0.04*)

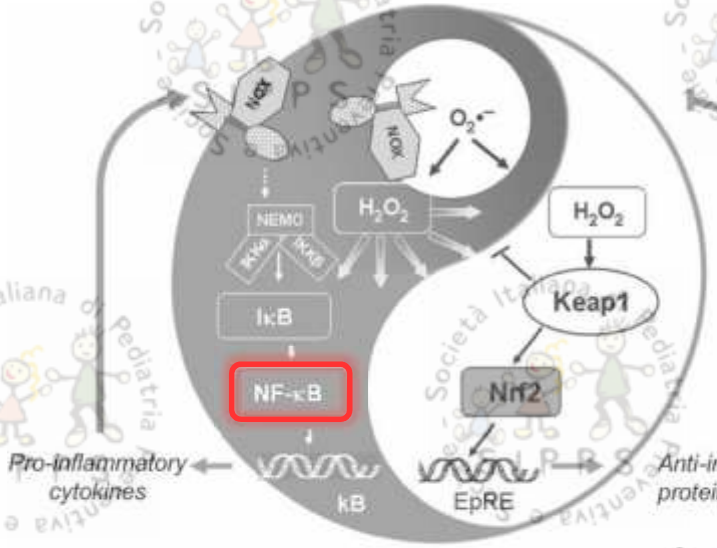
Secondhand Smoking Is Associated with Vascular Inflammation. *Adams T, Chest 2015;148:112*

- ✓ Minimally invasive method of endothelial biopsy.



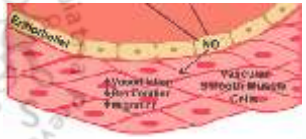
- ✓ Vascular endothelium in:
  - 23 healthy passive smokers;
  - 25 healthy active smokers;
  - 23 healthy control subjects.
- ✓ Endothelial nitric oxide synthase (eNOS) function [basal eNOS & activated eNOS (P-eNOS)];
- ✓ Markers of inflammation (NF-kB) & oxidative stress (nitrotyrosine).

Expression of **NF-kB was similarly increased in passive and active smokers** compared with control subjects.



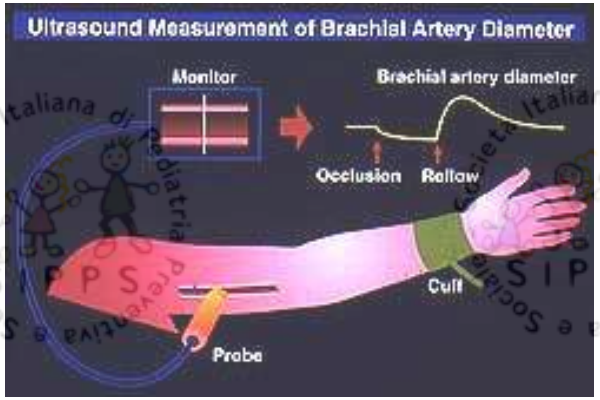
Secondhand Smoking Is Associated with Vascular Inflammation. *Adams T, Chest 2015;148:112*

- ✓ Minimally invasive method of endothelial biopsy.



- ✓ Vascular endothelium in:
  - 23 healthy passive smokers;
  - 25 healthy active smokers;
  - 23 healthy control subjects.
- ✓ Endothelial nitric oxide synthase (eNOS) function [basal eNOS & activated eNOS (P-eNOS)];
- ✓ Markers of inflammation (NF-kB) & oxidative stress (nitrotyrosine).

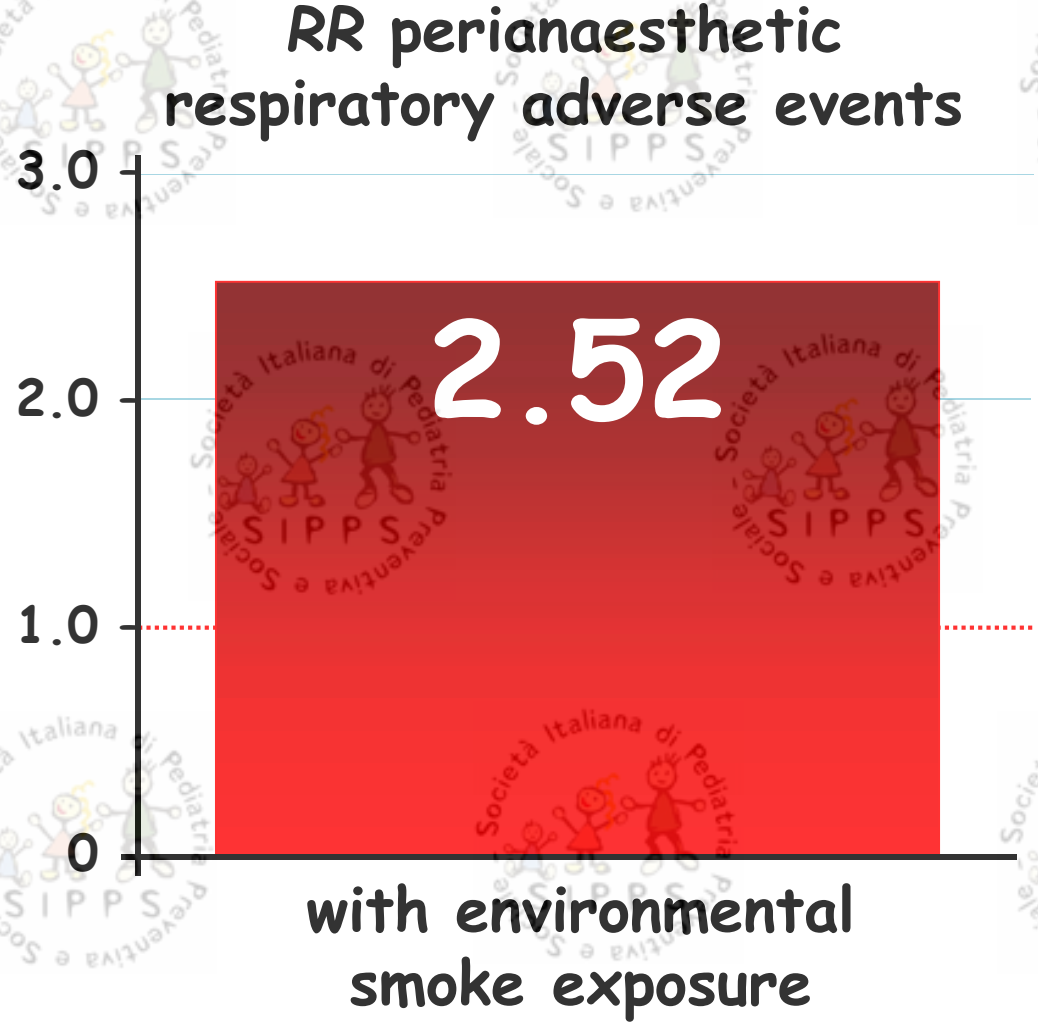
Brachial artery flow-mediated dilation was similarly reduced in passive and active smokers compared with control subjects, consistent with reduced endothelial NO bioavailability.



Impact of environmental tobacco smoke exposure on anaesthetic and surgical outcomes in children: a systematic review and meta-analysis

Chiswell C, Arch Dis Child 2017;102:123-130.

- ✓ Children aged 0–18 years undergoing anaesthetic or surgical procedures
- ✓ 28 relevant studies



Cigarette smoking and Surroundings

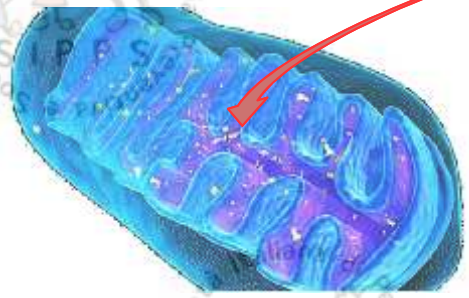
live fit

- ✓ Introduction
- ✓ Cigarette smoking in pregnancy
- ✓ Smoking in pregnancy surroundings
- ✓ Passive smoking
- ✓ **Passive smoking surroundings**
- ✓ Active smoking
- ✓ Active smoking surroundings
- ✓ The e-cigarettes' problem
- ✓ What can we do?
- ✓ Conclusions

Attilio Boner
University of Verona, Italy
attilio.boner@univr.it

Thirdhand Cigarette Smoke Causes Stress-Induced Mitochondrial Hyperfusion and Alters the Transcriptional Profile of Stem Cells.

Bahl V, Toxicol Sci. 2016;153(1):55-69.

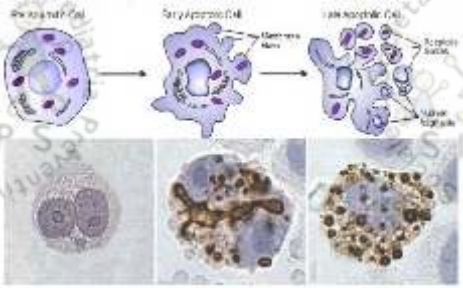


mitochondrial morphology and function in stem cells

Low levels of Third hand cigarette smoke (THS) extracted from terry cloth

- Mitochondrial fusion

- Increased superoxide production,
- Increased oxidation of mitochondrial proteins
- Decreased cell proliferation, which likely leads to apoptosis.

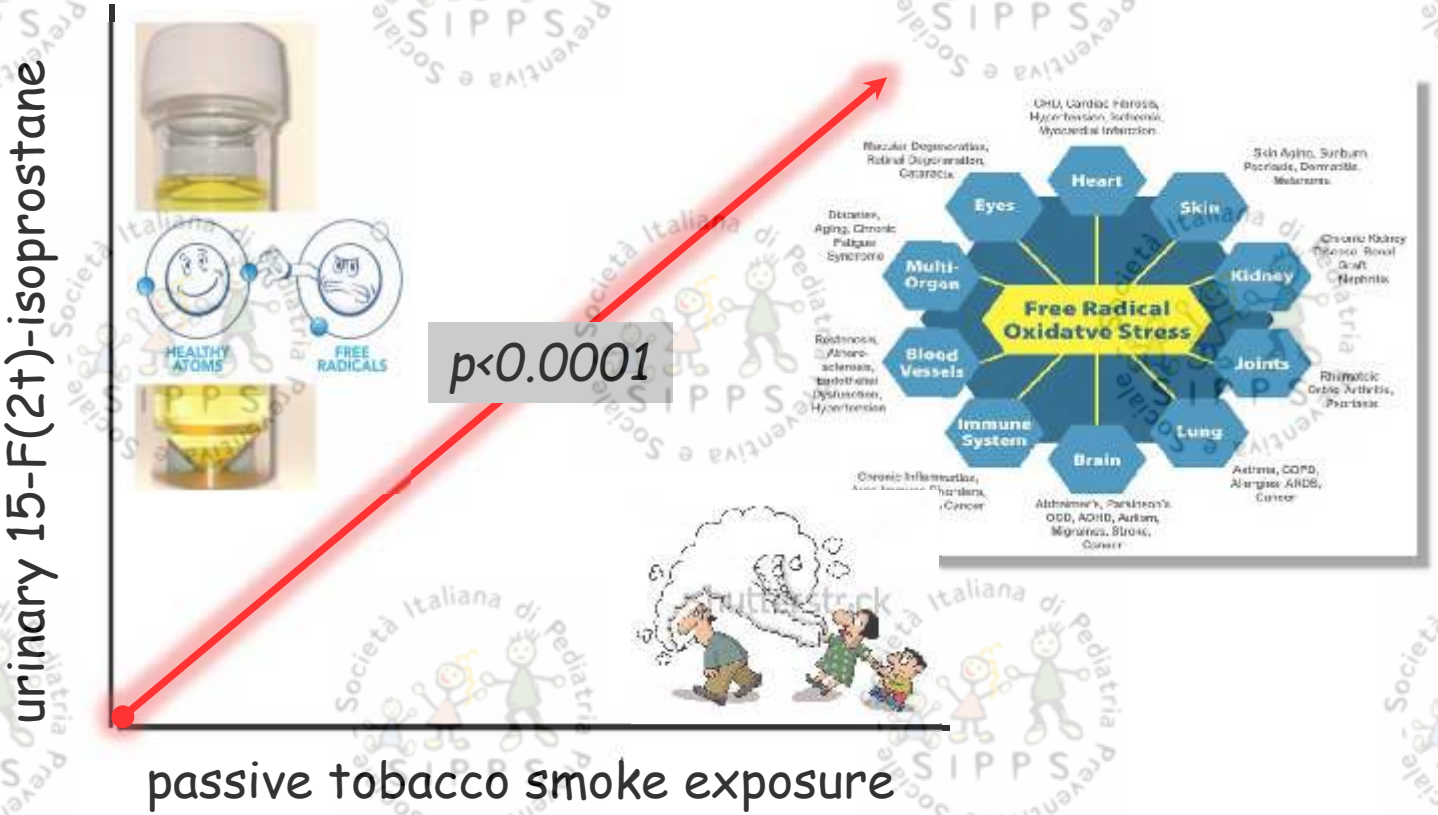


Oxidative stress in adolescent passive smokers living in urban and rural environments.

Bono R. Int J Hyg Environ Health. 2014;217(2-3):287-93

- ✓168 adolescents, differently exposed to passive tobacco smoke.
- ✓urinary 15-F(2t)-isoprostane

passive tobacco smoke exposure proved to play another important direct role in the distribution of 15-F(2t)-isoP levels

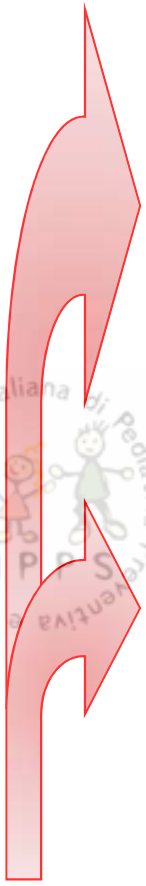


Serum oxidative stress parameters and paraoxonase-1 in children and adolescents exposed to passive smoking.

Kahraman FU. Pediatr Int. 2017;59(1):68-73.

✓40 children and adolescents passively exposed to cigarette smoke (as verified on urine cotinines) and 40 age- and gender-matched healthy controls not regularly exposed to cigarette smoke.

✓total antioxidant status (TAS), total oxidant status (TOS), and paraoxonase-1*

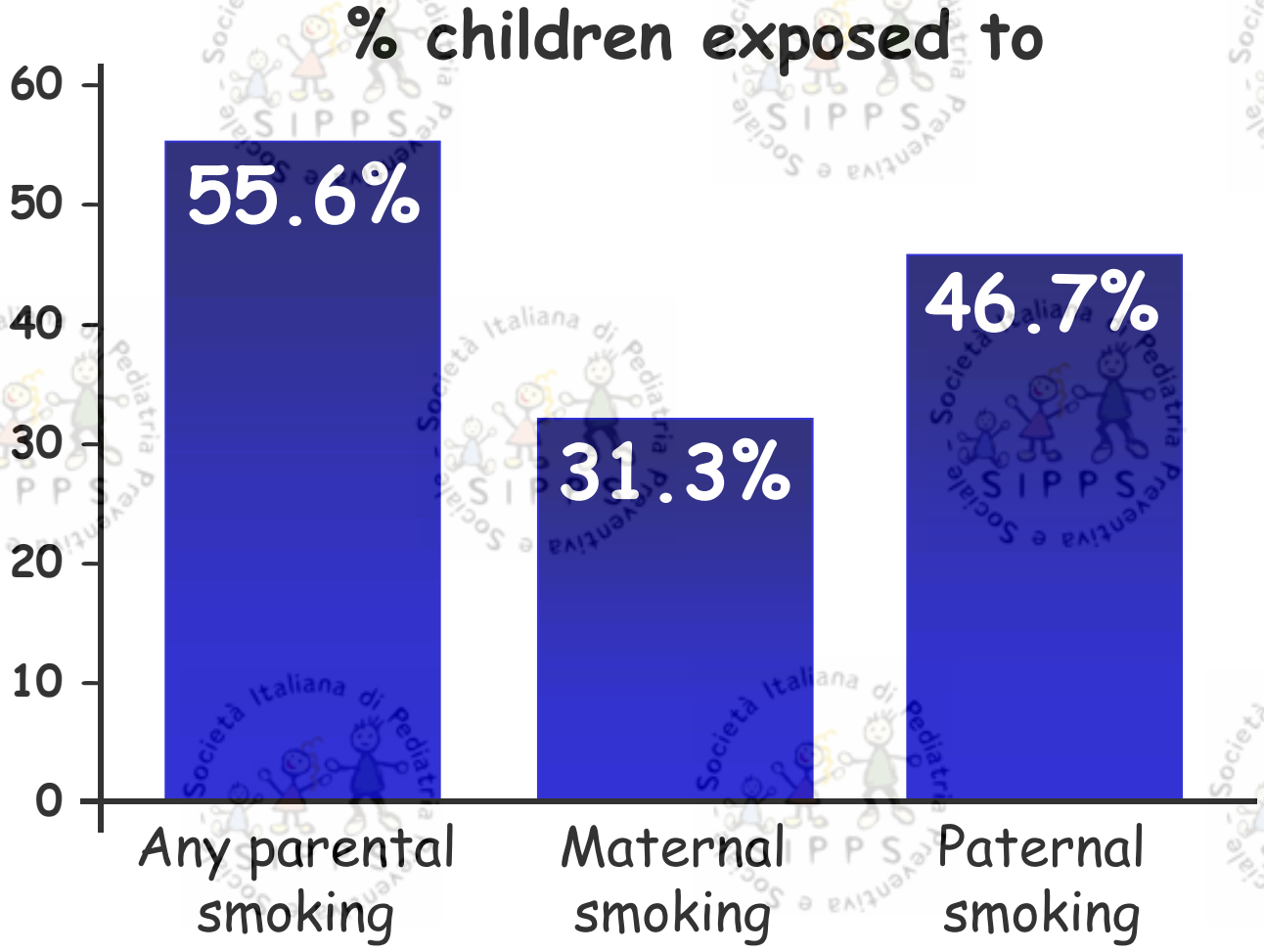


- total oxidant status (TOS) and oxidative stress index OSI were significantly higher for the passive smoke-exposed children *(P < 0.001)*, and
- serum paraoxonase-1 was significantly lower than in the controls *(P = 0.047)*.

*Paraoxonases biological functions: anti-inflammatory, anti-oxidative, anti-atherogenic, anti-diabetic, anti-microbial and organophosphate-hydrolyzing properties.

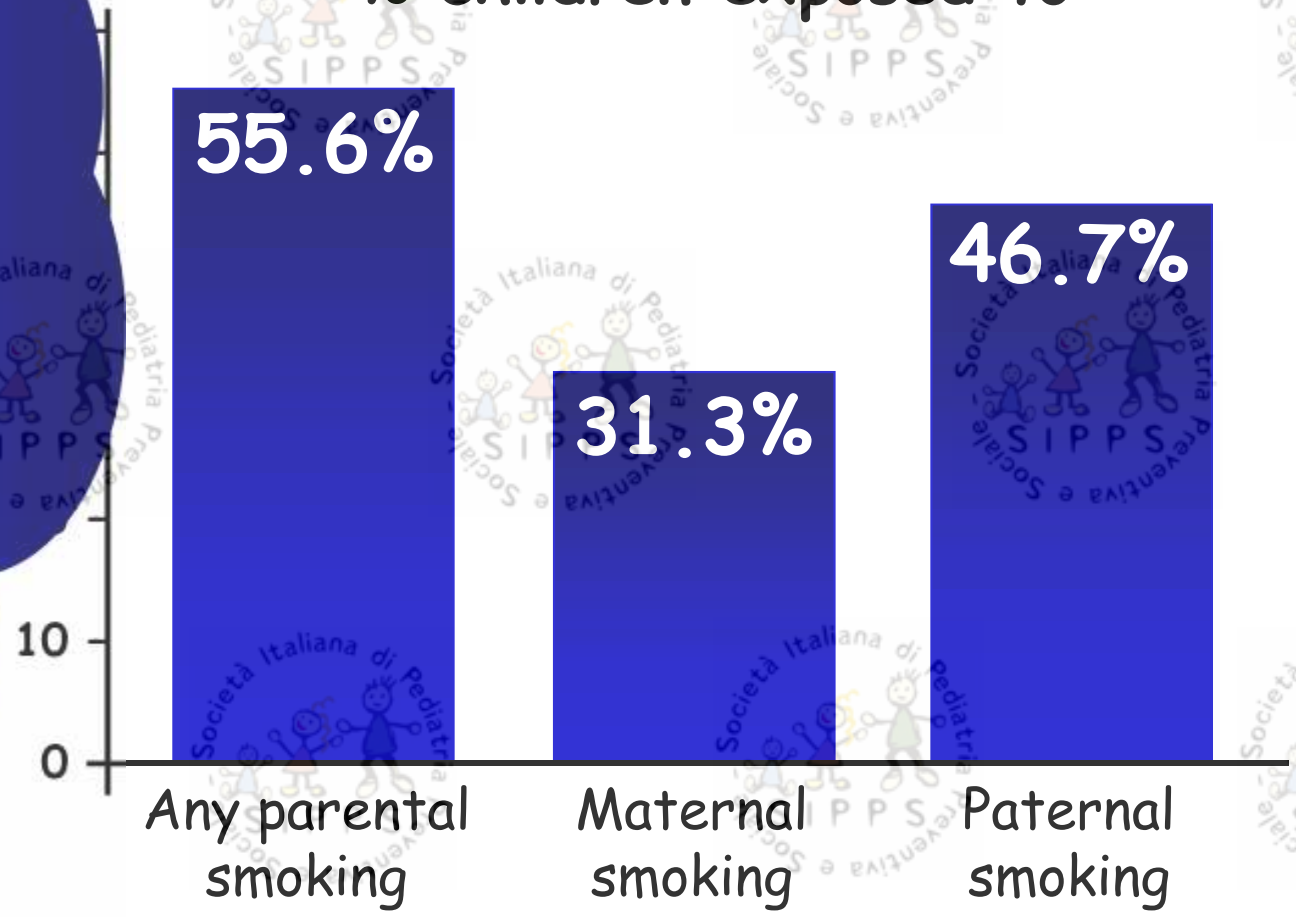
Exposure to parental smoking in childhood is associated with persistence of respiratory symptoms into young adult life. *Pugmire J, J Allergy Clin Immunol 2014;134:962*

- ✓ 412 Anglo-white households enrolled in 1972-1973.
- ✓ Clinic visits and questionnaires at baseline on enrollment and in up to 12 follow-up surveys taken approximately every 2 years subsequently.

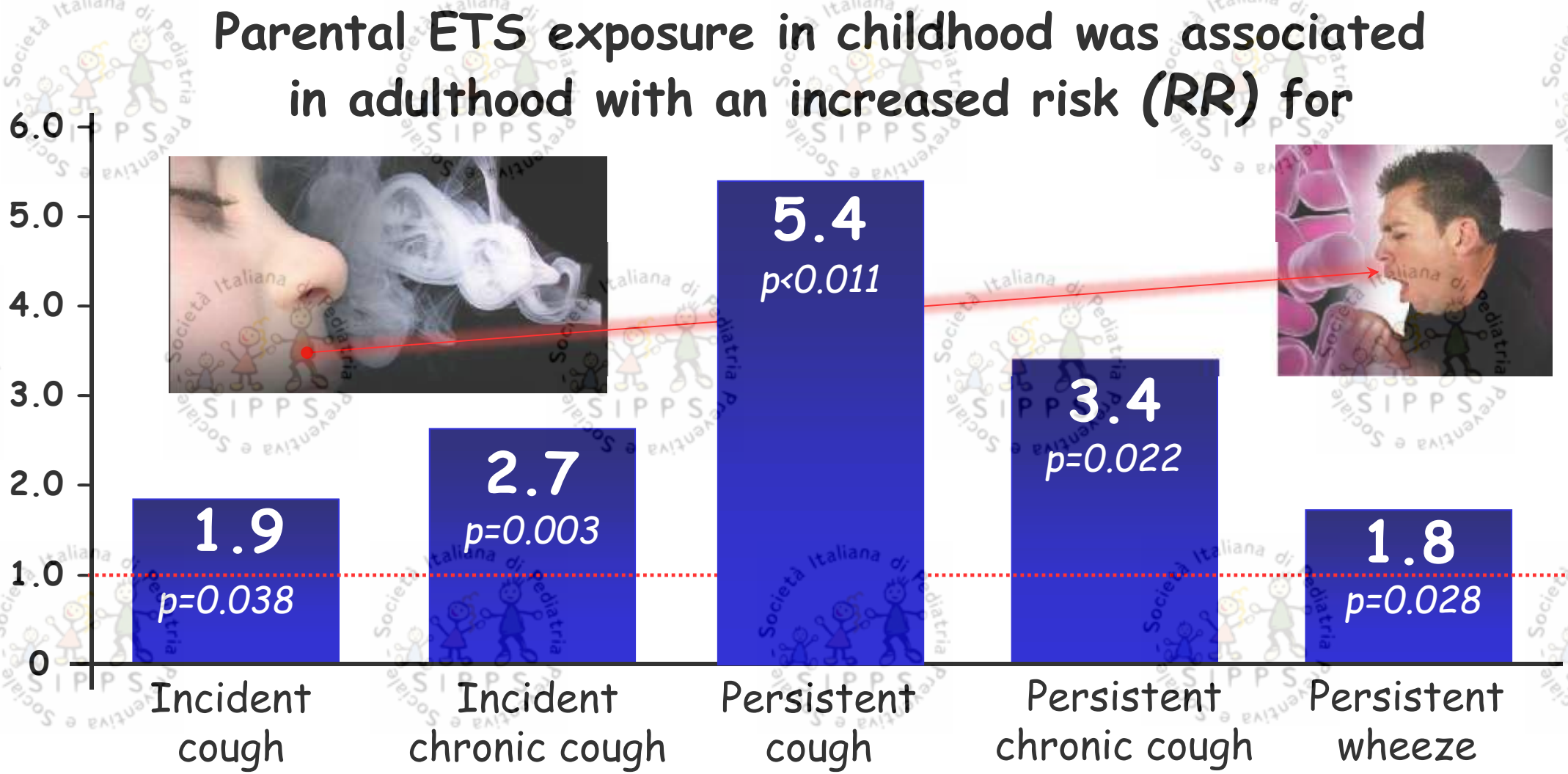


Exposure to parental smoking in childhood is associated with persistence of respiratory symptoms into young adult life. *Pugmire J, J Allergy Clin Immunol 2014;134:962*

Subjects exposed to parental ETS in childhood were more likely to have mothers and fathers with less years of formal education than were subjects with no ETS exposure.



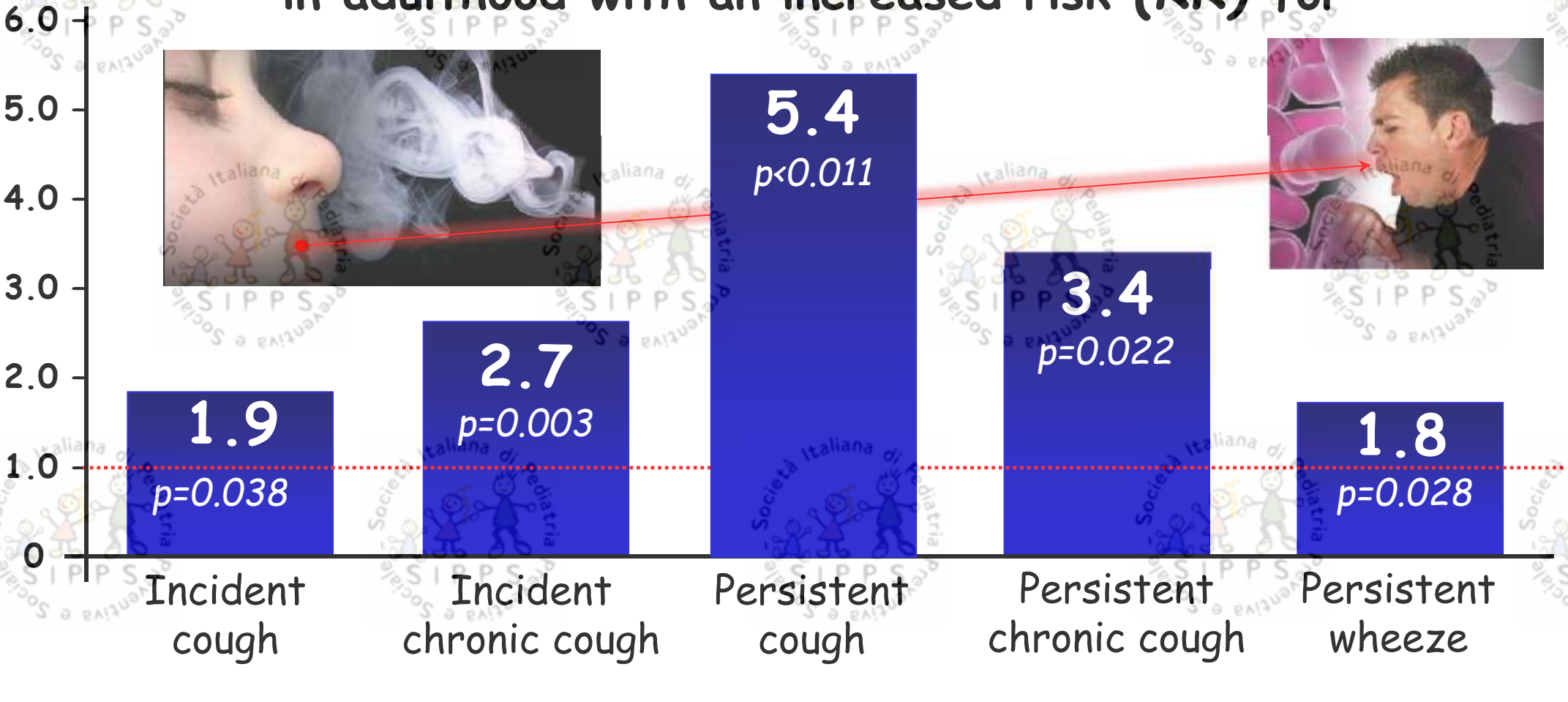
Exposure to parental smoking in childhood is associated with persistence of respiratory symptoms into young adult life. *Pugmire J, J Allergy Clin Immunol 2014;134:962*



Exposure to parental smoking in childhood is associated with persistence of [illegible] into young adult [illegible] 4:962

Comparable effects of paternal and maternal smoking were found

[illegible] associated in adulthood with an increased risk (RR) for

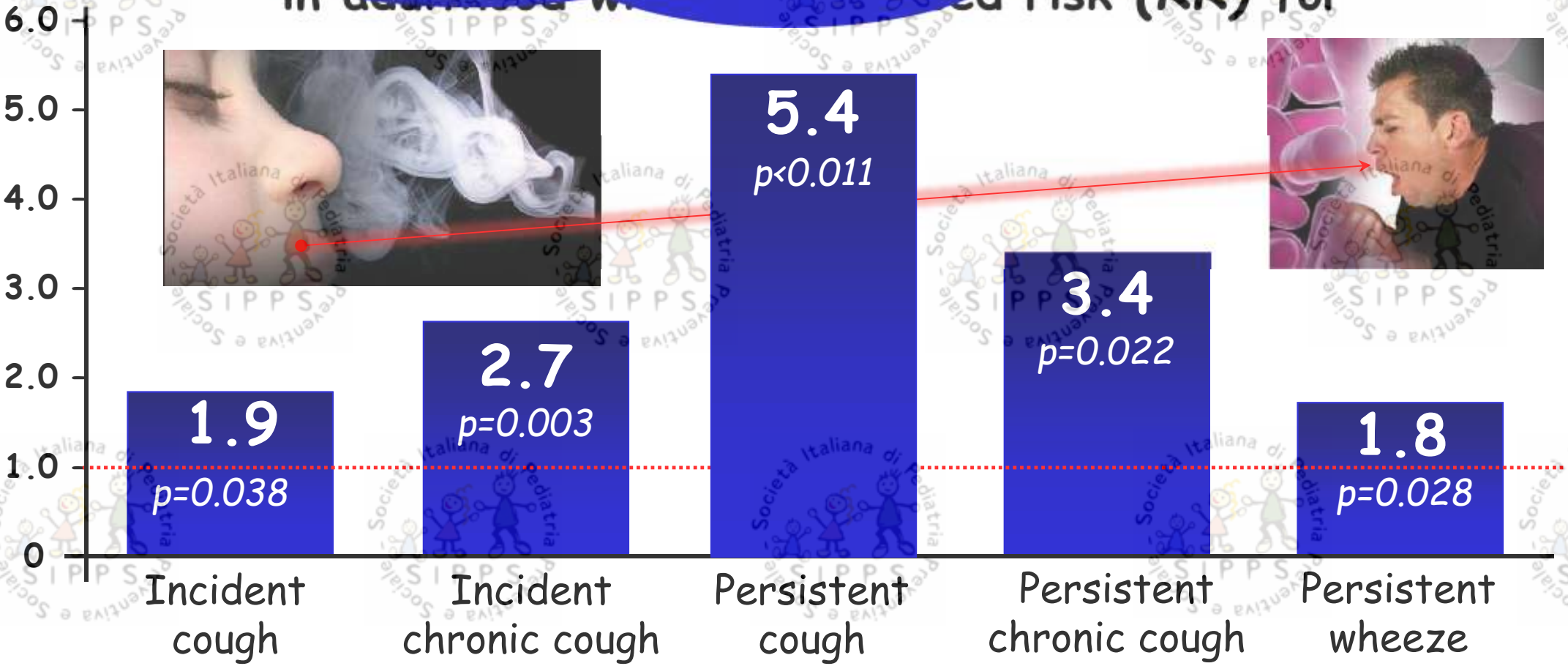


Exposure to parental smoking in childhood is associated with persistence of [illegible] into young adult[illegible]2

Consistent with previous studies, we found **parental smoking** to increase the likelihood of **engaging in active smoking as an adult.**

(7X)

[illegible]ciated [illegible] risk (RR) for



Cigarette smoking and Surroundings

live fit

- ✓ Introduction
- ✓ Cigarette smoking in pregnancy
- ✓ Smoking in pregnancy surroundings
- ✓ Passive smoking
- ✓ Passive smoking surroundings
- ✓ **Active smoking**
- ✓ Active smoking surroundings
- ✓ The e-cigarettes' problem
- ✓ What can we do?
- ✓ Conclusions

Attilio Boner
University of Verona, Italy
attilio.boner@univr.it

Predictors of the transition from experimental to daily smoking among adolescents in the United States.

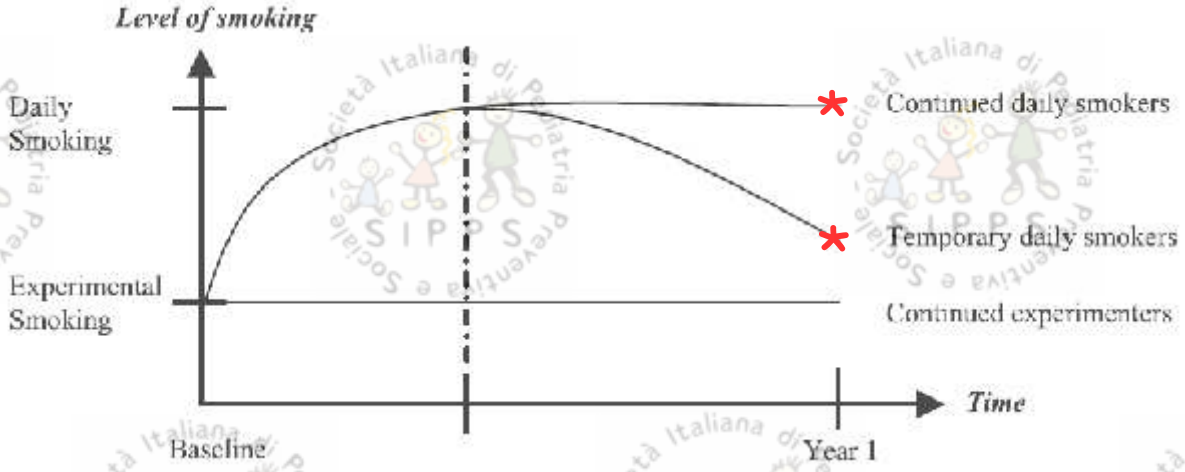
Park S, J Spec Pediatr Nurs. 2009;14(2):102-11

✓National Longitudinal Study of Adolescent Health (n = 4,903 U.S. adolescents).

✓Baseline predictors selected based on Problem Behavior Theory.

✓Factors affecting the transition from experimental smoking at baseline to two types of daily smoking:
-temporary daily smoking, and
-continued daily smoking,
at 1-year follow-up.

Change in Smoking Behavior Over Time



Predictors of the transition from experimental to daily smoking among adolescents in the United States.

Park S, J Spec Pediatr Nurs. 2009;14(2):102-11

✓National Longitudinal Study of Adolescent Health (n = 4,903 U.S. adolescents).

✓Baseline predictors selected based on Problem Behavior Theory.

✓Factors affecting the transition from experimental smoking at baseline to two types of daily smoking:
-temporary daily smoking, and
-continued daily smoking,
at 1-year follow-up.

Four Problem Behavior Theory-related factors significantly increased the risk for the progression to both temporary daily smoking and continued daily smoking:

1) greater number of friends who smoke (OR = 1.34),
2) use of marijuana (OR = 1.54),
3) use of alcohol (OR = 1.22),
4) worse academic performance (OR=1.21).

Predictors of the transition from experimental to daily smoking among adolescents in the United States.

Park S, J Spec Pediatr Nurs. 2009;14(2):102-11

✓Nati
of A
(n =

✓

f
l
s
-1
-cont
at 1-ye

Other significant predictors were:

- **depression (OR=1.46),**
- **perceived general good health (OR=0.79), and**
- **cigarette availability at home (OR=1.43).**

Four Problem Behavior Theory-related factors significantly increased the risk for the progression to both temporary daily smoking and continued daily smoking:

1) greater number of friends who smoke (OR = 1.34),
2) use of marijuana (OR = 1.54),
3) use of alcohol (OR = 1.22),
4) worse academic performance (OR=1.21).

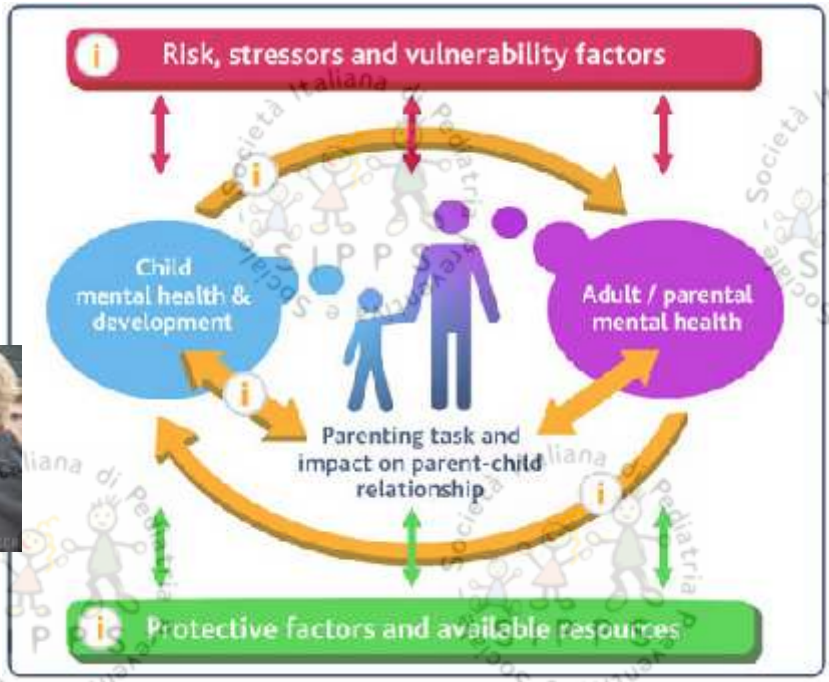
The dynamic role of parental influences in preventing adolescent smoking initiation.

Mahabee-Gittens EM, Addict Behav. 2013;38(4):1905-11.

BACKGROUND:

As adolescents grow, protective parental influences become less important and peer influences take precedence in adolescent's initiation of smoking.

It is unknown how and when this occurs.



We sought to: prospectively estimate incidence rates of smoking initiation from late childhood through mid-adolescence, identify important risk and protective parental influences on smoking initiation, and examine their dynamic nature in order to identify key ages.

The dynamic role of parental influences in preventing adolescent smoking initiation.

Mahabee-Gittens EM, Addict Behav. 2013;38(4):1905-11.

✓Longitudinal data from the National Survey of Parents and Youth of 8 nationally representative age cohorts (9-16 years) of never smokers in the U.S. were used (N=5705 dyads at baseline).

- The mean sample cumulative incidence rates of tobacco use increased from 1.8% to 22.5% between the 9 and 16 years old age.

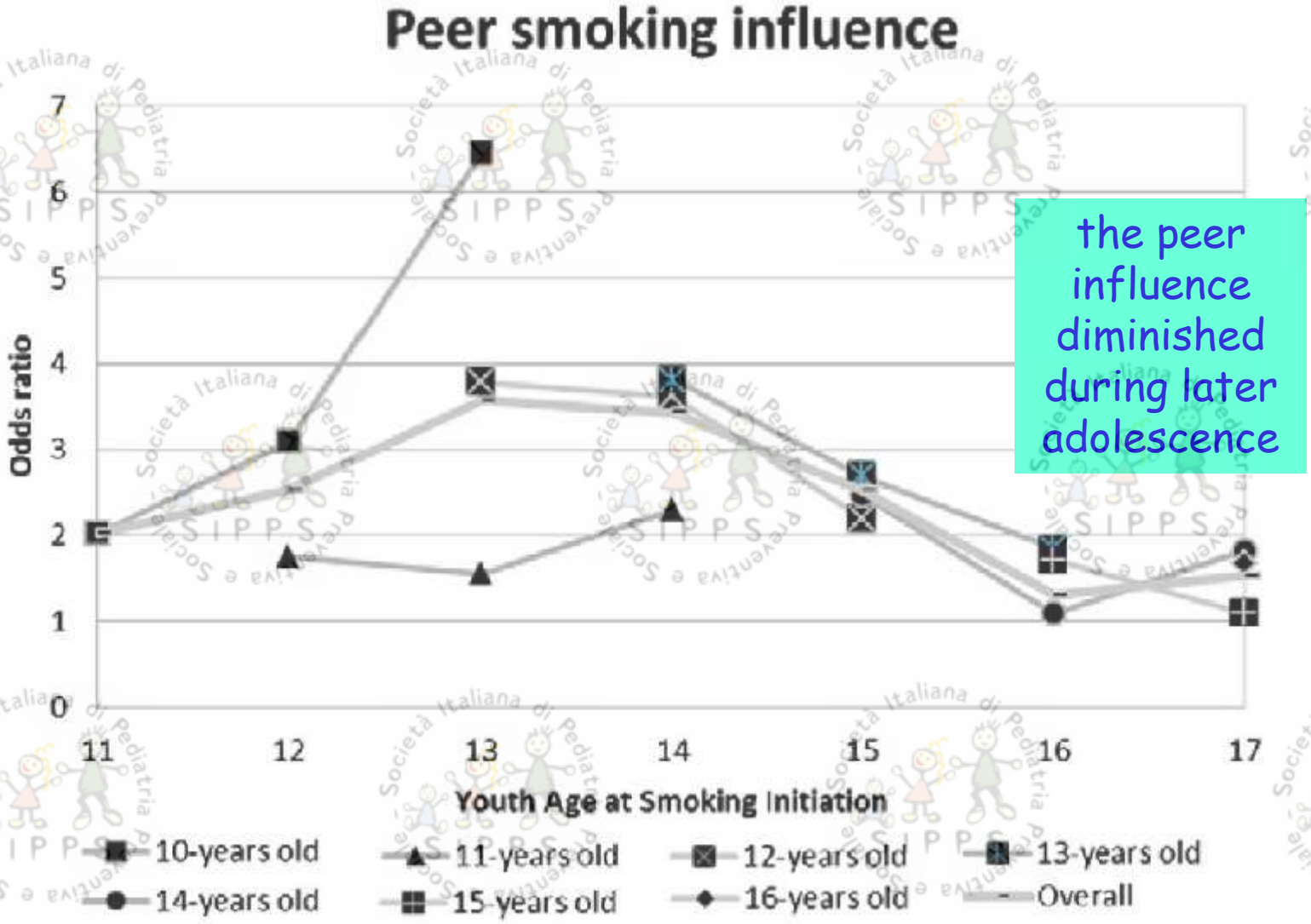
- Among risk factors, peer smoking was the most important across all ages;

- 11-15 year-olds who spent time with peers who smoked had 2 to 6.5 times higher odds of initiating smoking

The dynamic role of parental influences in preventing adolescent smoking initiation.

Mahabee-Gittens EM, Addict Behav. 2013;38(4):1905-11.

Population trajectories of smoking initiation and the risk factor of peer smoking.



The dynamic role of parental influences in preventing adolescent smoking initiation.

Mahabee-Gittens EM, Addict Behav. 2013;38(4):1905-11.

✓Longitudinal data from the National Survey of Parents and Youth of 8 nationally representative age cohorts (9-16 years) of never smokers in the U.S. were used (N=5705 dyads at baseline).

- Parent-youth connectedness significantly decreased the odds of smoking initiation by 14-37% in 11-14 year-olds;

- parental monitoring and punishment for smoking decreased the odds of smoking initiation risk by 36-59% in 10-15 year-olds, and by 15-28% in 12-14 year-olds, respectively.

The dynamic role of parental influences in preventing adolescent smoking initiation.

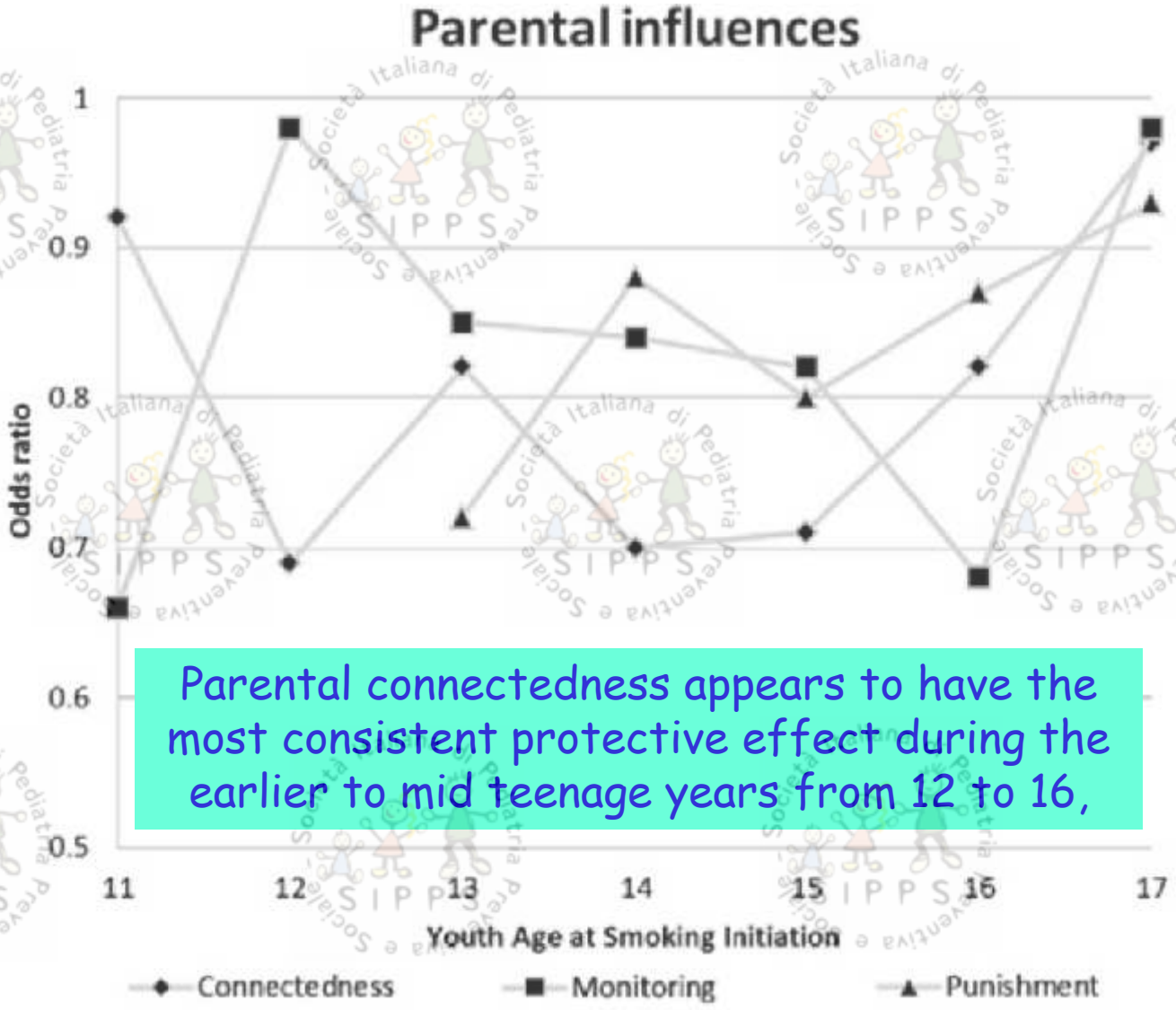
Mahabee-Gittens EM, Addict Behav. 2013;38(4):1905-11.

- Parent-adolescent connectedness
  - In the last 30 days, I really enjoyed being with my parents/caregivers
- Parental monitoring
  - How often does at least one of your parents know what you are doing when you are away from home?
- Perceived parental punishment
  - If one of your parents knew that you used tobacco or alcohol, how likely is it that he or she would punish you in some way?

The dynamic role of parental influences in preventing adolescent smoking initiation.

Mahabee-Gittens EM, Addict Behav. 2013;38(4):1905-11.

Population trajectories of smoking initiation and the protective parental influences of connectedness, monitoring, and punishment.



Parental connectedness appears to have the most consistent protective effect during the earlier to mid teenage years from 12 to 16,

The dynamic role of parental influences in preventing adolescent smoking initiation.

Mahabee-Gittens EM, Addict Behav. 2013;38(4):1905-11.

Parental influences are important in protecting against smoking initiation across adolescence.
At the same time, association with peers who smoke is a very strong risk factor.
Our findings provide empirical evidence to suggest that in order to prevent youth from initiating smoking, parents should be actively involved in their adolescents' lives and guard them against association with peers who smoke



- Parent-youth connectedness significantly decreased the odds of smoking initiation by 14-37% in 11-14 year-olds;

- parental monitoring and punishment for smoking decreased the odds of smoking initiation risk by 36-59% in 10-15 year-olds, and by 15-28% in 12-14 year-olds, respectively.

The dynamic role of parental influences in preventing adolescent smoking initiation.

Mahabee-Gittens EM, Addict Behav. 2013;38(4):1905-11.

it is important to see that youth reported parental influence was significantly protective despite the effect of the peers.



- Parent-youth connectedness significantly decreased the odds of smoking initiation by 14-37% in 11-14 year-olds;

- parental monitoring and punishment for smoking decreased the odds of smoking initiation risk by 36-59% in 10-15 year-olds, and by 15-28% in 12-14 year-olds, respectively.

Does one cigarette make an adolescent smoker, and is it influenced by age and age of smoking initiation? Evidence of association from the U.S. Youth Risk Behavior Surveillance System (2011).

Reidpath DD, Prev Med. 2014;59:37-41.

✓U.S. Youth Risk Behavior Survey 2011

a one year's decrease in the age of smoking initiation was associated with a 1.27 times increase in odds of regular smoking in females (95% CI: 1.192-1.348); and similar associations for males (OR: 1.28; 95% CI: 1.216-1.341).

Does one cigarette make an adolescent smoker, and is it influenced by age and age of smoking initiation? Evidence of association from the U.S. Youth Risk Behavior Surveillance System (2011).

Reidpath DD, Prev Med. 2014;59:37-41.

earlier initiation of smoking is associated with subsequent regular smoking irrespective of sex or race/ethnicity.

These findings have potentially important implications for intervention targeting.

a one year's decrease in the age of smoking initiation was associated with a 1.27 times increase in odds of regular smoking in females (95% CI: 1.192-1.348); and similar associations for males (OR: 1.28; 95% CI: 1.216-1.341).

Self-esteem and the initiation of substance use among adolescents. *Richardson CG, Can J Public Health. 2012;104(1):e60-3.*

✓British Columbia Adolescent Substance Use Survey (BASUS).

✓1,267 adolescents (57% female) in Grades 8 and 9.

Self-Esteem Synonyms:

- Self-worth
- Self-respect
- Self-value

For each one-point increase on the Rosenberg Self-Esteem Scale, there was a reduction in the odds of initiating substance use by up to

9% for tobacco,
3% for alcohol, and
7% for marijuana.


Rosenberg Self-Esteem Scale (RSES)

Instructions:

Self-esteem and the initiation of substance use among adolescents. *Richardson CG, Can J Public Health. 2012;104(1):e60-3.*

- ✓British Columbia Adolescent Substance Use Survey (BASUS).
- ✓1,267 adolescents (57% female) in Grades 8 and 9.

1) Nell'insieme mi sento soddisfatto/a di me stesso/a.
2) A volte penso che non servo a nulla
3) Sento di avere qualità positive
4) Sento di essere una persona degna di apprezzamento, quanto meno alla pari degli altri..
5) Sento di non avere molti motivi per essere orgoglioso.
6) In generale, tendo a pensare di essere un/a fallito/a.
7) Sono capace di fare le cose bene come la maggior parte delle persone.
8) Mi piacerebbe avere più rispetto per me stesso/a.
9) A volte mi sento inutile.
10) Adotto un atteggiamento positivo verso me stesso/a.

Rosenberg Self-Esteem Scale (RSES)

Instructions:

Below is a list of statements dealing with your general feelings about yourself. There are four possible answers for each of the 10 questions, from "strongly agree" to "strongly disagree." Tap the box to indicate how strongly you agree or disagree with each statement.

		Strongly Agree	Agree	Disagree	Strongly Disagree
1	On the whole, I am satisfied with myself	3	2	1	0
2	At times, I think I am no good at all	0	1	2	3
3	I feel that I have a number of good qualities	3	2	1	0
4	I am able to do things as well as most other people	3	2	1	0
5	I feel I do not have much to be proud of	0	1	2	3
6	I certainly feel useless at times	0	1	2	3
7	I feel that I'm a person of worth, at least on an equal plane with others	3	2	1	0
8	I wish I could have more respect for myself	0	1	2	3
9	All in all, I am inclined to feel that I am a failure	0	1	2	3
10	I take a positive attitude toward myself	3	2	1	0

Rosenberg Self-Esteem Scale

1. Credo di essere una persona apprezzabile, almeno nella stessa misura degli altri.
(Scegli una delle seguenti risposte e somma i punti: pienamente d'accordo = 4; d'accordo = 3; in disaccordo = 2; profondamente in disaccordo = 1)
2. Sono convinto di avere buone qualità.
(Scegli una delle seguenti risposte e somma i punti: pienamente d'accordo = 4; d'accordo = 3; in disaccordo = 2; profondamente in disaccordo = 1)
3. Sono capace di fare bene le cose come la maggior parte delle persone.
(Scegli una delle seguenti risposte e somma i punti: pienamente d'accordo = 4; d'accordo = 3; in disaccordo = 2; profondamente in disaccordo = 1)
4. Ho un atteggiamento positivo verso me stesso.
(Scegli una delle seguenti risposte e somma i punti: pienamente d'accordo = 4; d'accordo = 3; in disaccordo = 2; profondamente in disaccordo = 1)
5. In generale, sono soddisfatto di me stesso.
(Scegli una delle seguenti risposte e somma i punti: pienamente d'accordo = 4; d'accordo = 3; in disaccordo = 2; profondamente in disaccordo = 1)
6. Sento di non avere molti motivi per essere orgoglioso.
(Scegli una delle seguenti risposte e somma i punti: pienamente d'accordo = 1; d'accordo = 2; in disaccordo = 3; profondamente in disaccordo = 4)
7. Solitamente, tendo a pensare che sono un fallito.
(Scegli una delle seguenti risposte e somma i punti: pienamente d'accordo = 1; d'accordo = 2; in disaccordo = 3; profondamente in disaccordo = 4)
8. Mi piacerebbe poter avere più rispetto per me stesso.
(Scegli una delle seguenti risposte e somma i punti: pienamente d'accordo = 1; d'accordo = 2; in disaccordo = 3; profondamente in disaccordo = 4)
9. A volte mi sento completamente inutile.
(Scegli una delle seguenti risposte e somma i punti: pienamente d'accordo = 1; d'accordo = 2; in disaccordo = 3; profondamente in disaccordo = 4)
10. A volte sento di non essere una buona persona.
(Scegli una delle seguenti risposte e somma i punti: pienamente d'accordo = 1; d'accordo = 2; in disaccordo = 3; profondamente in disaccordo = 4)
Somma tutti i punti e scopri cosa dice di te la scala di Rosenberg

Se la somma è inferiore a 15
stiamo parlando di un'autostima molto bassa.

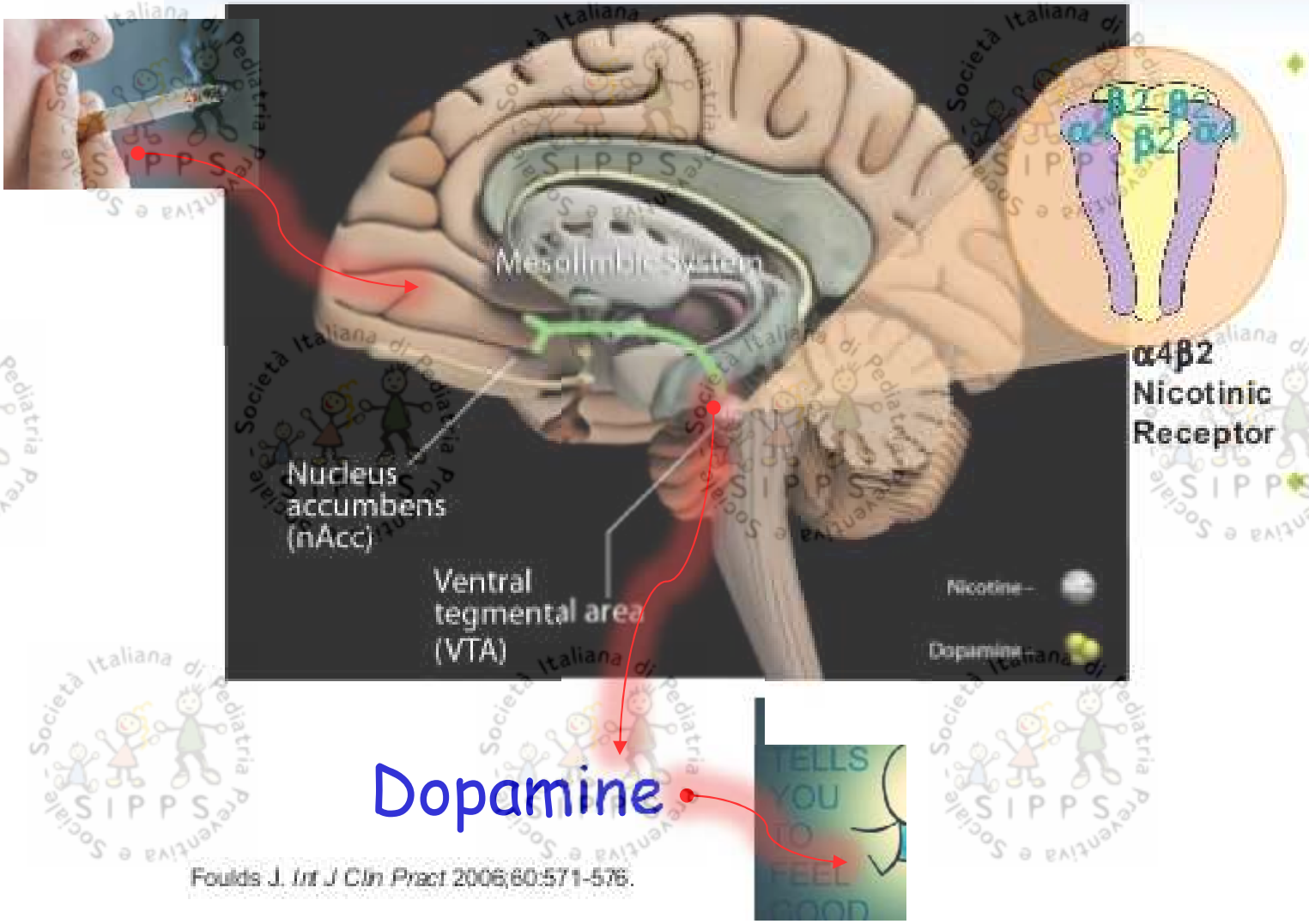
The effect of working for pay on adolescent tobacco use.

Ramchand R, Am J Public Health. 2007;97(11):2056-62.

✓a cohort of 799 predominantly African American students in Baltimore, Md, who had been followed since the first grade.

- At the 10th year of follow-up, when the adolescents were aged 14 to 18 years, there was a positive relationship between the time they spent working for pay and current tobacco use.
- Adolescents who spent more than 10 hours per week working for pay tended to initiate tobacco use earlier than did their peers.

Mechanism of Action of Nicotine in the Central Nervous System



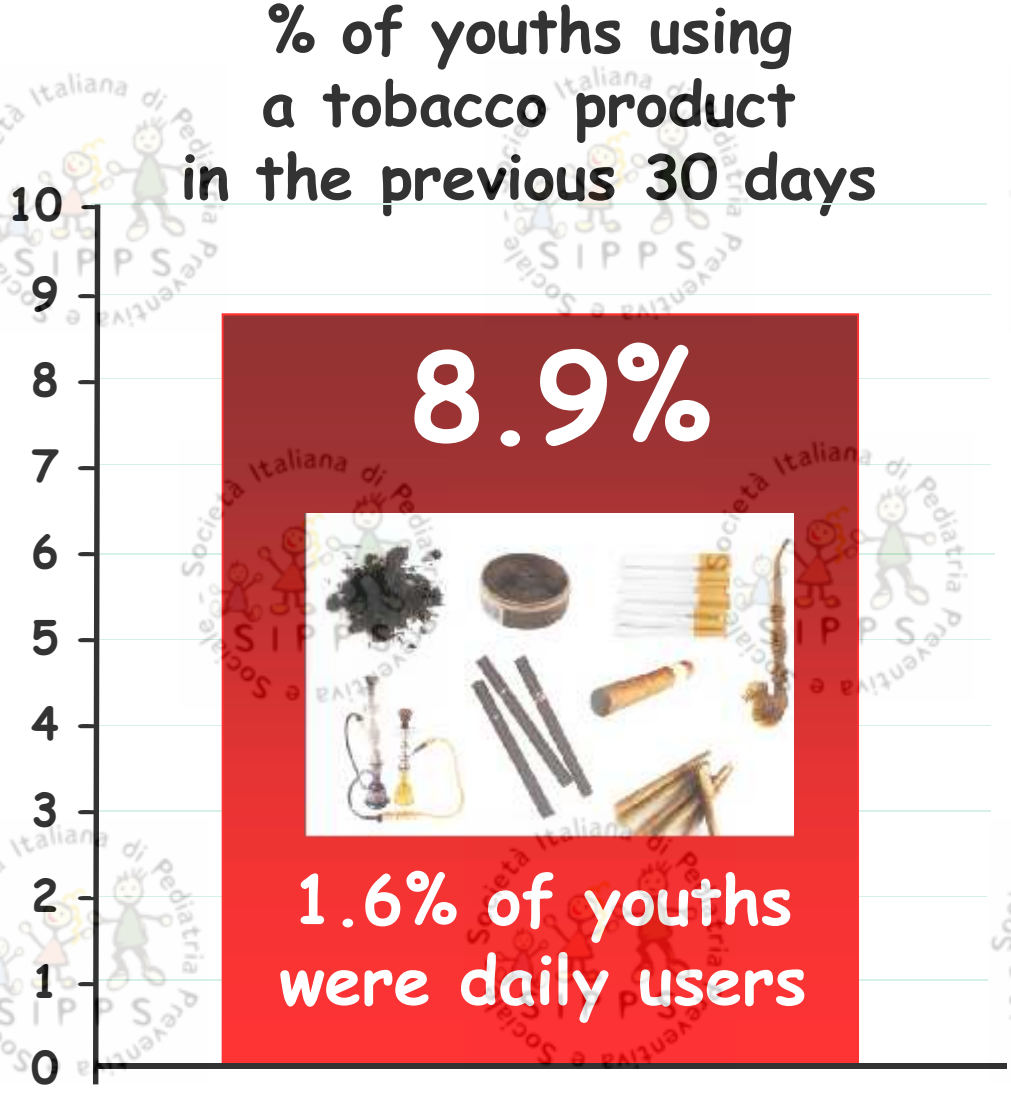
- Nicotine binds preferentially to nicotinic acetylcholine (nACh) receptors in the central nervous system; the primary is the α4β2 nACh receptor in the Ventral Tegmental Area (VTA)
- After nicotine binds to the α4β2 nACh receptor in the VTA, it results in a release of dopamine in the Nucleus Accumbens (nAcc), which is believed to be linked to reward

Foulds J. *Int J Clin Pract* 2006;60:571-576.

Tobacco-Product Use by Adults and Youths in the United States in 2013 and 2014

Kasza KA, NEJM 2017;376(4):342

- ✓ Prevalence estimates for 12 types of tobacco products
- ✓ 45,971 adult and youth participants (≥12 yrs of age) (Sep 2013 to Dec 2014) use of cigarettes, e-cigarettes, cigars, cigarillos, filtered cigars, pipe tobacco, hookah, snus pouches, other smokeless tobacco, dissolvable tobacco, bidis and kreteks

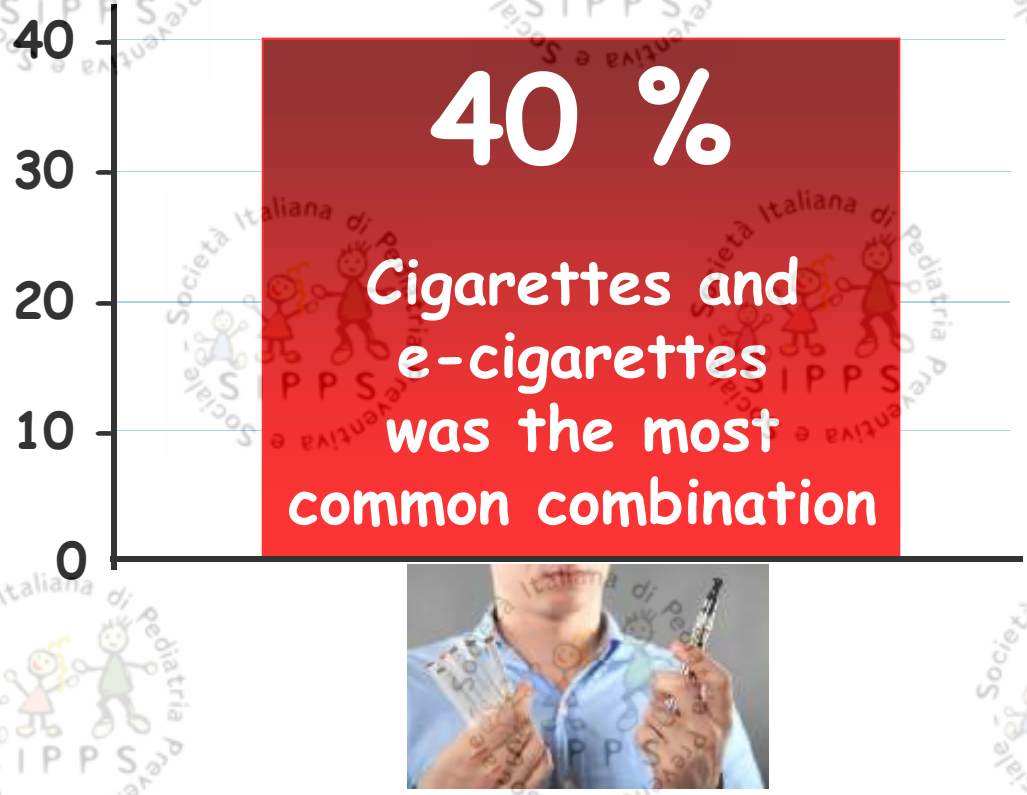


Tobacco-Product Use by Adults and Youths in the United States in 2013 and 2014

Kasza KA, NEJM 2017;376(4):342

- ✓ Prevalence estimates for 12 types of tobacco products
- ✓ 45,971 adult and youth participants (≥12 yrs of age) (Sep 2013 to Dec 2014) use of cigarettes, e-cigarettes, cigars, cigarillos, filtered cigars, pipe tobacco, hookah, snus pouches, other smokeless tobacco, dissolvable tobacco, bidis and kreteks

% of smokers using multiple tobacco products



Tobacco-Product Use by Adults and Youths in the United States in 2013 and 2014

Kasza KA, NEJM 2017;376(4):342

- ✓ Prevalence estimates for 12 types of tobacco products
- ✓ 45,971 adult and youth participants (≥12 yrs of age) (Sep 2013 to Dec 2014) use of cigarettes, e-cigarettes, cigars, cigarillos, filtered cigars, pipe tobacco, hookah, snus pouches, other smokeless tobacco, dissolvable tobacco, bidis and kreteks

- Young adults (18-24 yrs),
- Male,
- Members of racial minorities
- Members of sexual minorities

Generally had
higher use of tobacco
than their counterparts

Cigarette smoking and Surroundings

live fit

- ✓ Introduction
- ✓ Cigarette smoking in pregnancy
- ✓ Smoking in pregnancy surroundings
- ✓ Passive smoking
- ✓ Passive smoking surroundings
- ✓ Active smoking
- ✓ **Active smoking surroundings**
- ✓ The e-cigarettes' problem
- ✓ What can we do?
- ✓ Conclusions

Attilio Boner
University of Verona, Italy
attilio.boner@univr.it

Tobacco smoking and oxidative stress to DNA: a meta-analysis of studies using chromatographic and immunological methods.

Ellegaard PK, Scand J Clin Lab Invest. 2016;76(2):151-8.

✓Oxidative stress to DNA from smoking

✓excretion of urinary 8-oxo-7-hydrodeoxyguanosine (8-oxodG).

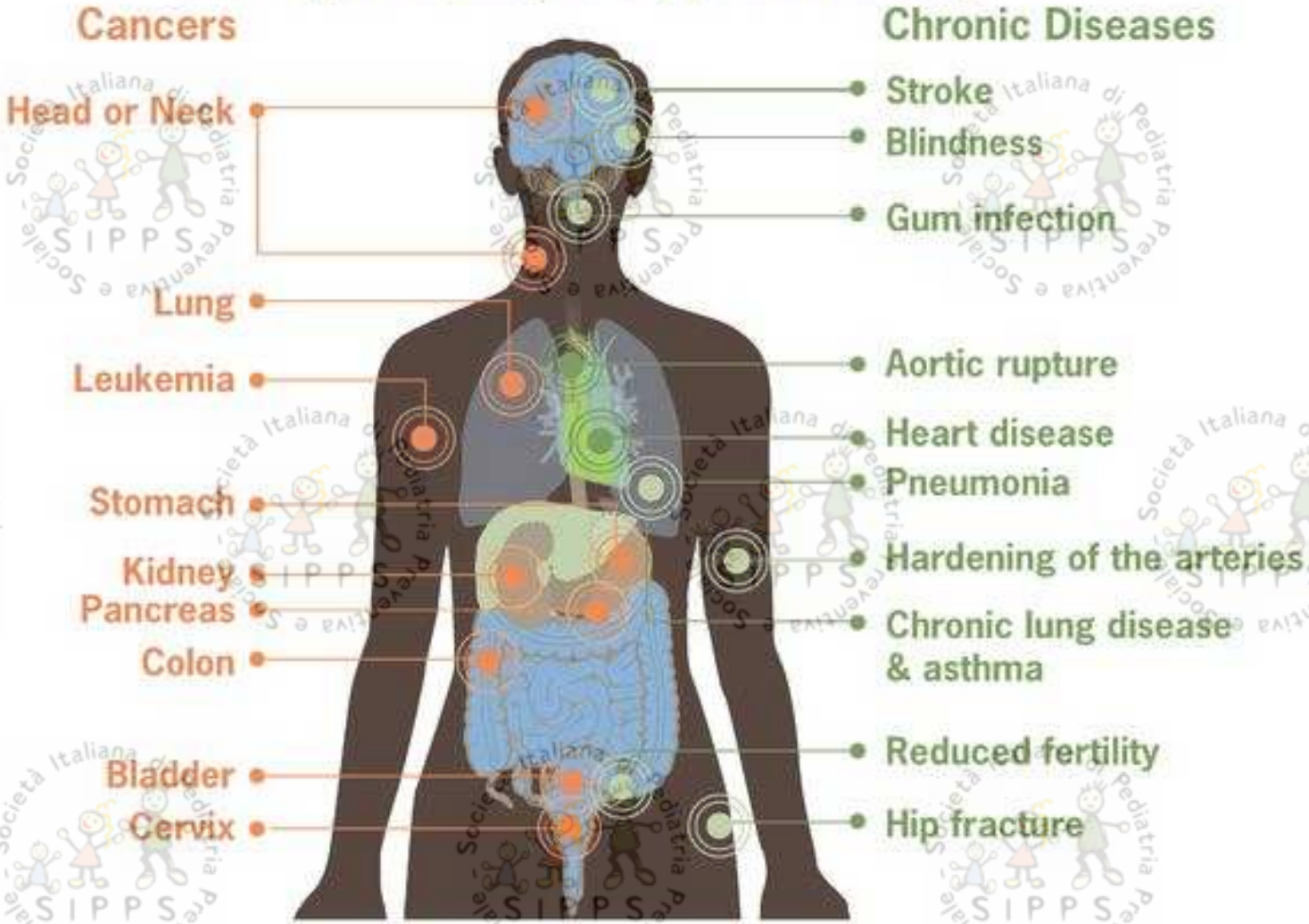
✓one randomized smoking cessation study and 36 cohort studies

Meta-analysis of the 36 cohort studies showed smoking is associated with a 15.7% *(95% CL 11.0:20.3, p < 0.0001)* increased oxidative stress to DNA,

in agreement with the reduction of oxidative stress to DNA found in the smoking cessation study.

Risks from Smoking

Smoking can damage every part of the body



That fact is that
1 in every 2
smokers
will die of
a tobacco related
disease.

Most smokers
will lose between
10 to 15
quality life years
before they die.

One cigarette takes
11 minutes off your life.

live fit

Smoking and Mortality — Beyond Established Causes

Carter B. NEJM 2015;372:631-640

BACKGROUND

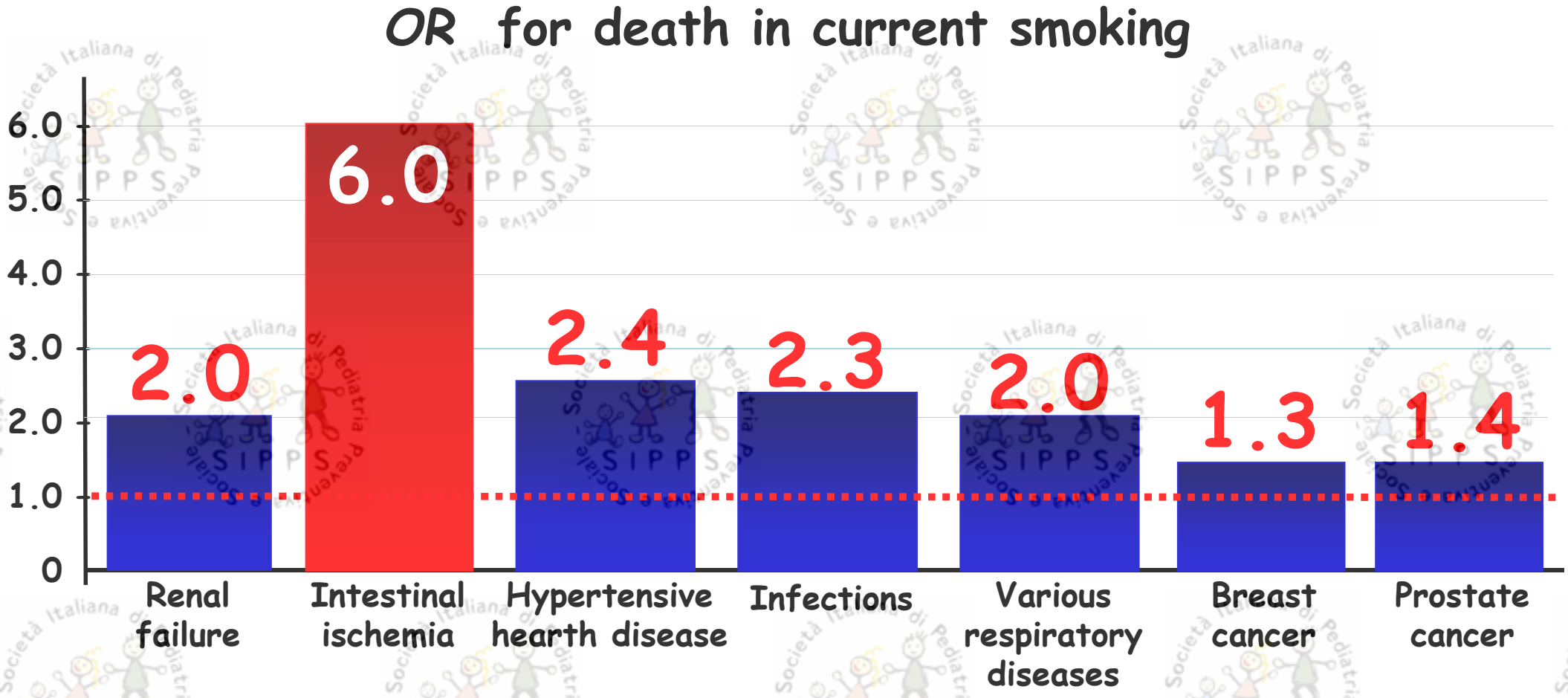
•Mortality among current smokers is 2 to 3 times as high as that among persons who never smoked.

Most of this excess mortality is believed to be explained by 21 common diseases (12 types of cancer, 6 categories of cardiovascular disease, diabetes, chronic obstructive pulmonary disease [COPD], and pneumonia including influenza) that have been formally established as caused by cigarette smoking and are included in official estimates of smoking-attributable mortality in the United States.

•However, if smoking causes additional diseases, these official estimates may significantly underestimate the number of deaths attributable to smoking.

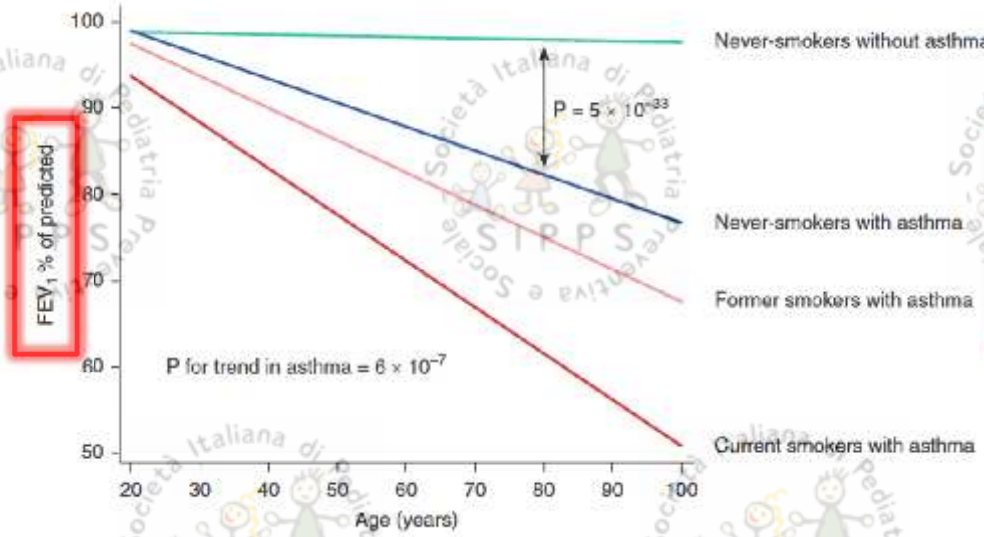
Smoking and Mortality — Beyond Established Causes

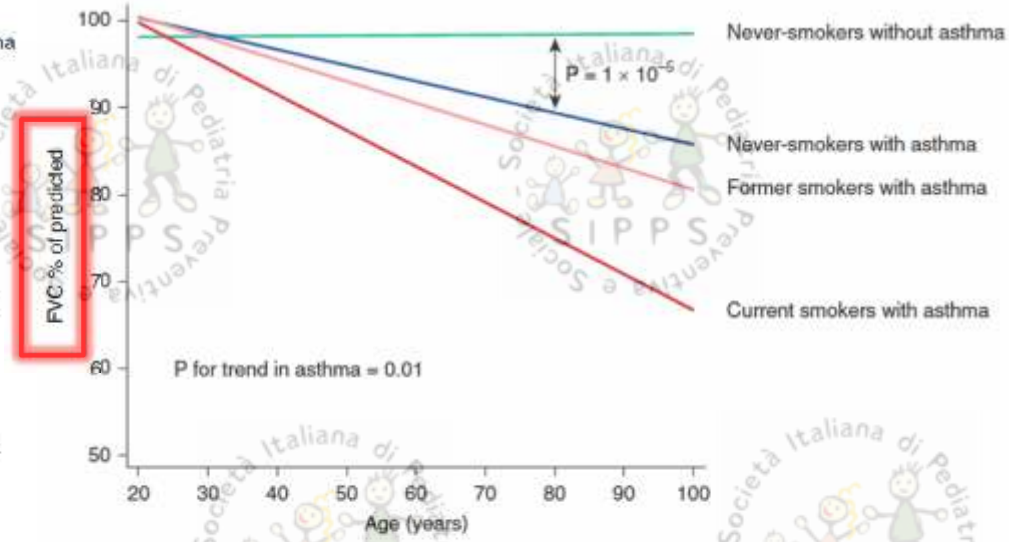
Carter B. NEJM 2015;372:631-640



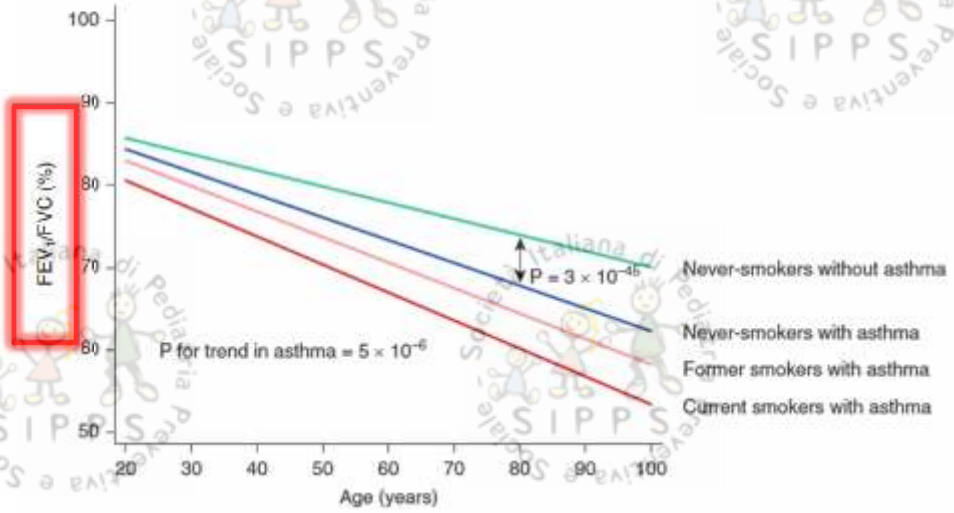
A substantial portion of the excess mortality among current smokers between 2000 and 2011 was due to associations with diseases that have not been formally established as caused by smoking

Characteristics and Prognosis of Never-Smokers and Smokers with Asthma in the Copenhagen General Population Study. *Çolak Y, AJRCCM 2015;192:172-181*





Lung function by age according to presence of asthma and smoking status.



Stages in adolescent involvement in drug use.

Kandel D. Science. 1975;190(4217):912-4.

Two longitudinal surveys based on random samples of high school students in New York State indicate 4 stages in the sequence of involvement with drugs: beer or wine, or both; cigarettes or hard liquor; marihuana; and other illicit drugs.

1 beer or wine, or both → 2 cigarettes or hard liquor → 3 marihuana → 4 other illicit drugs

The legal drugs are necessary intermediates between nonuse and marihuana.

Marijuana and tobacco: a major connection?

Tullis LM, J Addict Dis. 2003;22(3):51-62

Tobacco, marijuana, and alcohol continue to be the most commonly abused drugs by teens and young adults.

The gateway theory of drug use is often used to describe the progression from using alcohol or tobacco, to marijuana, and later use of other drugs like MDMA, cocaine, and heroin.

While tobacco use does commonly precede marijuana use, we propose that marijuana may be a "gateway drug" to tobacco smoking.

Our research with university students is suggesting that cigarette-smoking initiation often follows or coincides with marijuana.

Has Marijuana Legalization Increased Marijuana Use Among US Youth? *Hall W. JAMA Pediatr. 2017;171(2):116-117*

- Since 2012, citizens in Alaska, Colorado, Oregon, and Washington have voted to legalize the recreational use of marijuana by adults.

- Advocates of legalization have argued that prohibition wastes scarce law enforcement resources by selectively arresting minority users of a drug that has fewer adverse health effects than alcohol.
- It would be better, they argue, to legalize, regulate, and tax marijuana, like alcohol.
- Opponents of legalization argue that it will increase marijuana use among youth because it will make marijuana more available at a cheaper price and reduce the perceived risks of its use.

Has Marijuana Legalization Increased Marijuana Use Among US Youth? *Hall W. JAMA Pediatr. 2017;171(2):116-117*

- Marijuana legalization presents major challenges for prevention of use by youth.

- The challenge for health educators will be:

- in acknowledging that the acute adverse effects of marijuana use are modest by comparison with those of alcohol or heroin, while

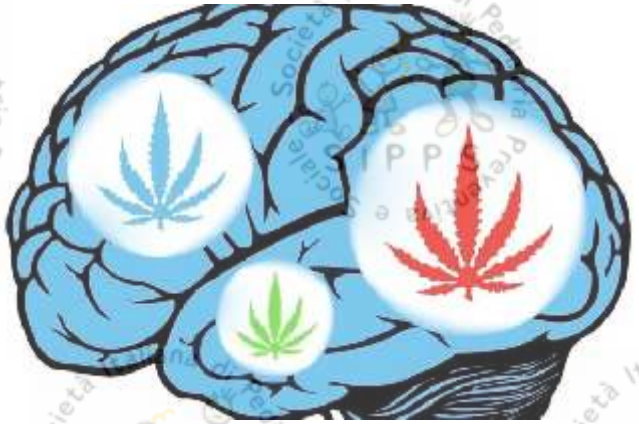
- persuading young people that they can experience adverse effects, especially if they begin use in their teens and use daily throughout young adult life.

Has Marijuana Legalization Increased Marijuana Use Among US Youth? *Hall W. JAMA Pediatr. 2017;171(2):116-117*

- Marijuana users need to be informed about the approximate doubling of the risks of a collision if they drive while intoxicated, especially if they use both alcohol and marijuana.

- Regular users need to be aware that they can develop dependence.

- The risk for dependence is about 1 in 10 for those who ever use marijuana and
  1 in 6 for those who first use in adolescence.



Has Marijuana Legalization Increased Marijuana Use Among US Youth? *Hall W. JAMA Pediatr. 2017;171(2):116-117*

- Marijuana users also need to know that dependent users have more:
- anxiety,
- depression, and
- psychotic disorders and

- are more likely:
- to leave school early,
- to be unemployed as adults, and
- experience downward social mobility in mid-adulthood.

Association of State Recreational Marijuana Laws with Adolescent Marijuana Use

Cerdá M. JAMA Pediatr. 2017;171(2):142-149

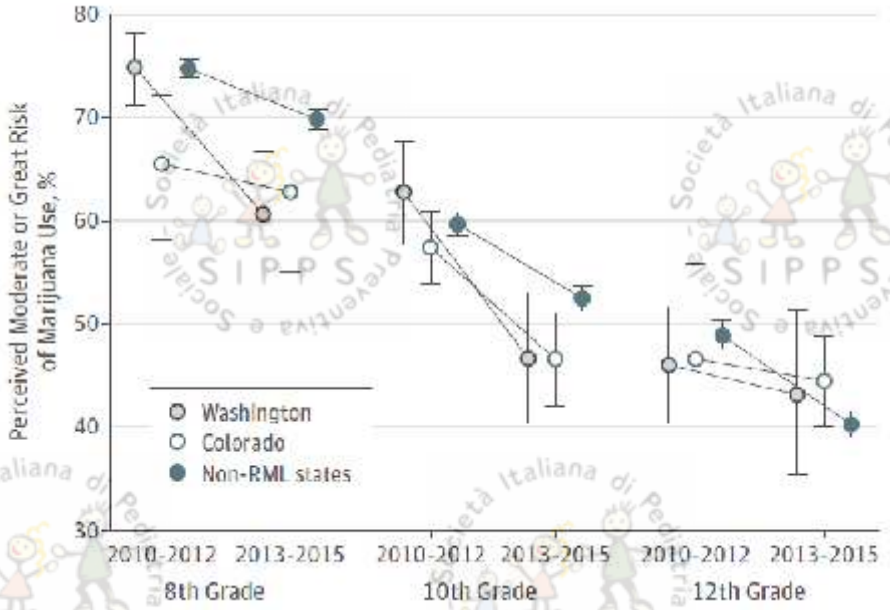
- ✓ 253 902 students in 8th, 10th, and 12th grades from 2010 to 2015 in secondary schools
- ✓ changes in perceived harmfulness of marijuana use and in past-month marijuana use in Washington and Colorado prior to recreational marijuana legalization (2010-2012) with postlegalization (2013-2015) vs the contemporaneous trends in other states that did not legalize recreational marijuana use in this period.

In contrast, among states that did not legalize recreational marijuana use, perceived harmfulness decreased by 4.9% and 7.2% among 8th and 10th graders, respectively, and marijuana use decreased by 1.3% and 0.9% over the same period.

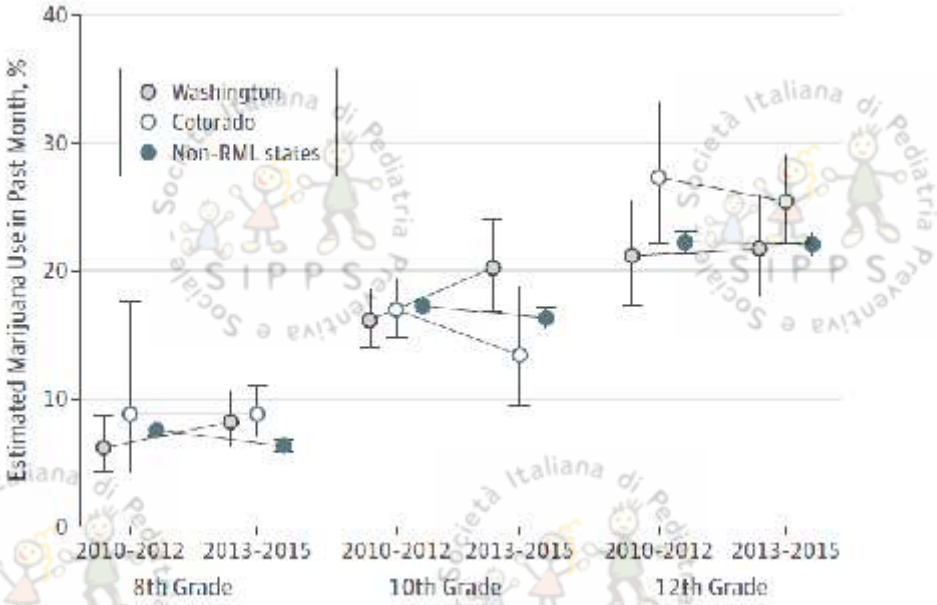
Association of State Recreational Marijuana Laws with Adolescent Marijuana Use

Cerdá M. JAMA Pediatr. 2017;171(2):142-149

prevalence of perceived harmfulness of marijuana use before and after RML in Colorado,Washington, and non-RML states by grade



prevalence of past-month marijuana use before and after RML in Colorado,Washington, and non-RML states by grade.



RML: Recreational Marijuana Laws

Association of State Recreational Marijuana Laws with Adolescent Marijuana Use

Cerdá M. JAMA Pediatr. 2017;171(2):142-149

- We found no comparable change in perceived harmfulness or marijuana use in Colorado.
  This difference may be related to the different degree of commercialization of marijuana prior to legalization in Washington and Colorado.
- Colorado had a very developed medical marijuana dispensary system prior to legalization, with substantial advertising, to which youth were already exposed.
- In addition, rates of perceived harmfulness in Colorado were already lower and rates of marijuana use were already higher than rates in Washington and non-RML states prior to legalization. Preexisting low levels of perceived harmfulness and high levels of use may have constrained further short term increases following RML enactment.

Association of State Recreational Marijuana Laws with Adolescent Marijuana Use

Cerdá M. JAMA Pediatr. 2017;171(2):142-149

Conclusions and relevance

Among 8th and 10th graders inWashington, perceived harmfulness of marijuana use decreased and marijuana use increased following legalization of recreational marijuana use.

In contrast, Colorado did not exhibit any differential change in perceived harmfulness or past-month adolescent marijuana use following legalization.

A cautious interpretation of the findings suggests investment in evidence-based adolescent substance use prevention programs in any additional states that may legalize recreational marijuana use.

Associations of Bullying and Cyberbullying with Substance Use and Sexual Risk Taking in Young Adults.

Kritsotakis G, J Nurs Scholarsh. 2017;49(4):360-370

✓812 second-year undergraduate students (mean age = 19.3 years)

✓substance use (smoking, alcohol abuse or drunkenness, illegal drug use including marijuana, hashish, and cannabis) and sexual risk taking (paying for sex and not using condoms)

✓Cyberbullying and its Effects and the Retrospective Bullying Questionnaires.

Cyberbully (OR= 1.85) or cybervictim (OR= 3.65) male students

were more likely to report smoking.

Associations of Bullying and Cyberbullying with Substance Use and Sexual Risk Taking in Young Adults.

Kritsotakis G, J Nurs Scholarsh. 2017;49(4):360-370

✓812
stu

✓s
(
c

✓
the
Quest

Both male and female late adolescents who were victims of bullying during middle and high school were less likely to use condoms during college years when compared to uninvolved students.

10 - 14 YEARS OLD	Early Adolescence	GRADES 5 TO 9
15 - 17 YEARS OLD	Middle Adolescence	GRADES 9 TO 12
18 - 24 YEARS OLD	Late Adolescence/ Early Adulthood	POST HIGH SCHOOL

Associations of Bullying and Cyberbullying with Substance Use and Sexual Risk Taking in Young Adults.

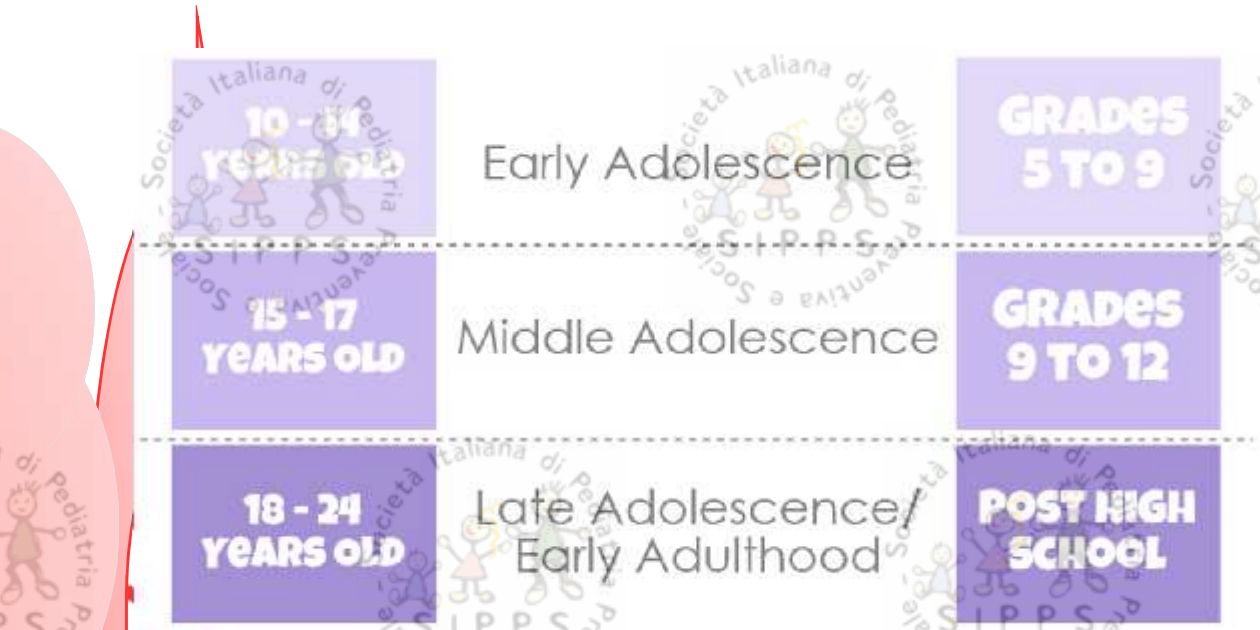
Kritsotakis G, J Nurs Scholarsh. 2017;49(4):360-370

✓812
stu

✓s
(
c

✓
the
Quest

Among males, being a bully or victim at school doubled the odds for past month drunkenness and tripled the odds of paying for sex.



Victims of Bullying and Tobacco Use Behaviors in Adolescents: Differences Between Bullied at School, Electronically, or Both.

Case KR, J Sch Health. 2016;86(11):832-840.

✓associations between being a victim of bullying (at school only, electronically only, or both at school and electronically) and use of tobacco products using data from the 2013 national Youth Risk Behavior Survey.

- Girls who were bullied both at school and electronically reported the highest odds of all tobacco use behaviors (ever use of cigarettes, current use of cigarettes, and current use of any tobacco product).

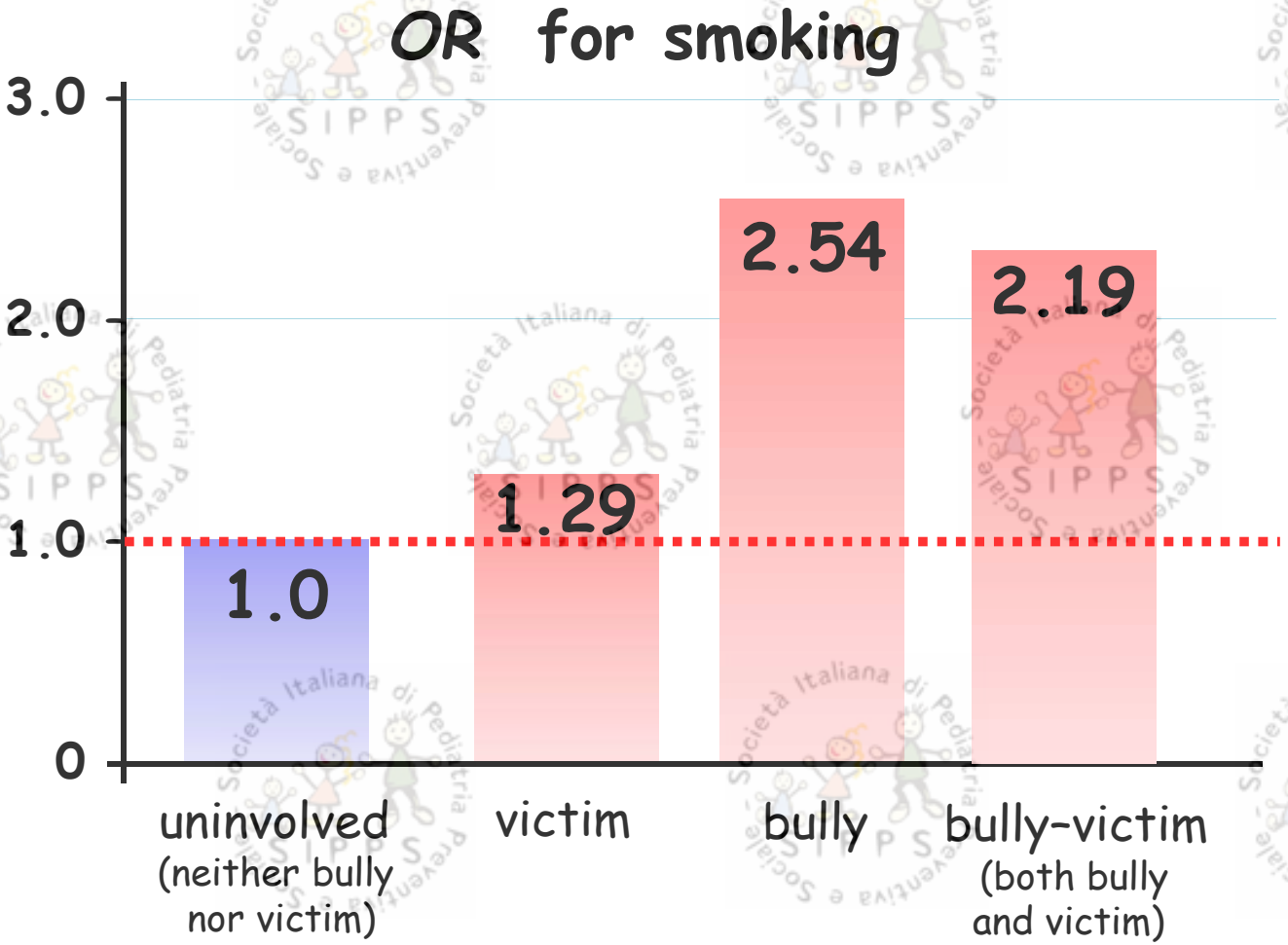
- Conversely, for boys, only the association between being bullied electronically only and ever use of cigarettes remained significant after adjusting for covariates.

School bullying and susceptibility to smoking among never-tried cigarette smoking students.

Azagba S. Prev Med. 2016;85:69-73.

✓cross-sectional data on Canadian adolescent and youth from the 2012/2013 Youth Smoking Survey (n=28,843).

✓logistic regression analysis to examine the association between bullying and smoking susceptibility among never-smoking students.



Different forms of bullying and their association to smoking and drinking behavior in Italian adolescents.

Vieno A. J Sch Health. 2011;81(7):393-399.

✓2667 Italian middle and secondary school students (49.9% girls) randomly selected

✓2006 Health Behavior in School-aged Children (HBSC) survey,

✓prevalence of 6 forms of bullying (physical, verbal, relational, sexual, cyber, and racist), and the role of smoking and drinking in bullying

❑Prevalence of having been bullied or having bullied others at school at least once in the last 2 months was:

- 11.6% for physical,
- 52% for verbal,
- 47.9% for relational,
- 18.5% for sexual,
- 19.4% for cyber, and
- 9.4% for racist bullying.

Different forms of bullying and their association to smoking and drinking behavior in Italian adolescents.

Vieno A. J Sch Health. 2011;81(7):393-399.

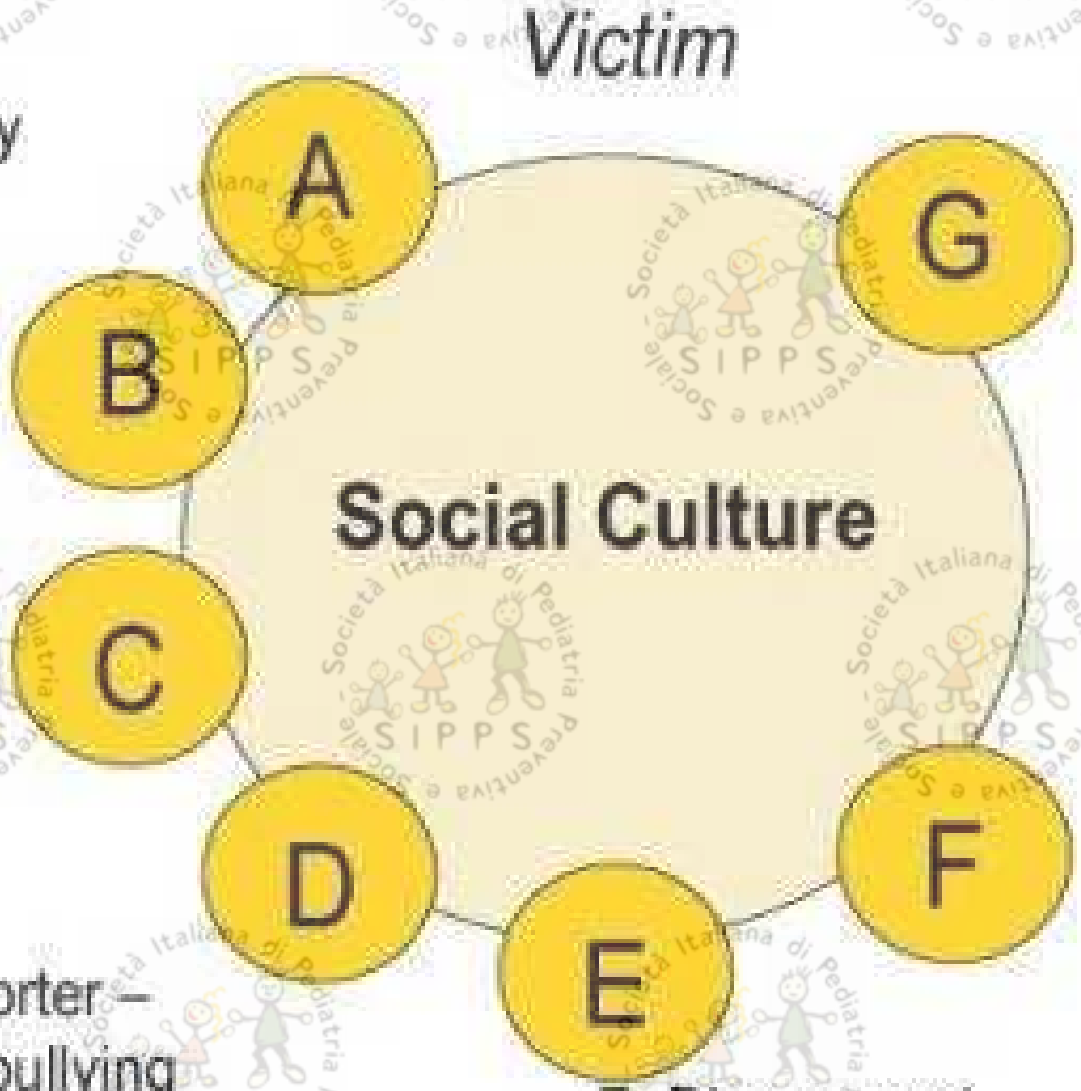
Prevalence (N and %) of Smokers and Drinkers, by Bullying Status, and Association (OR, and 95% IC)*

	Prevalence of Smokers	OR (95% CI) **	p value	Prevalence of Drinkers	OR (95% CI) **	p value
Completely uninvolved	80 (10.3)			74 (9.5)		
*Physical			<.001			<.001
Bullies	36 (22.8)	3.88 (2.33-6.47)	<.001	42 (26.4)	4.79 (2.91-7.90)	<.001
Victims	12 (15.4)	2.57 (1.24-5.36)	.012	15 (19.2)	3.19 (1.59-6.41)	.001
Bully-victims	16 (27.6)	3.64 (1.72-7.68)	<.001	16 (27.1)	3.29 (1.54-7.03)	.002
*Verbal			<.001			<.001
Bullies	92 (21.1)	2.88 (2.03-4.08)	<.001	104 (23.7)	3.54 (2.49-5.02)	<.001
Victims	46 (10.0)	1.16 (.74-1.81)	ns	27 (6.4)	.84 (.51-1.39)	ns
Bully-victims	54 (11.4)	1.40 (1.07-2.08)	.023	57 (12.2)	1.70 (1.14-2.54)	<.001
*Relational			<.001			<.001
Bullies	48 (17.2)	2.14 (1.42-3.23)	<.001	56 (20.1)	2.93 (1.95-4.40)	<.001
Victims	20 (12.6)	1.39 (1.00-2.01)	.050	67 (12.0)	1.58 (1.09-2.32)	.017
Bully-victims	70 (18.5)	2.47 (1.70-3.60)	<.001	63 (16.6)	2.37 (1.60-3.52)	<.001
*Sexual			<.001			<.001
Bullies	27 (17.4)	2.31 (1.35-3.93)	.002	36 (23.2)	3.42 (2.06-5.67)	<.001
Victims	30 (14.3)	2.00 (1.23-3.24)	.005	29 (13.9)	2.17 (1.32-3.56)	.002
Bully victims	22 (20.6)	2.59 (1.40-4.77)	.002	24 (22.2)	2.75 (1.49-5.08)	.001
*Cyber			<.001			<.001
Bullies	25 (18.0)	2.47 (1.43-4.28)	<.001	29 (20.7)	3.10 (1.83-5.25)	<.001
Victims	21 (14.3)	1.88 (1.17-3.04)	.010	38 (17.4)	2.77 (1.75-4.39)	<.001
Bully-victims	29 (22.1)	3.65 (2.13-6.25)	<.001	30 (22.9)	2.98 (1.70-5.22)	<.001
*Racist			<.001			<.001
Bullies	18 (23.7)	4.12 (2.16-7.89)	<.001	23 (30.3)	5.00 (2.71-9.25)	<.001
Victims	7 (24.1)	3.78 (1.49-9.57)	.005	2 (6.7)	.80 (.18-3.51)	ns
Bully-victims	33 (25.4)	4.72 (2.76-8.07)	<.001	31 (23.5)	3.37 (1.95-5.83)	<.001

*The "Completely Uninvolved" was the category of reference.

** Adjusted for gender, age, and parental educational level.

The Cycle of Bullying



A. Bully

B. Follower or henchman – may even carry out the acts

C. Supporter, takes part in the bullying

D. Passive Supporter – seems to like the bullying but does not take an active part

E. Disengaged Onlooker

G. Defender – Dislikes the bullying and tries to help the victim

F. Passive Defender – dislikes the bullying but does not show open defense

Cigarette smoking and Surroundings

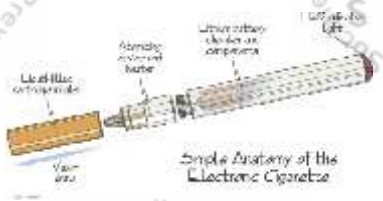
live fit

- ✓ Introduction
- ✓ Cigarette smoking in pregnancy
- ✓ Smoking in pregnancy surroundings
- ✓ Passive smoking
- ✓ Passive smoking surroundings
- ✓ Active smoking
- ✓ Active smoking surroundings
- ✓ **The e-cigarettes' problem**
- ✓ What can we do?
- ✓ Conclusions

Attilio Boner
University of Verona, Italy
attilio.boner@univr.it

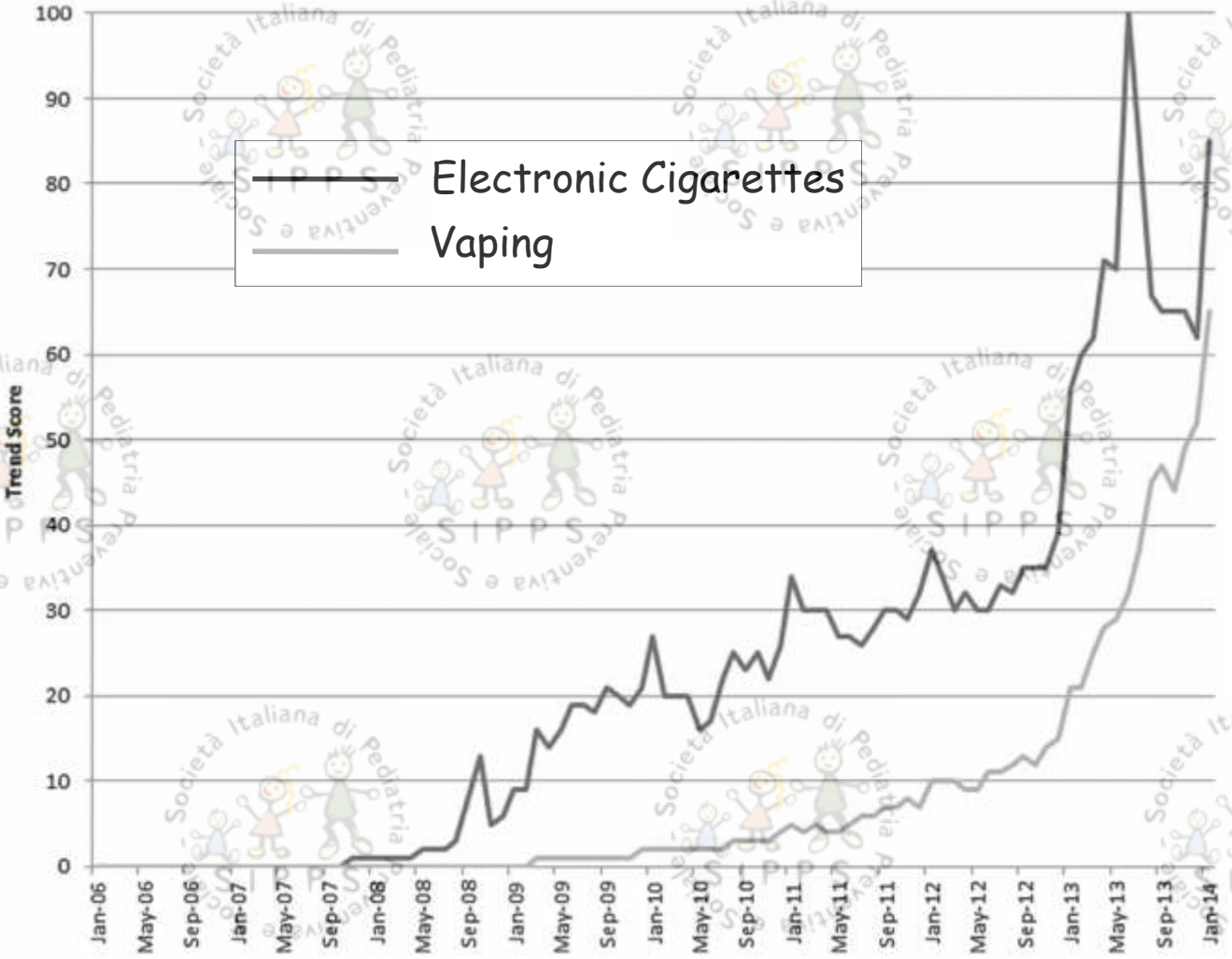
Electronic cigarettes: navigating the vapor

Nickels AS. Ann Allergy Asthma Immunol 2014;112:481



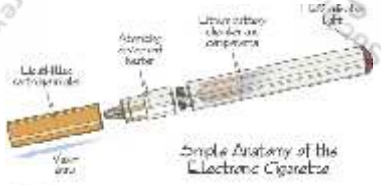
- Particularly worrisome is the increasing use of e-Cigarettes in youth.
- Internet searches for the terms e-Cigarettes and vaping are steadily increasing, as reflected by Google search data.

Google Trends: normalized search frequency worldwide-electronic cigarettes and vaping.



Electronic cigarettes: navigating the vapor

Nickels AS. Ann Allergy Asthma Immunol 2014;112:481



- The reintroduction of nicotine-containing products for use in public might undermine this progress made by previous smoking bans and produce a new generation of nicotine dependence.

- In middle school and high school students, "ever use" of e-Cigarette use increased from 1.4% to 2.7% ($p<0.05$) and from 4.7% to 10.0% ($p<0.05$) in 2011 and 2012, respectively. Overall, 6.8% of students had tried e-Cigarettes as of 2012.

- "If e-Cigarettes prove to be a 'gateway' or 'bridge' product, leading to an increase in underage smoking, that would represent a serious setback in the fight against tobacco-related illness".

E-Cigarette Use Among Youth and Young Adults
A Major Public Health Concern

Murthy V, JAMA, 2017;171:209-210

- E-cigarette use has tripled among our nation's young people in recent years, and 1 in 6 high school students currently use e-cigarettes.

- E-cigarettes include a diverse group of devices that allow users to inhale an aerosol, which typically contains nicotine, flavorings, and other additives. These products are now the most commonly used form of tobacco among youth in the United States, surpassing cigarettes, chewing tobacco, cigars, and hookah.

E-Cigarette Use Among Youth and Young Adults
A Major Public Health Concern

Murthy V, JAMA, 2017;171:209-210

- The Report concludes that the use of products containing nicotine poses dangers to young people, pregnant women, and fetuses.

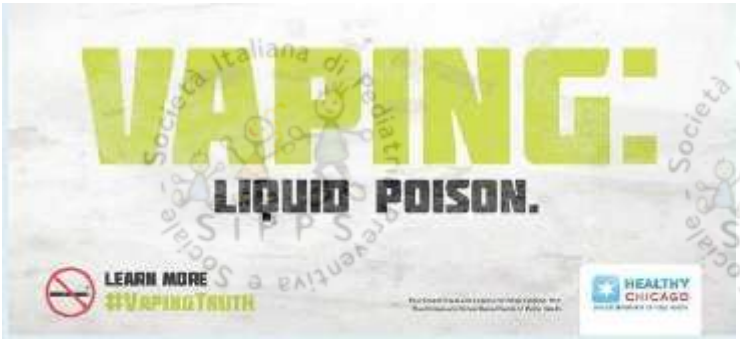
- Nicotine can cross the placenta and can result in multiple adverse consequences, including sudden infant death syndrome, altered corpus callosum, deficits in auditory processing, and obesity.

- The adolescent brain is also particularly vulnerable to adverse effects of nicotine exposure, including addiction, deficits learning and attention, reduced impulse control, mood disorders, and priming for use of other addictive substances.

E-Cigarettes, Youth, and the US Food and Drug Administration's "Deeming" Regulation

Berman ML, JAMA 2016;170(11):1039-1041

- The rule requires health warnings on roll-your-own tobacco, cigarette tobacco, and certain newly regulated tobacco products and also bans free samples.



- In addition, because of the rule, manufacturers of newly regulated tobacco products that were not on the market as of February 15, 2007, will have to show that products meet the applicable public health standard set by the law. And those manufacturers will have to receive marketing authorization from the FDA.

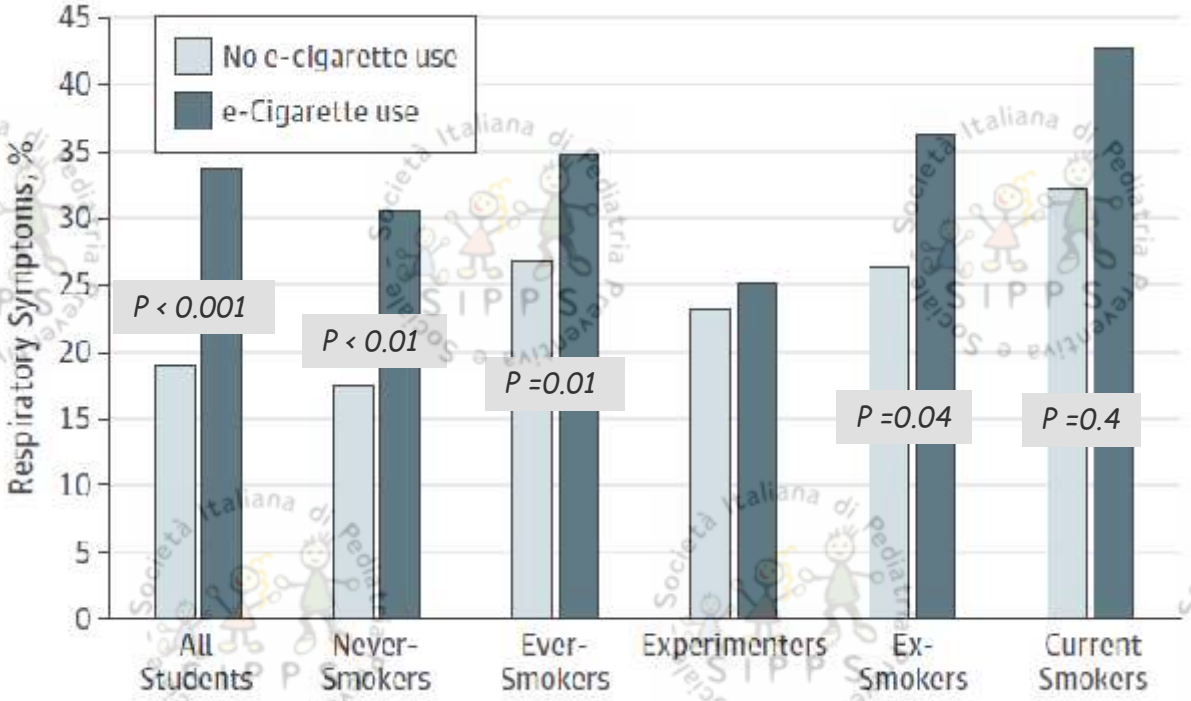
- The new rule also restricts youth access to newly regulated tobacco products by: 1) not allowing products to be sold to those younger than 18 and requiring age verification via photo ID; and 2) not allowing tobacco products to be sold in vending machines (unless in an adult-only facility).

Electronic Cigarette Use and Respiratory Symptoms in Chinese Adolescents in Hong Kong

Wang MP, JAMA 2016;170(1):89-91

- ✓ During 2012-2013,we surveyed secondary 1 (US grade 7, typically aged 12 years) to secondary 6 (college) students.
- ✓ Anonymous questionnaire Hong Kong.
- ✓ 45128 students.

Prevalence of Respiratory Symptoms is higher in e-Cigarette Users than Nonusers Across Different Smoking Status

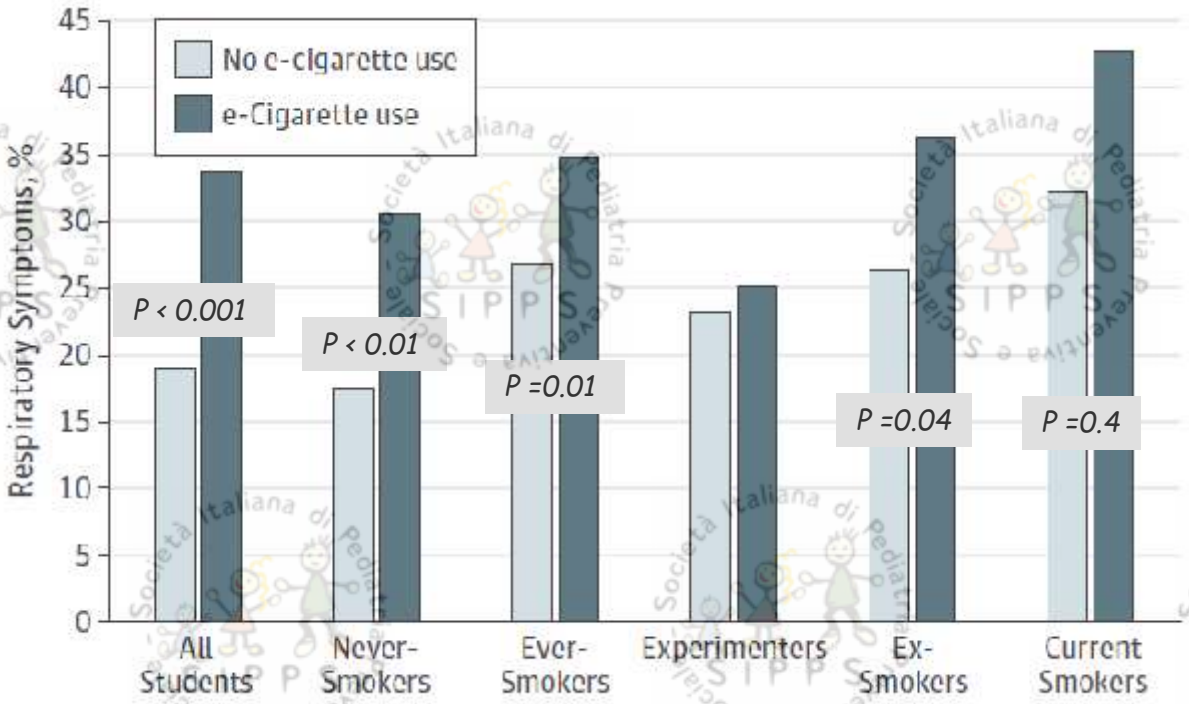


Electronic Cigarette Use and Respiratory Symptoms in Chinese Adolescents in Hong Kong

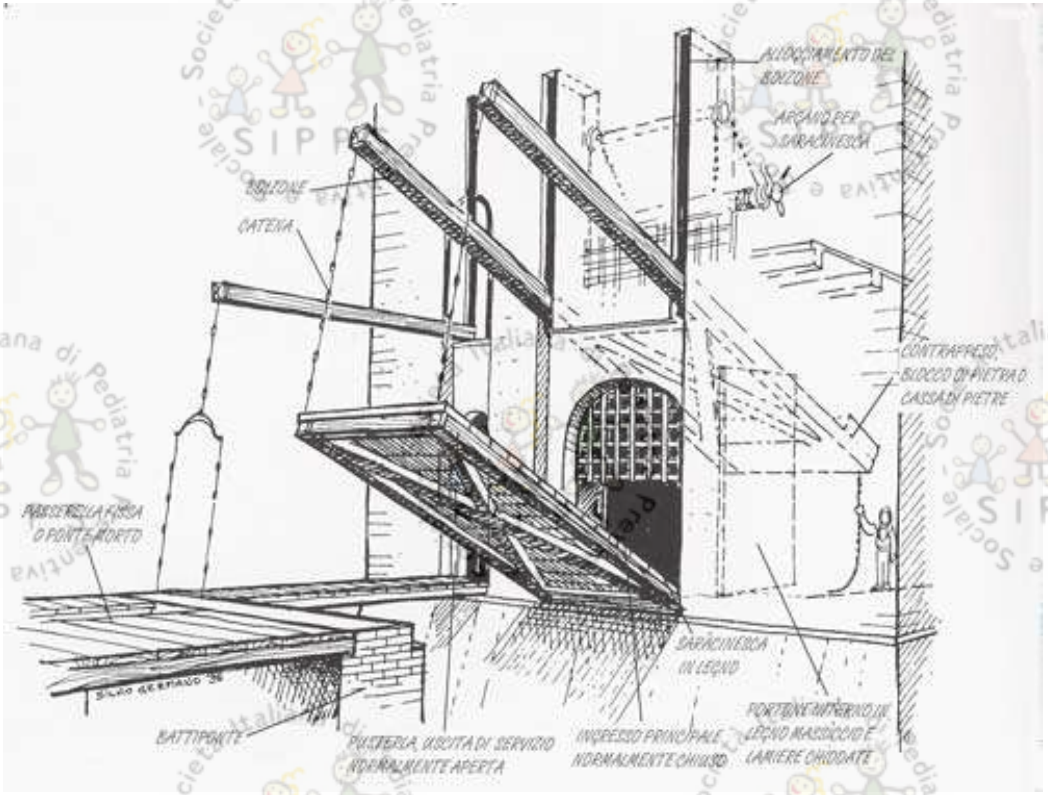
Wang MP, JAMA 2016;170(1):89-91

Higher prevalence of respiratory symptoms in e-cigarette users regardless of smoking status.

Prevalence of Respiratory Symptoms is higher in e-Cigarette Users than Nonusers Across Different Smoking Status

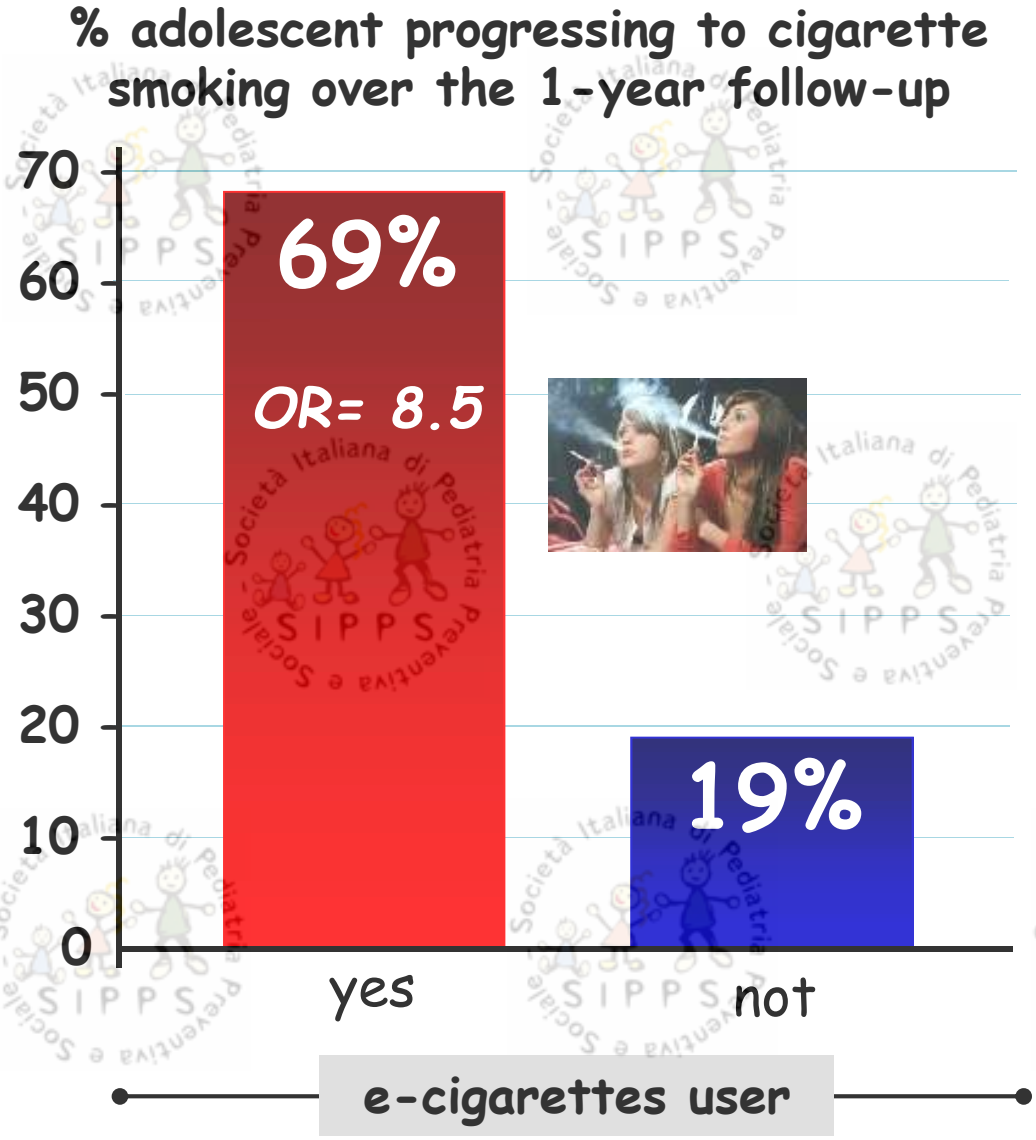


E-cigarettes as a gateway



Progression to Traditional Cigarette Smoking After Electronic Cigarette Use Among US Adolescents and Young Adults *Primack BA, JAMA Pediatr. 2015;169:1018-1023*

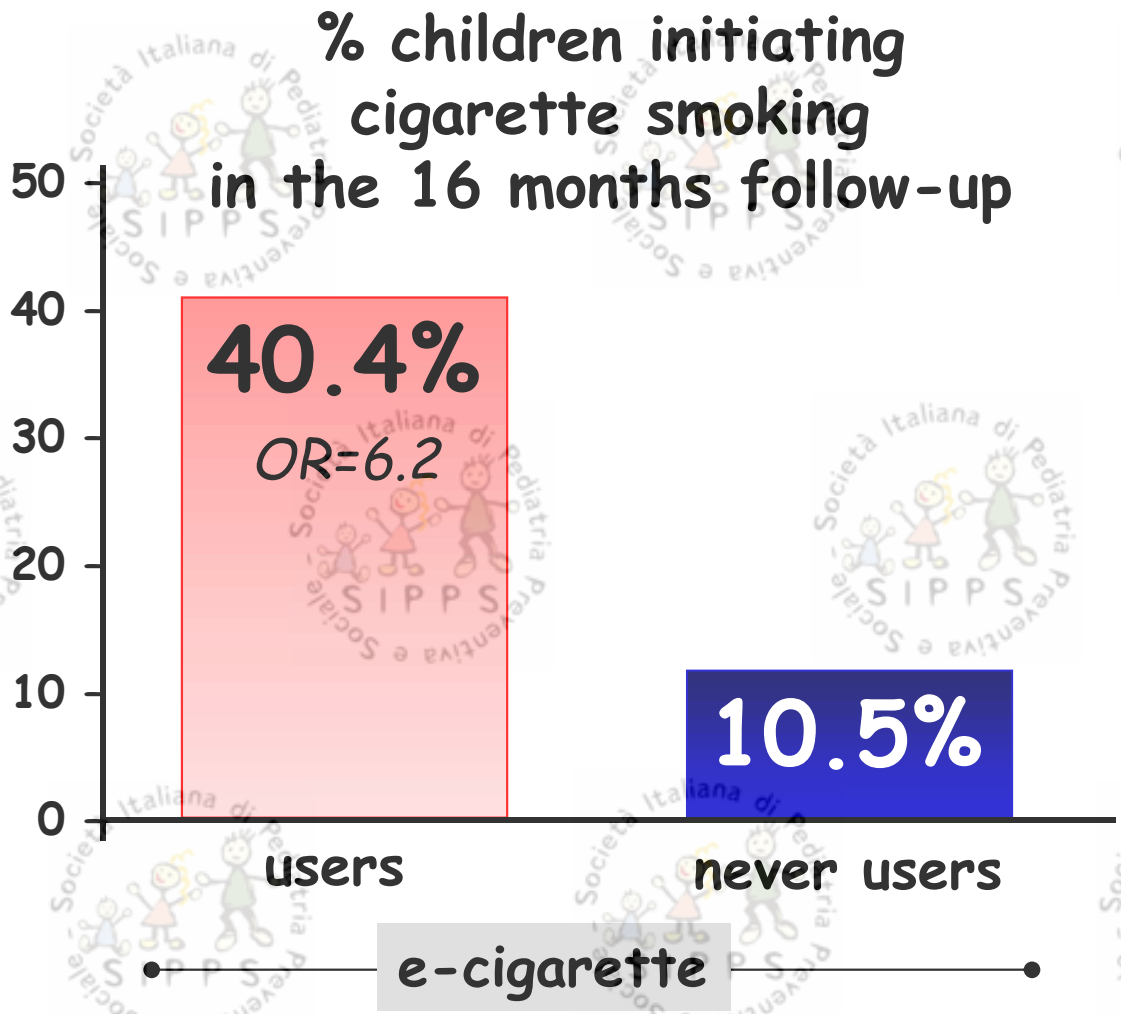
- ✓Longitudinal cohort study
- ✓694 participants aged 16 to 26 yrs
- ✓Never cigarette smokers and attitudinally nonsusceptible to smoking cigarettes
- ✓Reassessed 1 year later



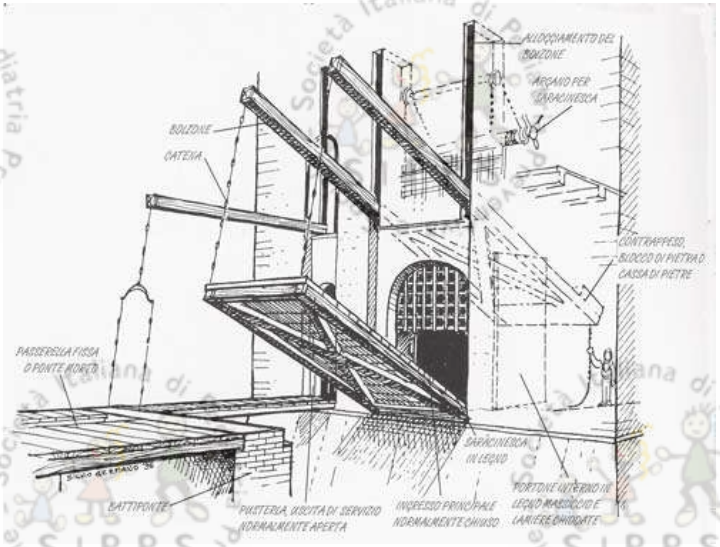
E-Cigarettes and Future Cigarette Use

Barrington-Trimis JL, Pediatrics 2016;138:e20160379

- ✓ e-cigarette use in 11th and 12th grade (mean age = 17.4).
- ✓ Follow-up data on tobacco product use were of 16 months later.



E-cigarettes: further risks



Pediatric Exposure to E-Cigarettes, Nicotine, and Tobacco Products in the United States

Kamboj A, Pediatrics 2016;138:e20160041

- ✓ National Poison Data System data From January 2012 through April 2015.

- The National Poison Data System received 29 141 calls for nicotine and tobacco product exposures among children younger than 6 years, averaging 729 child exposures per month.

Pediatric Exposure to E-Cigarettes, Nicotine, and Tobacco Products in the United States

Kamboj A, Pediatrics 2016;138:e20160041

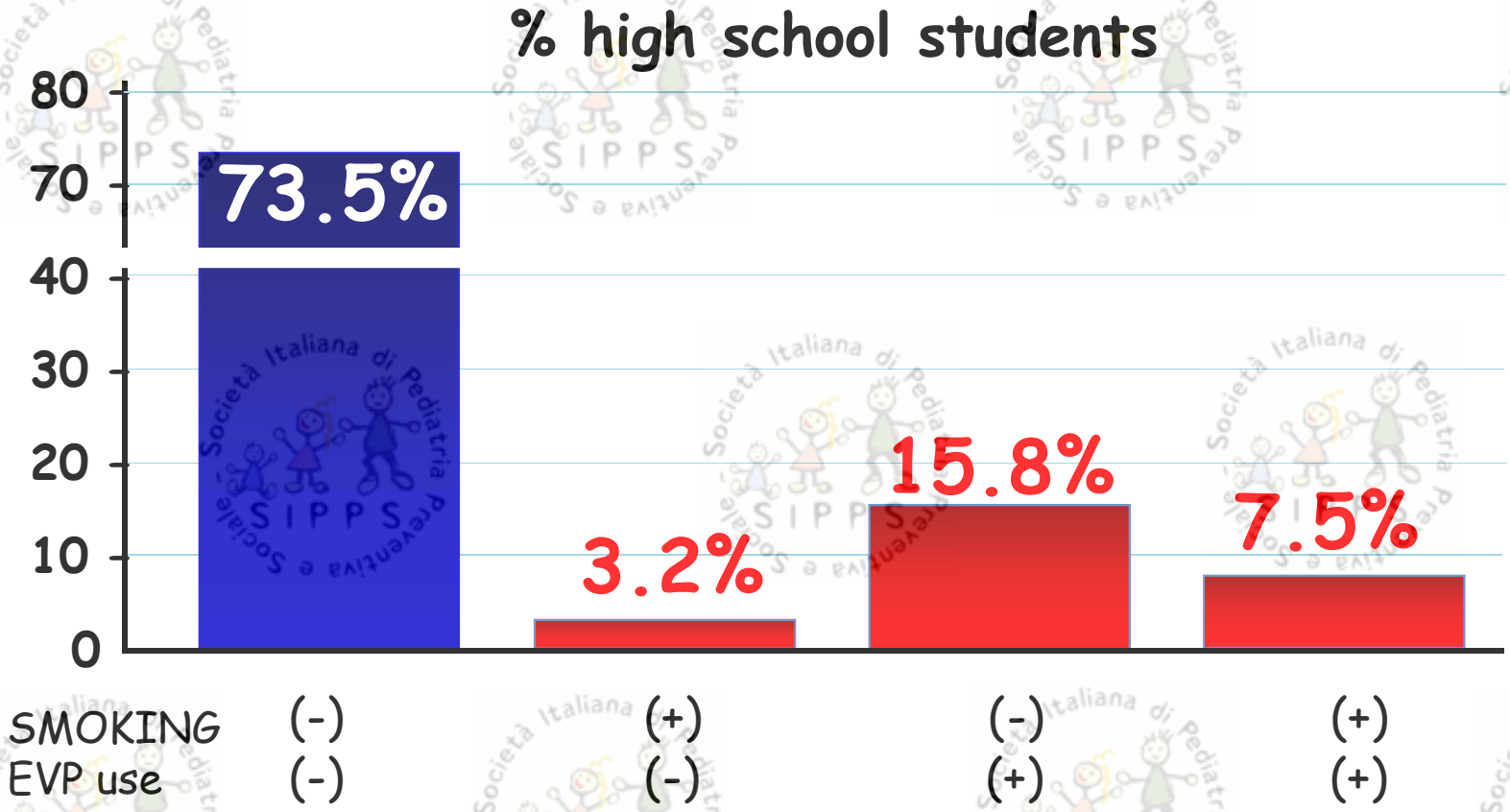
✓ The monthly number of exposures associated with e-cigarettes increased by 1492.9% during the study period

- The National Poison Data System received 29 141 calls for nicotine and tobacco product exposures among children younger than 6 years, averaging 729 child exposures per month.

Adolescent Risk Behaviors and Use of Electronic Vapor Products and Cigarettes

Demissie Z. Pediatrics 2017;139(2) :e20162921

- ✓ 2015 national Youth Risk Behavior Survey data (N = 15 624) to classify students into 4 mutually exclusive categories of smoking and electronic vapor products (EVP) use based on 30-day use: nonuse, cigarette smoking only, EVP use only, and dual use.

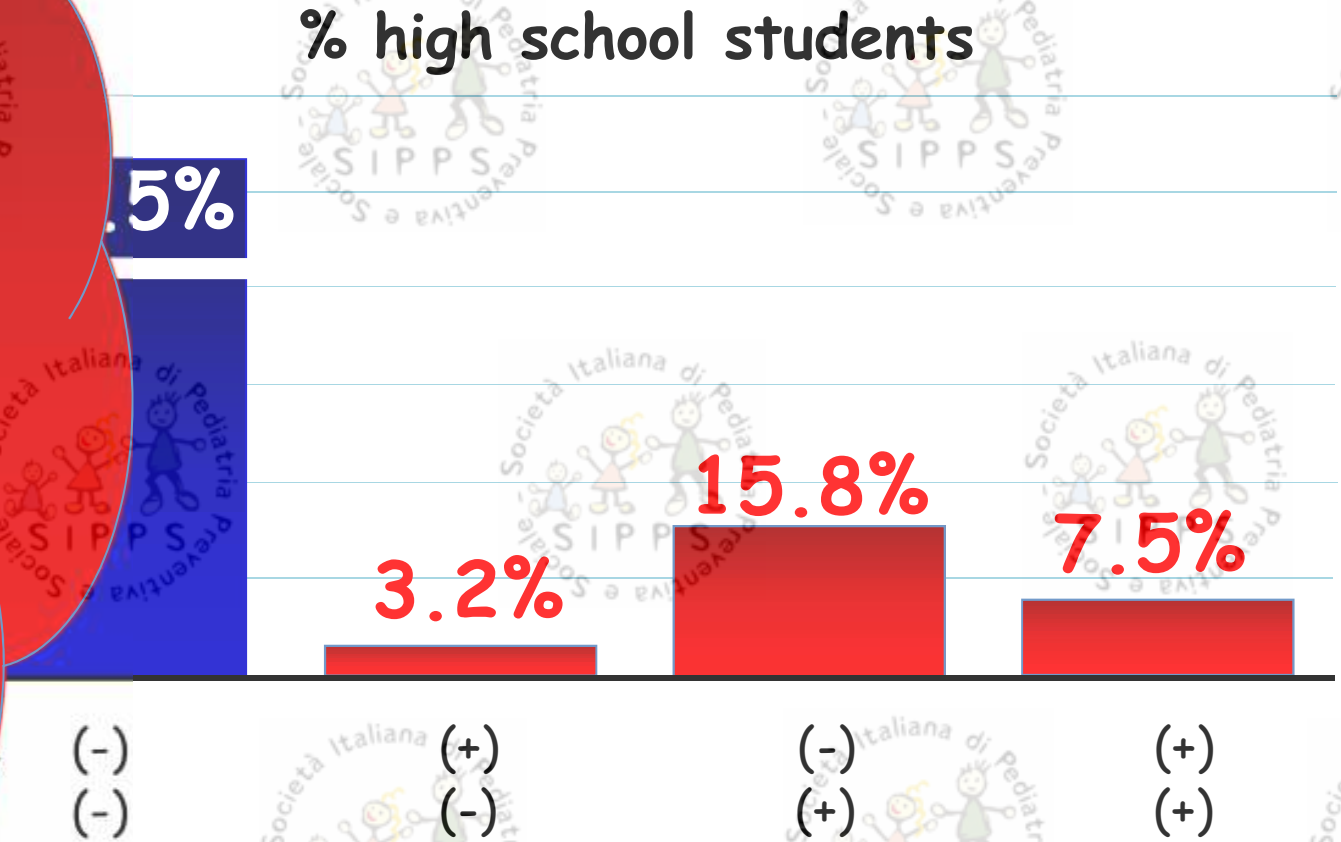


Adolescent Risk Behaviors and Use of Electronic Vapor Products and Cigarettes

Demissie Z. Pediatrics 2017;139(2) :e20162921

- ✓ 2015 natio
  Yo
  B
  use
  use.

Cigarette-only smokers, EVP-only users, and dual users were more likely than nonusers to engage in several injury, violence, and substance use behaviors; have ≥4 lifetime sexual partners; be currently sexually active and drink soda ≥3 times/day

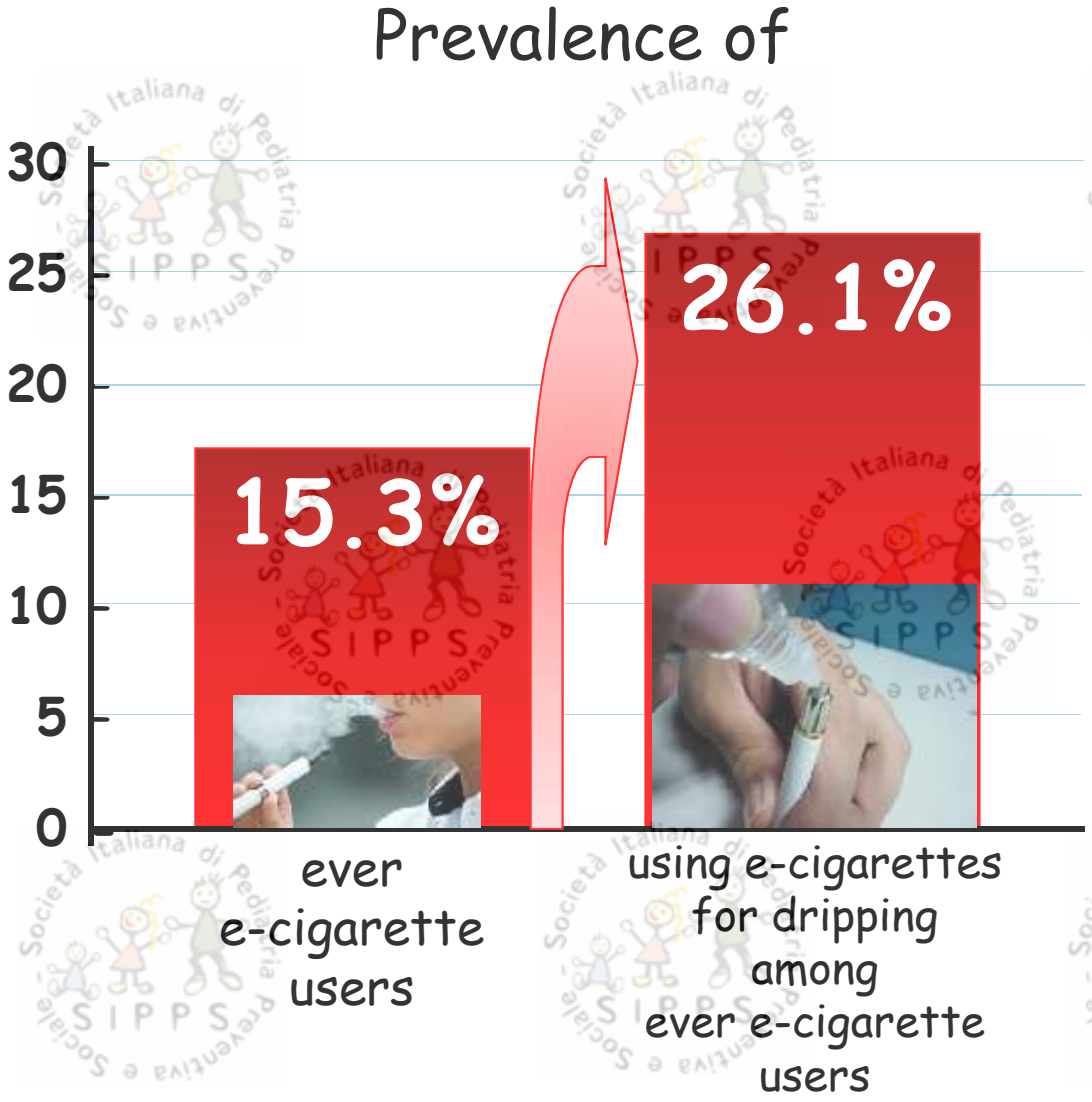


E-Cigarettes and "Dripping" Among High-School Youth

Krishnan-Sarin S, Pediatrics 2017;139(3)

✓7045 students from high schools completed anonymous surveys.

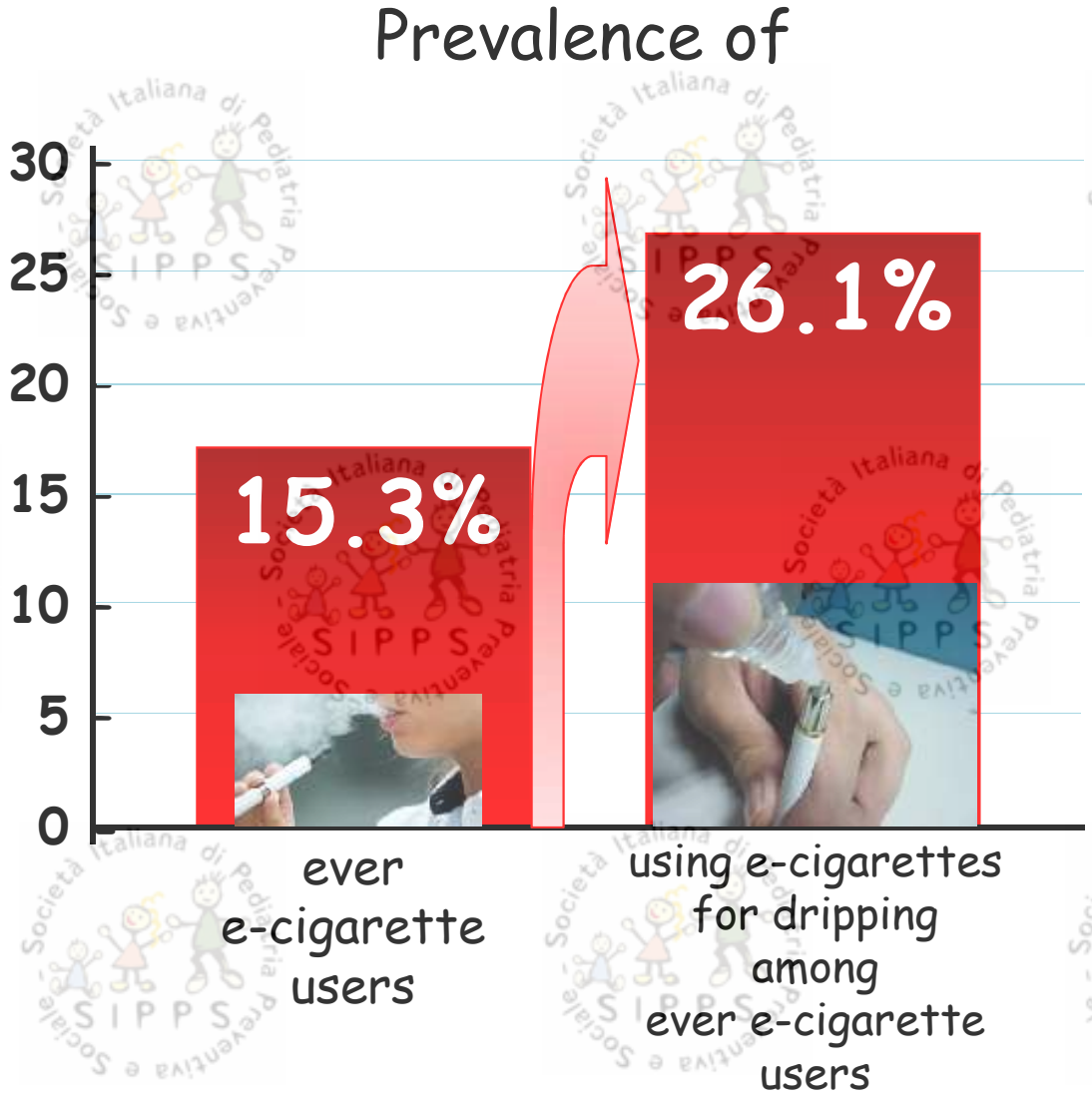
✓Prevalence rates of ever using e-cigarettes for dripping.



E-Cigarettes and "Dripping" Among High-School Youth

Krishnan-Sarin S, Pediatrics 2017;139(3)

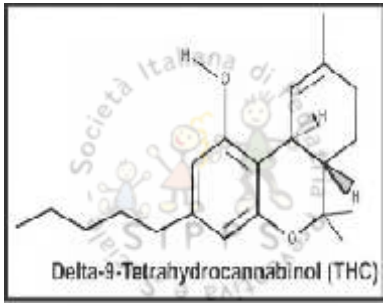
A substantial portion (~1 in 4) of high school adolescents who had ever used e-cigarettes also report using the device for dripping.



High School Students' Use of Electronic Cigarettes to Vaporize Cannabis

Morean M.E. Pediatrics 2015;136:611

- E-cigarettes can be modified to provide an efficient way to vaporize cannabis in the form of highly concentrated liquid hash oil, highly concentrated waxy forms of D-9-tetrahydrocannabinol (THC, the primary psychoactive ingredient in cannabis), or dried cannabis buds or leaves.

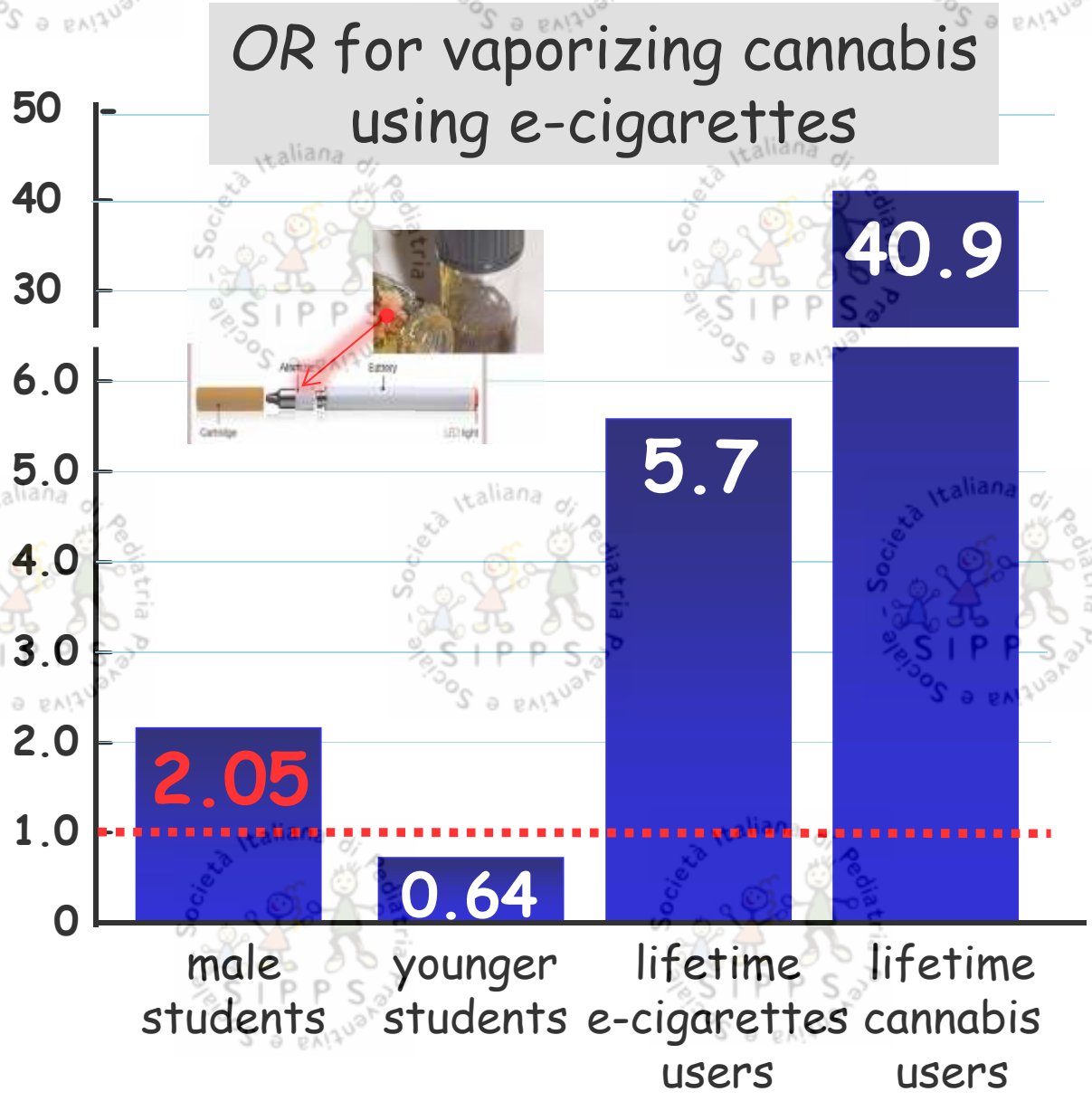


- Of note, vaporizing cannabis by using e-cigarettes is less evident than combustible means of smoking cannabis (eg, joints, blunts, pipes), because vaporization results in a less pungent odor.
  Also of concern, the THC concentrations of vaporized hash oil and waxes can exceed that of dried cannabis by 4 to 30 times.

High School Students' Use of Electronic Cigarettes to Vaporize Cannabis

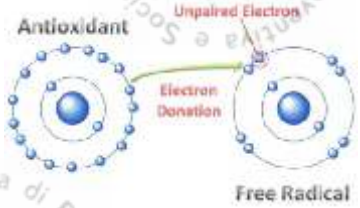
Morean M.E. Pediatrics 2015;136:611

- ✓ 3847 Connecticut high school students
- ✓ Anonymous survey assessing e-cigarette and cannabis use.



Acute Impact of Tobacco vs Electronic Cigarette Smoking on Oxidative Stress and Vascular Function

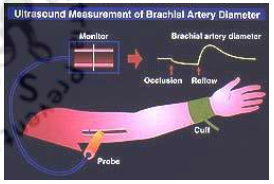
Carnevale R, Chest 2016;150:606-612



- ✓ 40 healthy subjects
- ✓ All subjects smoked traditional tobacco cigarettes.
- ✓ One week later, the same subjects smoked an e-Cigarette with the same nominal nicotine content.
- ✓ Markers of oxidative stress, nitric oxide bioavailability, and vitamin E levels.
- ✓ Flow-mediated dilation (FMD).

- ❑ Smoking both e-Cigarettes and traditional cigarettes led to:

- a significant increase in the: levels of soluble NOX2-derived peptide and 8-iso-prostaglandin F2a
- a significant decrease in nitric oxide bioavailability, vitamin E levels, and FMD.



E-cigarettes for smoking cessation

E-cigarettes and smoking cessation in real-world and clinical settings: a systematic review and meta-analysis

Kalkhoran S, Lancet Respir Med 2016;4:116-128

✓ 38 studies

OR of quitting cigarettes

in those who used e-cigarettes compared with those who did not use e-cigarettes

E-cigarettes and smoking cessation in real-world and clinical settings: a systematic review and meta-analysis

Kalkhoran S, Lancet Respir Med 2016;4:116-128

- Association of e-cigarette use with quitting did not significantly differ among studies of all smokers using e-cigarettes (irrespective of interest in quitting cigarettes) (*OR* 0·63, 95% CI 0·45-0·86) compared with studies of only smokers interested in cigarette cessation (0·86, 0·60-1·23; p=0.94).

- As currently being used, e-cigarettes are associated with significantly less quitting among smokers.

E-cigarettes and smoking cessation in real-world and clinical settings: a systematic review and meta-analysis

Kalkhoran S, Lancet Respir Med 2016;4:116-128

- Data from the large population based California Tobacco Surveys, showed that nicotine replacement therapy (NRT) was associated with long-term success in quitting cigarettes when available by prescription only, but this association was lost when NRT became available over the counter.
- E-cigarettes are not being used just as smoking cessation devices in the real world.
- Indeed, one important motivation for using e-cigarettes is to self-administer nicotine in places where smoking is prohibited.

Cigarette smoking and Surroundings

live fit

- ✓ Introduction
- ✓ Cigarette smoking in pregnancy
- ✓ Smoking in pregnancy surroundings
- ✓ Passive smoking
- ✓ Passive smoking surroundings
- ✓ Active smoking
- ✓ Active smoking surroundings
- ✓ The e-cigarettes' problem
- ✓ **What can we do?**
- ✓ Conclusions

Attilio Boner
University of Verona, Italy
attilio.boner@univr.it

Public Policy to Protect Children From Tobacco, Nicotine, and Tobacco Smoke *Farber HJ, Pediatrics 2015;136;998*

RECOMMENDATIONS FOR PUBLIC POLICY TO PROTECT CHILDREN FROM TOBACCO USE INITIATION

- Tobacco product advertising and promotion in forms that are accessible to children and youth should be prohibited.

  Recommendation Strength: Strong Recommendation

- Point-of-sale tobacco product advertising and product placement that can be viewed by children should be prohibited.

  Recommendation Strength: Strong Recommendation

- Depictions of tobacco products in movies and other media that can be viewed by youth should be restricted.

  Recommendation Strength: Strong Recommendation

Association of Smoke-Free Laws with Lower Percentages of New and Current Smokers Among Adolescents and Young Adults - An 11-Year Longitudinal Study -

Song AV, JAMA Pediatr. 2015;169:1-6

- ✓National Longitudinal Survey of Youth (data from 1997 to 2007)
- ✓Laws for 100% smoke-free workplaces, laws for 100% smoke-free bars and state cigarette taxes.
- ✓Smoking initiation (first report of smoking cigarette), current (for 30 days) smoking, number of days smoking in the past 30 days among current smokers

Laws for 100% smoke-free workplaces

significantly lower odds of initiating smoking (OR=0.66).

Association of Smoke-Free Laws with Lower Percentages of New and Current Smokers Among Adolescents and Young Adults - An 11-Year Longitudinal Study -

Song AV, JAMA Pediatr. 2015;169:1-6

- ✓National Longitudinal Survey of Youth (data from 1997 to 2007)
- ✓Laws for 100% smoke-free workplaces, laws for 100% smoke-free bars and state cigarette taxes.
- ✓Smoking initiation (first report of smoking cigarette), current (for 30 days) smoking, number of days smoking in the past 30 days among current smokers

Laws for 100% smoke-free bars

lower odds of being a current smoker (OR=0.80) and fewer days of smoking (OR=0.85) among current smokers.

Smoke-free legislation and childhood hospitalisations for respiratory tract infections

Been JV, Eur Respir J 2015;46:697-706

✓association between England's smoke-free legislation and childhood respiratory tract infections (RTIs) hospitalisations

✓hospital admissions for acute RTIs among children (<15 years of age) from 2001 to 2012

immediate reduction in lower RTI admissions

Smoke-free legislation and childhood hospitalisations for respiratory tract infections

Been JV, Eur Respir J 2015;46:697-706

The introduction of national smoke-free legislation in England was associated with ~11 000 fewer hospital admissions per year for RTIs in children.

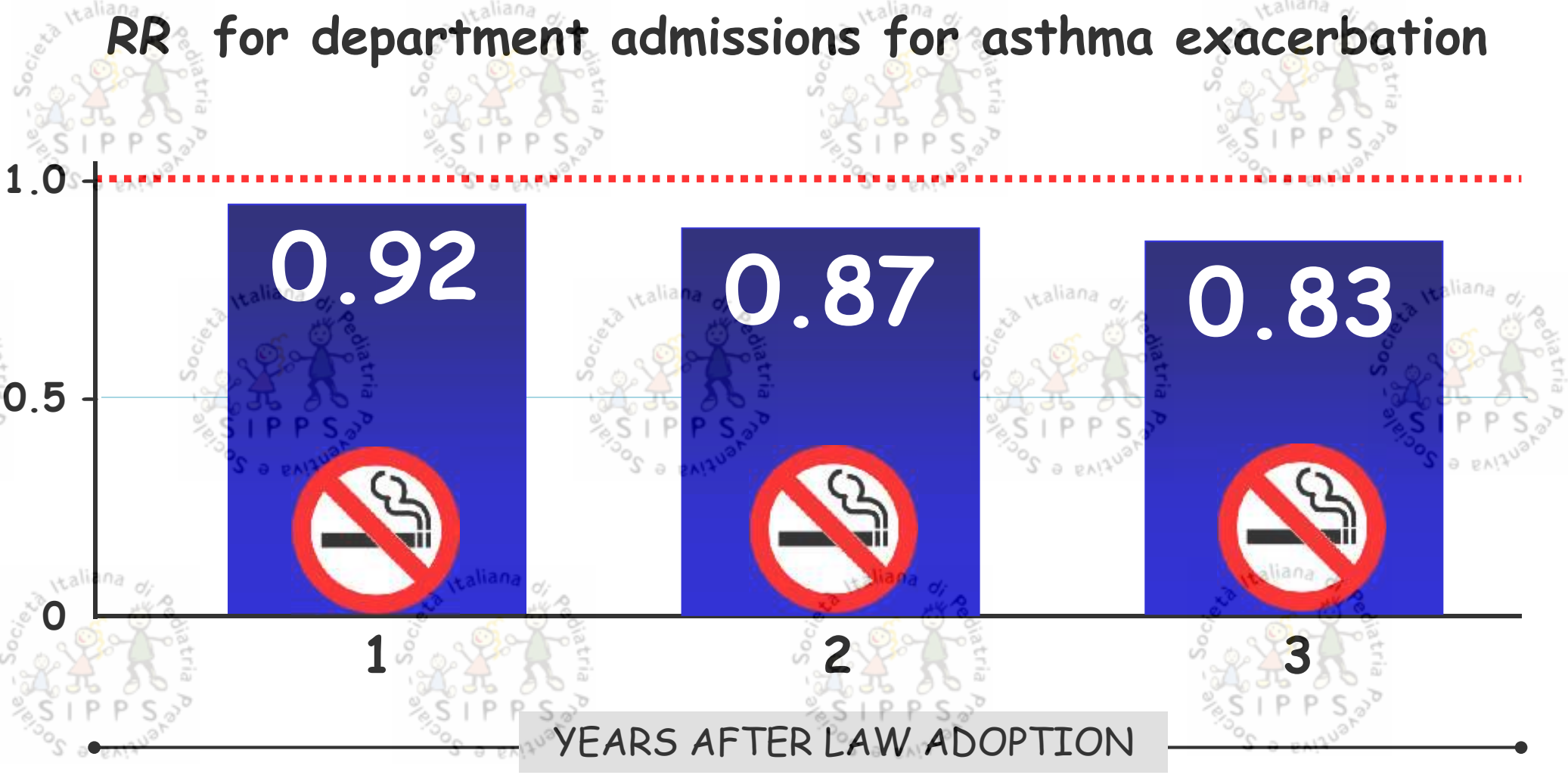
immediate reduction in lower RTI admissions

Indoor tobacco legislation is associated with fewer emergency department visits for asthma exacerbation in children *Ciaccio CE. Ann Allergy Asthma Immunol 2016;117:641-645*

- ✓Retrospective analysis to estimate the impact of clean indoor air legislation on the rate of emergency department admissions for asthma exacerbation in children.
- ✓Asthma emergency department visits from 20 hospitals from July 2000 to January 2014 (n=335,588).

Indoor smoking legislation, pooled across all cities, was associated with a **decreased rate of severe asthma exacerbation** *(p<0.0001)*.

Indoor tobacco legislation is associated with fewer emergency department visits for asthma exacerbation in children *Ciaccio CE. Ann Allergy Asthma Immunol 2016;117:641-645*



Tobacco 21–An Important Public Policy to Protect our Youth

Farber HJ, AJRCCM 2016;194:19-20

What is Tobacco 21?

Tobacco 21 bans the sale of tobacco products to persons under 21 years of age. Tobacco products include cigarettes, cigars, pipe tobacco, and roll your own tobacco, oral tobacco (chewing tobacco, snuff, and snus), hookah (water pipe) tobacco, and electronic nicotine delivery systems (electronic cigarettes and others).[1]

Tobacco 21–An Important Public Policy to Protect our Youth

Farber HJ, AJRCCM 2016;194:19-20

What benefits can we expect from Tobacco 21?

It is estimated that having this new law in place will result in about 12% fewer smokers.
Fewer babies will be harmed because fewer parents will be smokers.
There won't be as many hospitalizations.

And perhaps most important, our children will live longer and healthier.

Clinical Practice Policy to Protect Children From Tobacco, Nicotine, and Tobacco Smoke

Farber HJ, Pediatrics 2015;136;1008

RECOMMENDED ACTIONS FOR PEDIATRICIANS

- ✓ Inquire about tobacco use and tobacco smoke exposure as part of health supervision visits and visits for diseases that may be caused or exacerbated by tobacco smoke exposure.

Recommendation Strength: Strong Recommendation

Questions for parents that can be used to identify tobacco exposure include the following:

a. Does your child live with anyone who uses tobacco?
b. Does anyone who provides care for your child smoke?
c. Does your child visit places where people smoke?
d. Does anyone ever smoke in your home?
e. Does anyone ever smoke in your car?
f. Do you ever smell smoke from your neighbors in or near your home or apartment?

Clinical Practice Policy to Protect Children From Tobacco, Nicotine, and Tobacco Smoke

Farber HJ, Pediatrics 2015;136;1008

RECOMMENDED ACTIONS FOR PEDIATRICIANS

✓ Inquire about tobacco use and tobacco smoke exposure as part of health supervision visits and visits for diseases that may be caused or exacerbated by tobacco smoke exposure.

Recommendation Strength: Strong Recommendation

Identifying adolescent tobacco use can be challenging. Screening questions can provide an opening for the pediatrician.

Keep in mind that the tobacco product used might not be cigarettes.

Useful questions include the following:

a. Do any of your friends use tobacco?
b. Have you ever tried a tobacco product?
c. How many times have you tried (name of tobacco product)?
d. How often do you use (name of tobacco product)?
e. Do you friends use e-cigarettes, e-hookah, or vape?
f. Have you tried an e-cigarette, e-hookah, or vape?

Clinical Practice Policy to Protect Children From Tobacco, Nicotine, and Tobacco Smoke

Farber HJ, Pediatrics 2015;136;1008

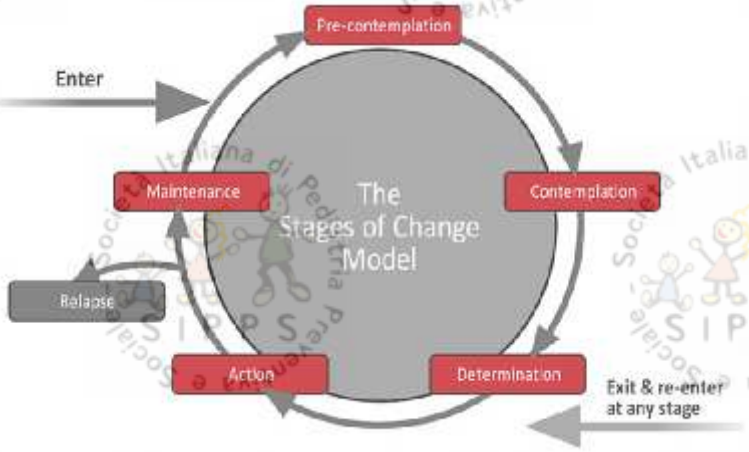
RECOMMENDED ACTIONS FOR PEDIATRICIANS

- Address parent/caregiver tobacco dependence as part of pediatric health care.

Recommendation Strength: Strong Recommendation

- Recommend tobacco dependence treatment of tobacco-dependent parents and caregivers.

Recommendation Strength: Strong Recommendation



The 5 A's to Quit Tobacco

Ask to quit at every visit.

Advise to quit tobacco at every visit.

Assess willingness to quit at every visit.

Assist quitting within 2 weeks with pharmacotherapy or counseling.

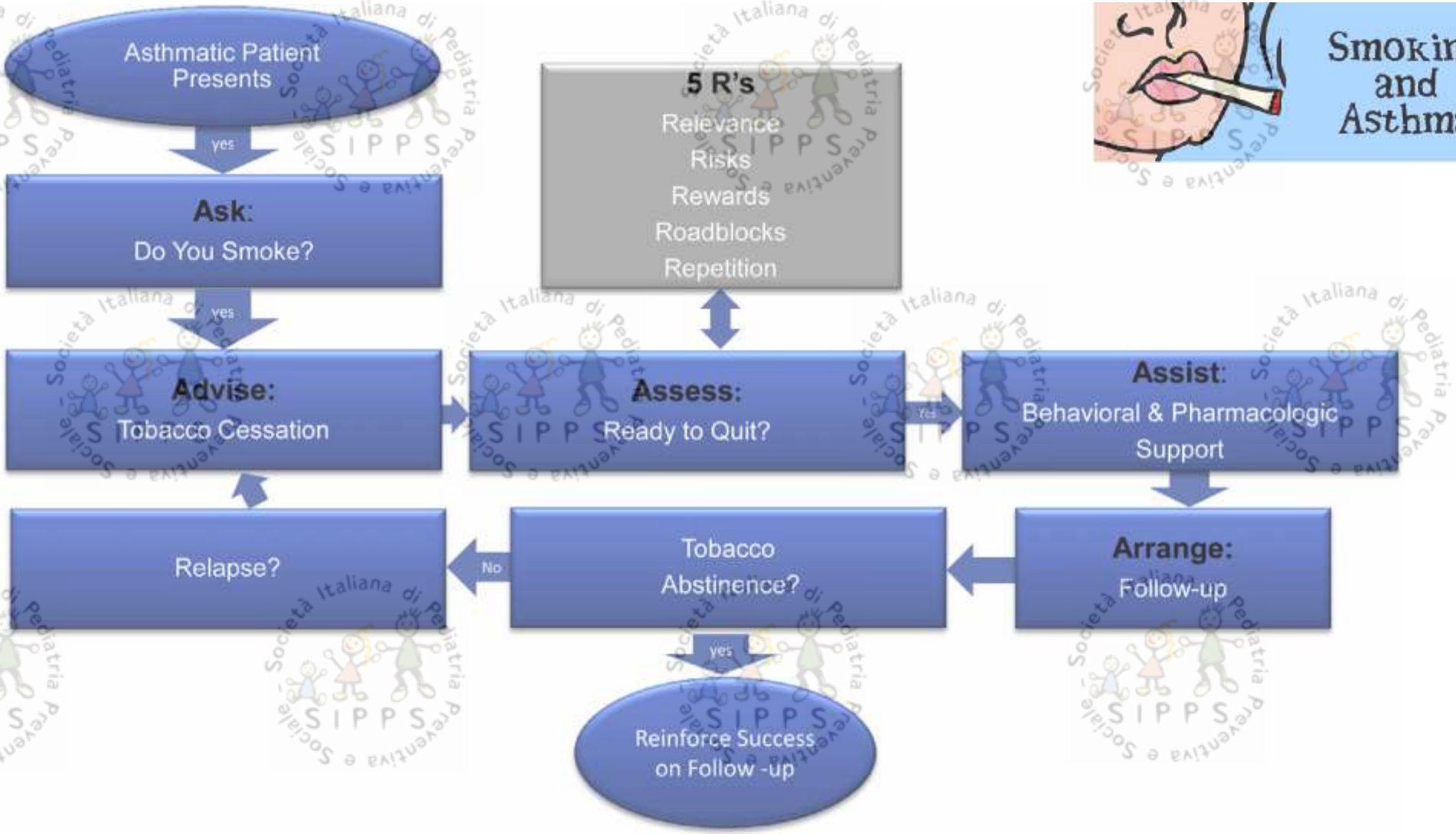
Arrange follow-up contact in 1st week after quitting.

Smoking and asthma: never the twain should meet*

Sands MF. Ann Allergy Astma Imunol 2014;113:502

*Two things which are so different as to have no opportunity to unite.

An algorithmic approach to smoking cessation incorporating the 5 As and the 5 Rs



Smoking and asthma: never the twain should meet*

Sands MF. Ann Allergy Astma Imunol 2014;113:502

Evaluation

Efforts must start with the recognition of perceived barriers to cessation followed by a frank discussion of how they can be overcome.

This process may begin with the "5 As".

1) Ask about tobacco use.
2) Advise cessation.
3) Assess willingness to quit.
4) Assist with cessation (behavioral and pharmacologic support).
5) Arrange for follow-up (without this, relapse is very high).

Smoking and asthma: never the twain should meet*

Sands MF. Ann Allergy Astma Imunol 2014;113:502

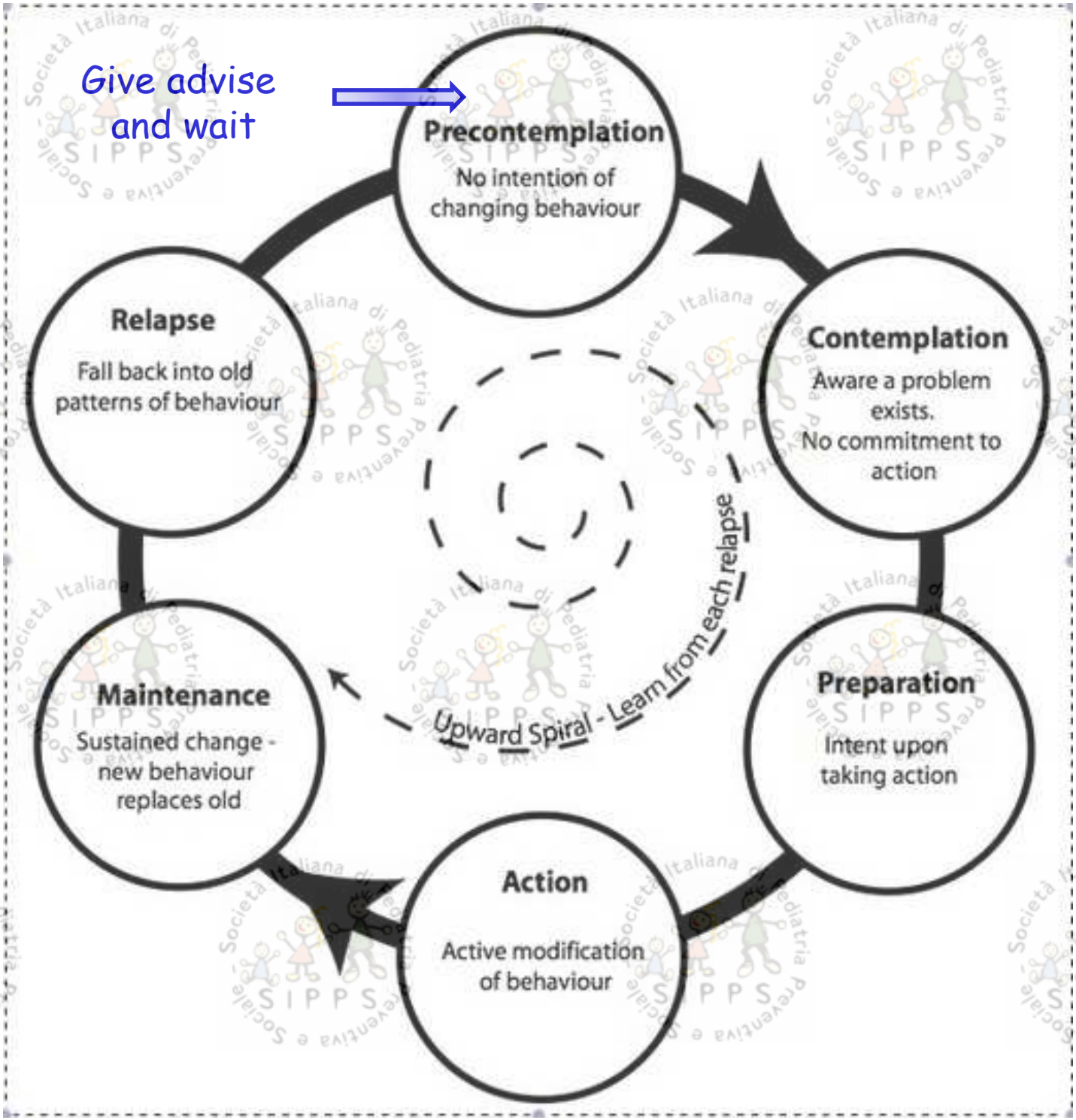
Evaluation

Counseling also should incorporate the "5 Rs". These include:

1) Relevance (quitting is personal).
2) For risks, have the patient describe the consequences of smoking on health.
3) For rewards, identify the benefits of cessation.
4) For roadblocks, patients must contemplate why they anticipate cessation might be undermined (household smokers, depression, anxiety, substance abuse, prior failed attempts, withdrawal symptoms, weight gain).
5) For repetition, use these elements to interact when there is a relapse or lack of primary motivation.

TEORIA DEGLI STADI DEL CAMBIAMENTO

(Prochaska J., Di Clemente C., 1980)



Clinical Decision Support Tool for Parental Tobacco Treatment in Primary Care

Jenssen BP, Pediatrics 2016;137: e20154185

Parental tobacco treatment Clinical Decision Support tool. NRT prescription link

Cytisine versus nicotine for smoking cessation.
Walker N, NEJM. 2014;371(25):2353-62

plant Cytisus laburnum (Golden Rain acacia).

The Children's Hospital of Philadelphia
4865 Market Street
Philadelphia, PA 19139
(267) 425-9800
www.chop.edu

Name _____ Date _____

Address _____ D.O.B. _____

℞ Check product and dose:

☐ Nicotine Gum

Dosing Recommendation:

☐ 2 mg — 1st cigarette >30 minutes after waking: 2 mg

☐ 4 mg — 1st cigarette ≤30 minutes after waking: 4 mg

Chew 1 piece every 1-2 hours
Dispense 2 months' supply

☐ Nicotine Patch

Dosing Recommendation:

☐ 14 mg — <10 cigarettes/day: 14 mg

☐ 21 mg — >10 cigarettes/day: 21 mg

Apply 1 patch for 16-24 hours each day
Dispense 2 months' supply

Refil ☐1 ☐2 ☐3

Provider Name _____ Lic # _____

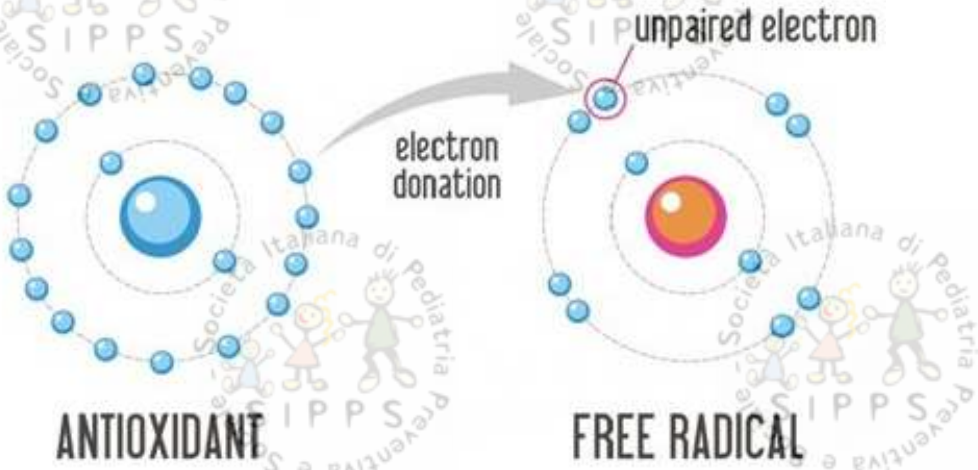
Provider Signature _____

plant Cytisus laburnum
(Golden Rain acacia).

Citisina compresse da 1,5 mg – n° 100 capsule

Giorno	n° cpr/die	Frequenza assunzione
1	2	1 cpr ogni 12 ore (ore 8,20)
2	3	1 cpr ogni 6 ore (ore 8,14,20)
3	4	1 cpr ogni 4 ore (ore 8,12,16,20)
4-7	5	1 cpr ogni 3 ore (ore 8,11,14,17,20)
8-14	6	1 cpr ogni 2 ore e mezza (ore 8.00; 10.30; 13.00; 15.30; 18.00; 20.30)
15-21	5	1 cpr ogni 3 ore (ore 8,11,14,17,20)
22-28	4	1 cpr ogni 4 ore (ore 8,12,16,20)
29-35	3	1 cpr ogni 6 ore (ore 8,14,20)
36-40	2	1 cpr ogni 12 ore (ore 8,20)


#8
Effect
Mitigation


unpaired electron
electron
donation
ANTIOXIDANT
FREE RADICAL

Role of Oxidative Stress in the Suppression of Immune Responses in Peripheral Blood Mononuclear Cells Exposed to Combustible Tobacco Product Preparation.

Arimilli S, Inflammation. 2017 [Epub ahead of print]

oChronic inflammation, resulting from increased oxidative stress contributes to the increased susceptibility of smokers to cancer and microbial infections.

whole-smoke conditioned medium (WS-CM) and total particulate matter (TPM) prepared from Kentucky 3R4F reference cigarettes

peripheral blood mononuclear cells

suppression of select cytokine secretions in Toll-like receptor (TLR) agonist-stimulated cells and target cell killing

Role of Oxidative Stress in the Suppression of Immune Responses in Peripheral Blood Mononuclear Cells Exposed to Combustible Tobacco Product Preparation.

Arimilli S, Inflammation. 2017 [Epub ahead of print]

oChronic inflammation, resulting from increased oxidative stress contributes to the increased susceptibility of smokers to cancer and microbial infections.

whole-smoke conditioned medium (WS-CM) and total particulate matter (TPM) prepared from Kentucky 3R4F reference cigarettes

peripheral blood mononuclear cells

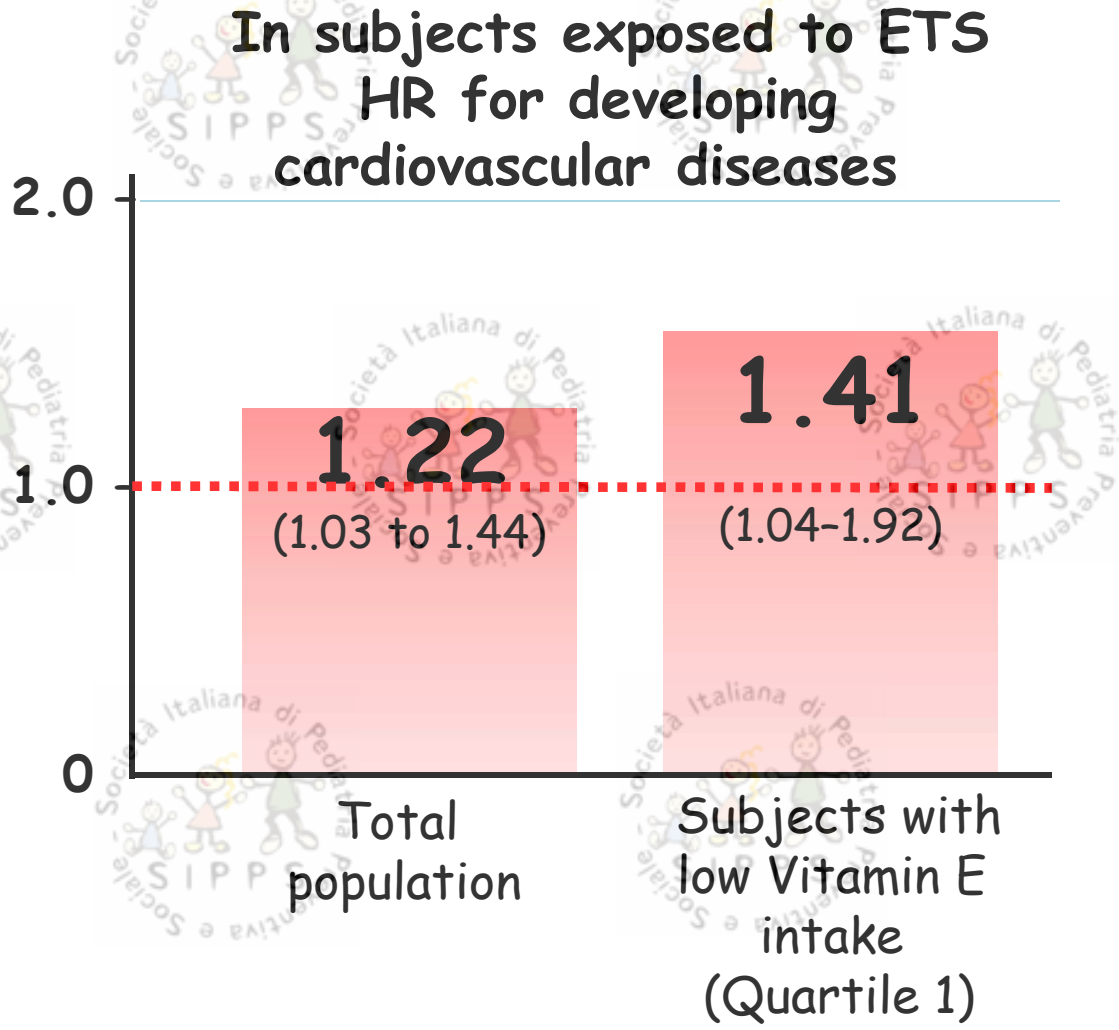
Pretreatment with N-acetyl cysteine (NAC), a precursor of reduced glutathione and an established anti-oxidant, protected against DNA damage and restored the target cell killing.

suppression of select cytokine secretions in Toll-like receptor (TLR) agonist-stimulated cells and target cell killing

The Relationship between Environmental Tobacco Smoke Exposure and Cardiovascular Disease and the Potential Modifying Effect of Diet in a Prospective Cohort among American Indians: The Strong Heart Study.

Rajkumar S, Int J Environ Res Public Health. 2017;14(5). pii: E504.

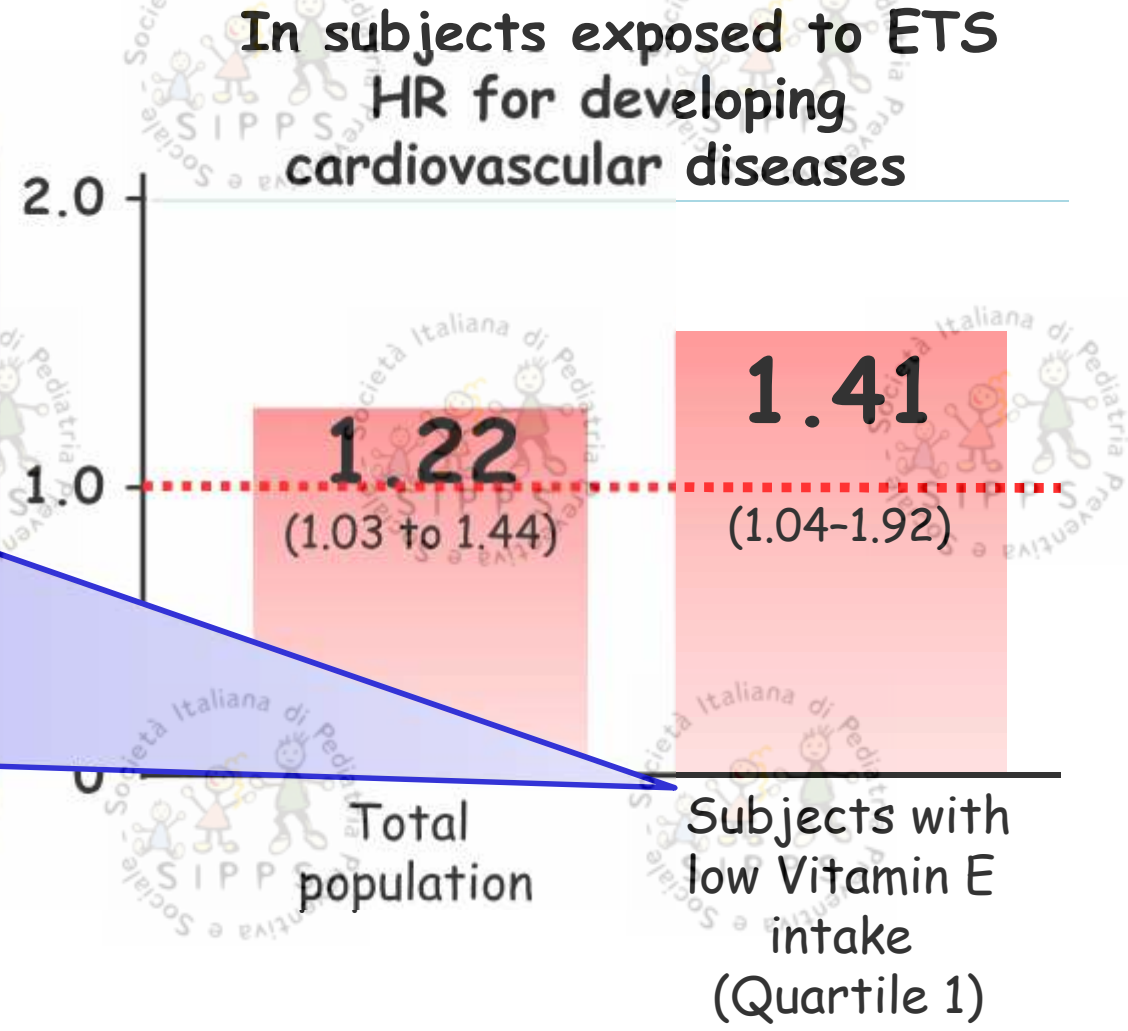
- ✓843 non-smoking American Indians
- ✓self-reported exposure to ETS
- ✓fatal and nonfatal CVD incidence



The Relationship between Environmental Tobacco Smoke Exposure and Cardiovascular Disease and the Potential Modifying Effect of Diet in a Prospective Cohort among American Indians: The Strong Heart Study.

Rajkumar S, Int J Environ Res Public Health. 2017;14(5). pii: E504.

Vitamin E increases antioxidant gene expression and antioxidant enzymes.



Pharmacological and dietary antioxidant therapies for chronic obstructive pulmonary disease.

Biswas S, Curr Med Chem. 2013;20(12):1496-530.

The progression and exacerbations of chronic obstructive pulmonary disease (COPD) are intimately associated with tobacco smoke-induced oxidative stress.

pathological hallmarks of COPD:

- Alterations in redox signaling proinflammatory kinases and transcription factors,
- steroid resistance,
- unfolded protein response,
- mucus hypersecretion,
- extracellular matrix remodeling,
- autophagy/apoptosis,
- epigenetic changes,
- cellular senescence/aging,
- endothelial dysfunction,
- autoimmunity, and
- skeletal muscle dysfunction

Pharmacological and dietary antioxidant therapies for chronic obstructive pulmonary disease.

Biswas S, Curr Med Chem. 2013;20(12):1496-530.

The progression and exacerbations of chronic obstructive pulmonary disease (COPD) are intimately associated with tobacco smoke-induced oxidative stress.

pathological hallmarks of COPD:

- Alterations in redox signaling proinflammatory kinases and transcription factors,
- steroid resistance,
- unfolded protein response,
- mucus hypersecretion,
- extracellular matrix remodeling,
- autophagy/apoptosis,
- epigenetic changes,
- cellular senescence/aging,
- endothelial dysfunction,
- autoimmunity, and
- skeletal muscle dysfunction

dietary natural product-derived polyphenols and other compounds such as: curcumin, resveratrol, quercetin, sulforaphane, have made possible to modulate various biochemical aspects of COPD.

Pharmacological and dietary antioxidant therapies for chronic obstructive pulmonary disease.

Biswas S, Curr Med Chem. 2013;20(12):1496-530.

The progression and exacerbations of chronic obstructive pulmonary disease (COPD) are intimately associated with tobacco smoke-induced oxidative stress.

proinflammatory kinases

Various researches and clinical trials have revealed that these antioxidants can:

- ❖detoxify free radicals and oxidants,
- ❖control expression of:
  - ▪redox and glutathione biosynthesis genes,
  - ▪chromatin remodeling, and ultimately
  - ▪inflammatory gene expression.

dietary natural product-derived polyphenols and other compounds such as: curcumin, resveratrol, quercetin, sulforaphane, have made possible to modulate various biochemical aspects of COPD.

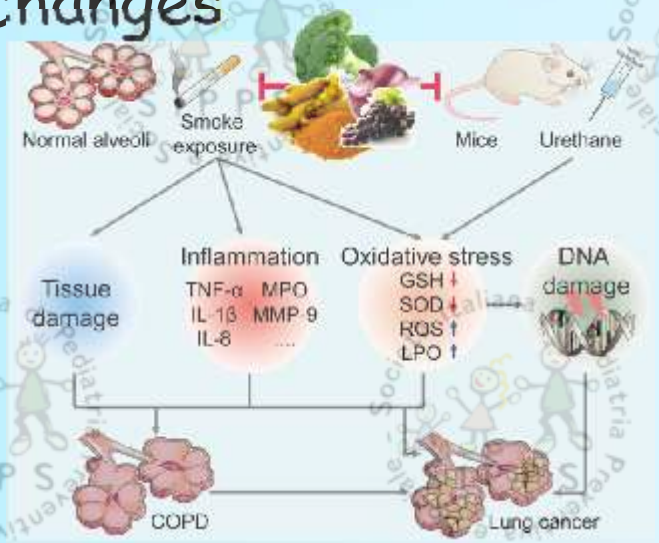
Pharmacological and dietary antioxidant therapies for chronic obstructive pulmonary disease.

Biswas S, Curr Med Chem. 2013;20(12):1496-530.

The progression and exacerbations of chronic obstructive pulmonary disease (COPD) are intimately associated with tobacco smoke-induced oxidative stress.

proinflammatory kinases

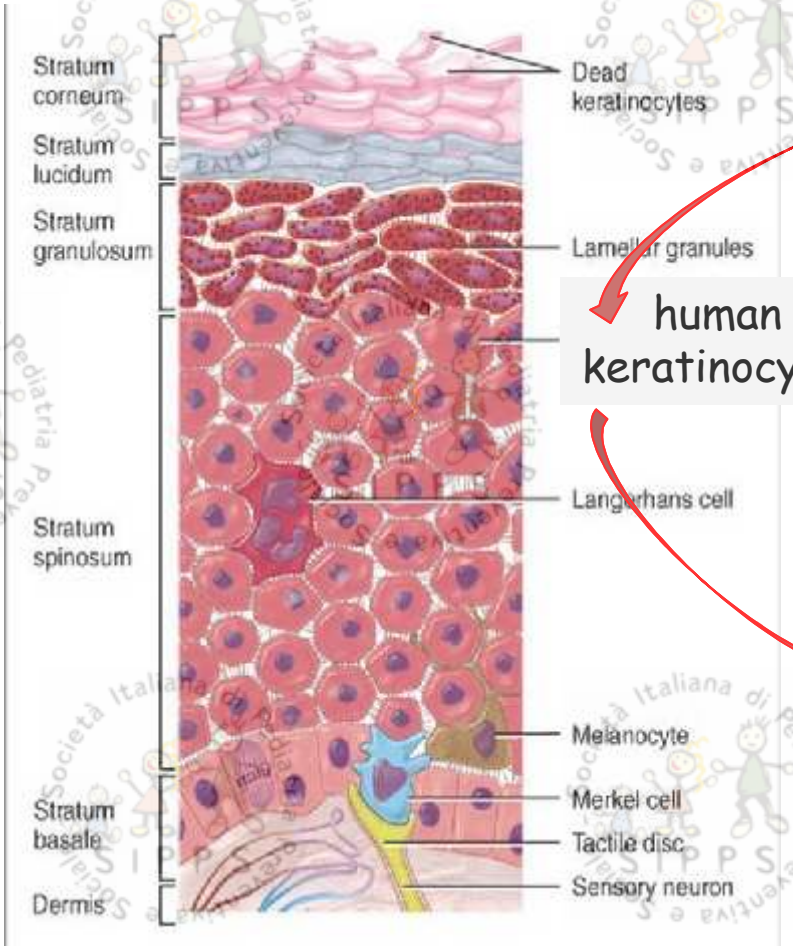
In addition, modulation of cigarette smoke-induced oxidative stress and related cellular changes have also been reported to be effected by synthetic molecules.



dietary natural product-derived polyphenols and other compounds such as: curcumin, resveratrol, quercetin, sulforaphane, have made possible to modulate various biochemical aspects of COPD.

Resveratrol prevents cigarette smoke-induced keratinocytes damage.

Sticozzi C, Food Funct. 2014;5(9):2348-56



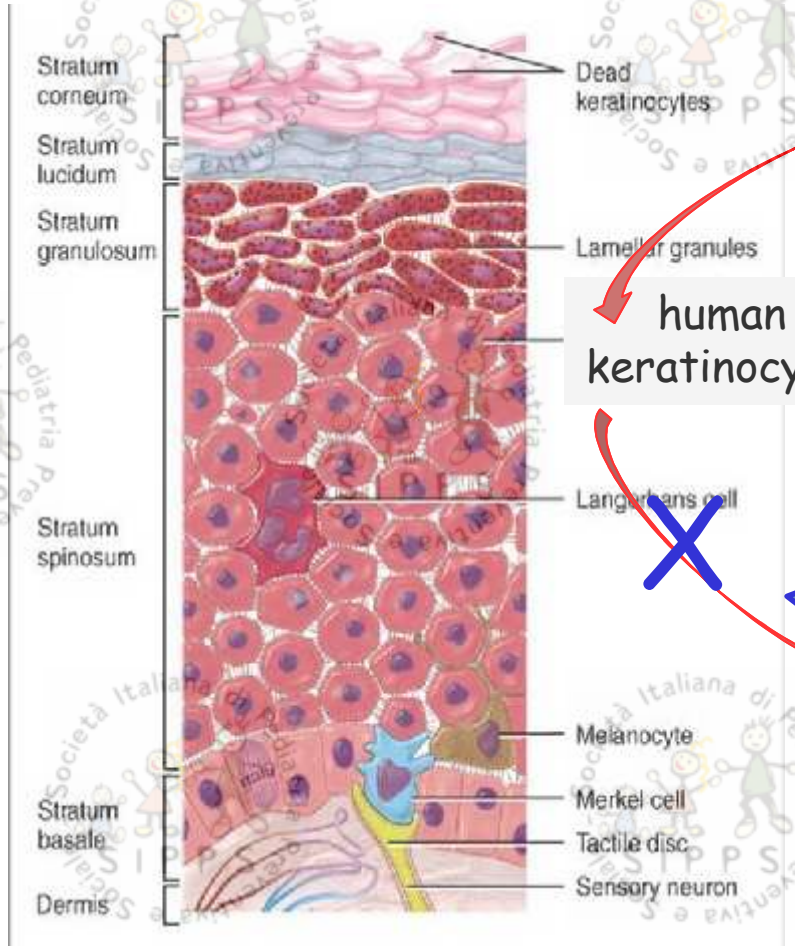
cigarette smoke

human keratinocytes

cellular oxidative stress (OS) and inflammation via the production of ROS and lipid peroxidation compounds

Resveratrol prevents cigarette smoke-induced keratinocytes damage.

Sticozzi C, Food Funct. 2014;5(9):2348-56



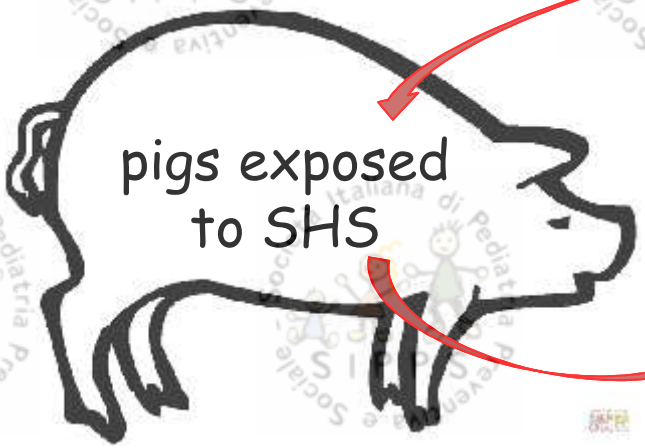
cigarette smoke

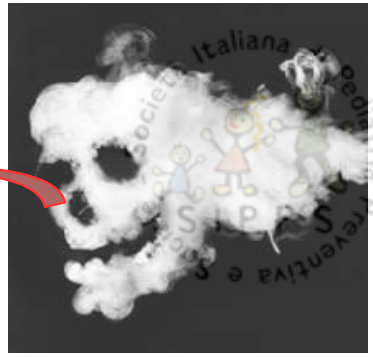
human keratinocytes

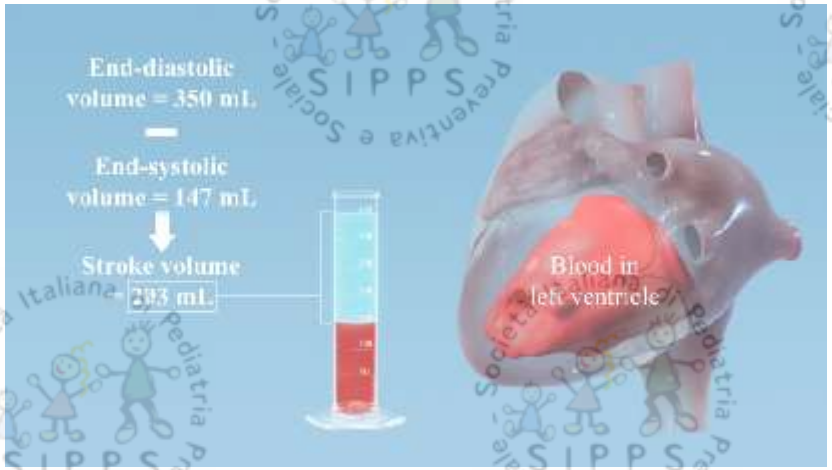
cellular oxidative stress (OS) and inflammation via the production of ROS and lipid peroxidation compounds

Resveratrol protects against functional impairment and cardiac structural protein degradation induced by secondhand smoke exposure.

Arcand S, Can J Cardiol. 2013;29(10):1320-8.



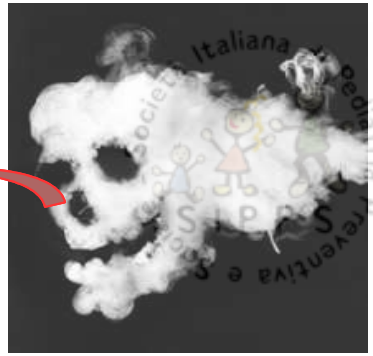


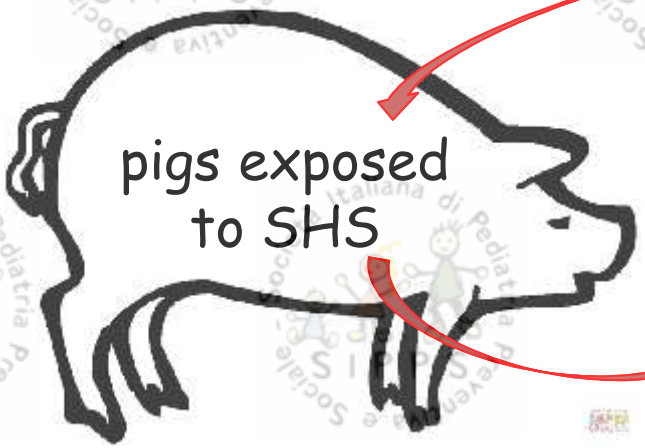


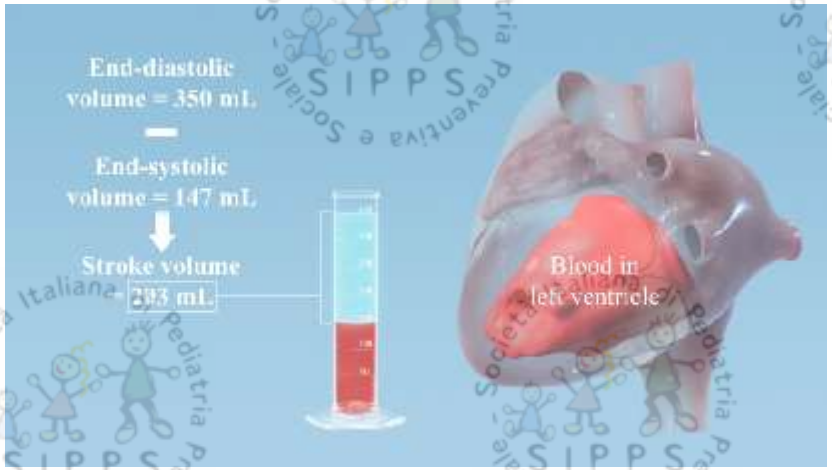
- After 28 days,
  - end-diastolic volume, end-systolic volume, and stroke volume were all impaired.
  - Inflammation, oxidative stress, and matrix metalloproteinase-2 were increased
  - intact myosin light chain 1 were decreased

Resveratrol protects against functional impairment and cardiac structural protein degradation induced by secondhand smoke exposure.

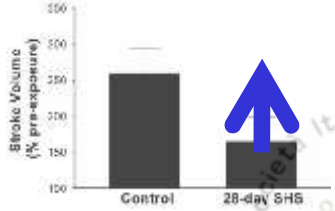
Arcand S, Can J Cardiol. 2013;29(10):1320-8.







- After 14 days,
  - end-diastolic volume, end-systolic volume, and stroke volume were all impaired.



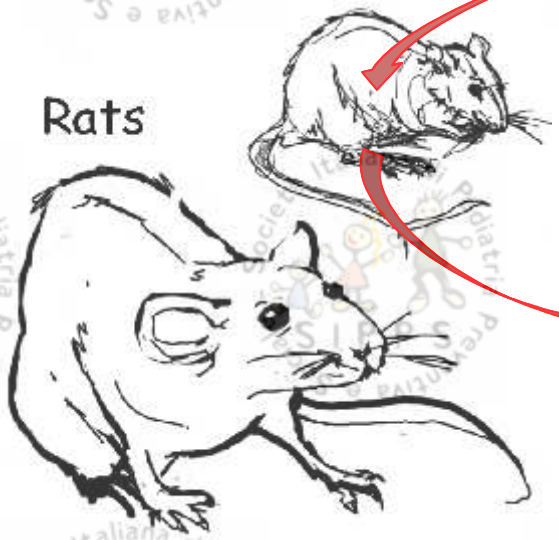
Normalized by Resveratrol

- Inflammation, oxidative stress, and matrix metalloproteinase-2 were increased
- intact myosin light chain 1 were decreased

Free and nanoencapsulated curcumin prevents cigarette smoke-induced cognitive impairment and redox imbalance.

Jaques JA, Neurobiol Learn Mem. 2013;100:98-107.

once a day,
5 days each week,
for 30 days.



❑**Cigarette smoke-exposure:**

- impaired object recognition memory *(P<0.001)*, indicated by the low recognition index,
- increased biomarkers of oxidative/nitrosative stress such as TBARS *(P<0.05)* and NOx *(P<0.01)*,
- decreased antioxidant defenses such as NPSH content *(P<0.01)* and SOD activity *(P<0.01)* and
- inhibited the activities of enzymes involved in ion homeostasis such as Na(+),K(+)-ATPase and Ca(2+)-ATPase.

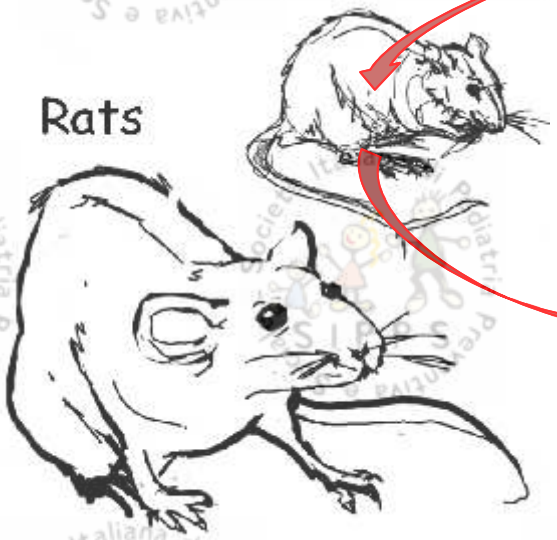
Free and nanoencapsulated curcumin prevents cigarette smoke-induced cognitive impairment and redox imbalance.

Jaques JA, Neurobiol Learn Mem. 2013;100:98-107.

All prevented by curcumin

once a day,
5 days each week,
for 30 days.

Rats



❑**Cigarette smoke-exposure:**

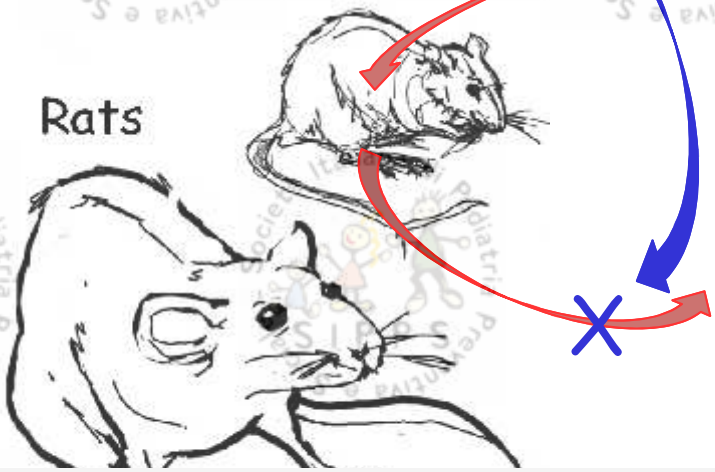
- impaired object recognition memory *(P<0.001)*, indicated by the low recognition index,
- increased biomarkers of oxidative/nitrosative stress such as TBARS *(P<0.05)* and N[illegible] *(P<0.01)*,
- decreased antioxidant defenses such as NPSH content *(P<0.01)* and SOD activity *(P<0.01)* and
- inhibited the activities of enzymes involved in ion homeostasis such as Na(+),K(+)-ATPase and Ca(2+)-ATPase.

Free and nanoencapsulated curcumin prevents cigarette smoke-induced cognitive impairment and redox imbalance.

Jaques JA, Neurobiol Learn Mem. 2013;100:98-107.

All prevented by curcumin

once a day,
5 days each week,
for 30 days.



❑**Cigarette smoke-exposure:**

- impaired object recognition memory *(P<0.001)*, indicated by the low recognition index,
- increased biomarkers of oxidative/nitrosative stress such as TBARS *(P<0.05)* and N[illegible] *(P<0.01)*,
- decreased antioxidant defenses such as NPSH content *(P<0.01)* and SOD activity *(P<0.01)* and
- inhibited the activities of enzymes involved in ion homeostasis such as Na(+),K(+)-ATPase and Ca(2+)-ATPase.

Our results suggest that curcumin is a potential therapeutic agent for neurocognition and that lipid coated curcumin may overcome its poor bioavailability.

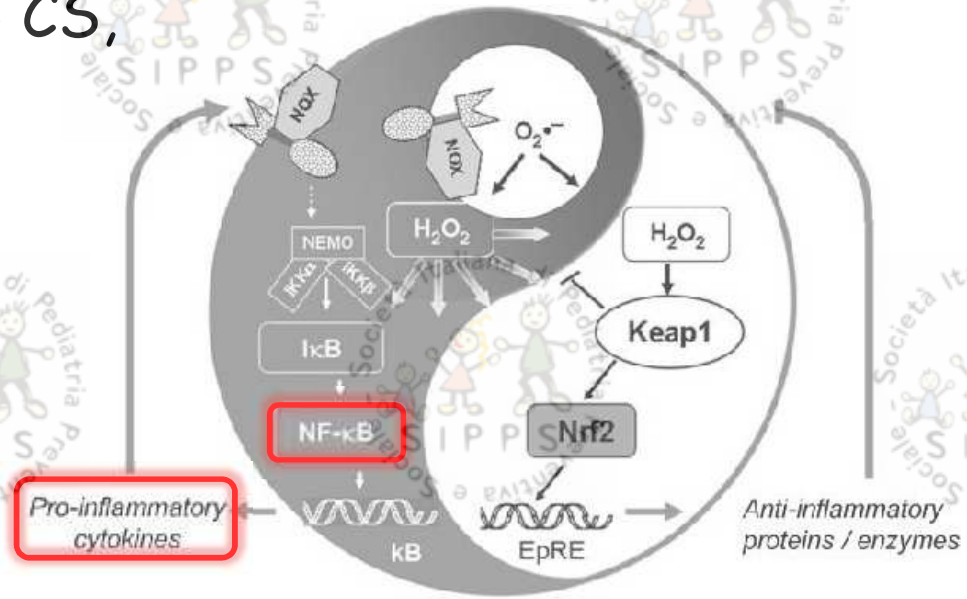
Increased pro-inflammatory activity and impairment of human monocyte differentiation induced by in vitro exposure to cigarette smoke.

Lerner L, J Physiol Pharmacol. 2009 Nov;60 Suppl 5:81-6.

- Cigarette smoking (CS) is associated with a variety of human pathologies including cardiovascular disease and cancer.

- Human monocytes are prevalent in oral and respiratory mucosa and may be affected by exposure to CS, which induces oxidative stress.

- As a result, up-regulation of nuclear factor-kappaB (NF-kappaB) may occur.



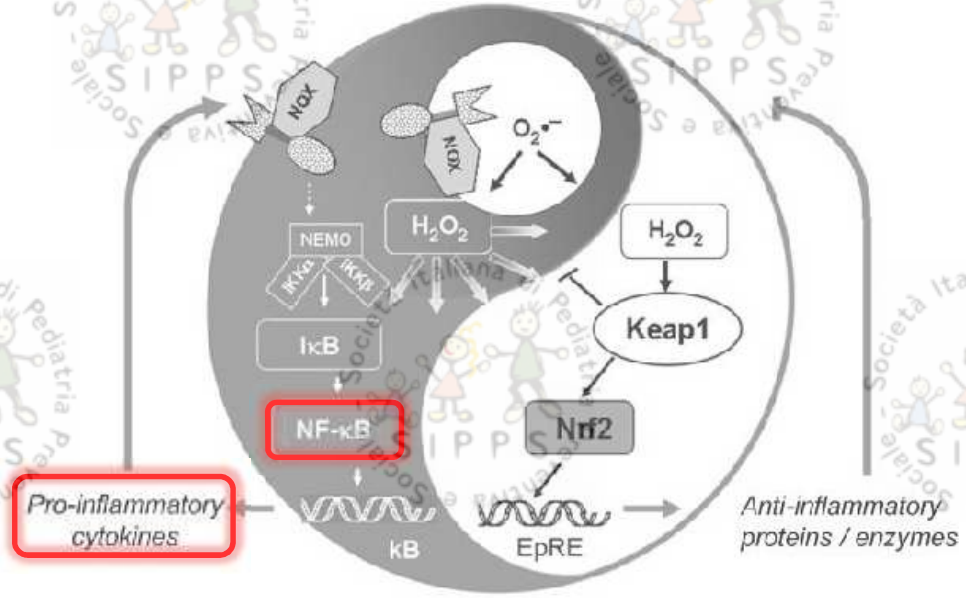
Increased pro-inflammatory activity and impairment of human monocyte differentiation induced by in vitro exposure to cigarette smoke.

Lerner L, J Physiol Pharmacol. 2009 Nov;60 Suppl 5:81-6.

exposed to Cigarette Smoke Extract in vitro

Human monocyte cell lines

Activation of NF-KB and increased production and secretion of IL-8 and up-regulation of certain C-C chemokines.



Increased pro-inflammatory activity and impairment of human monocyte differentiation induced by in vitro exposure to cigarette smoke.

Lerner L, J Physiol Pharmacol. 2009 Nov;60 Suppl 5:81-6.

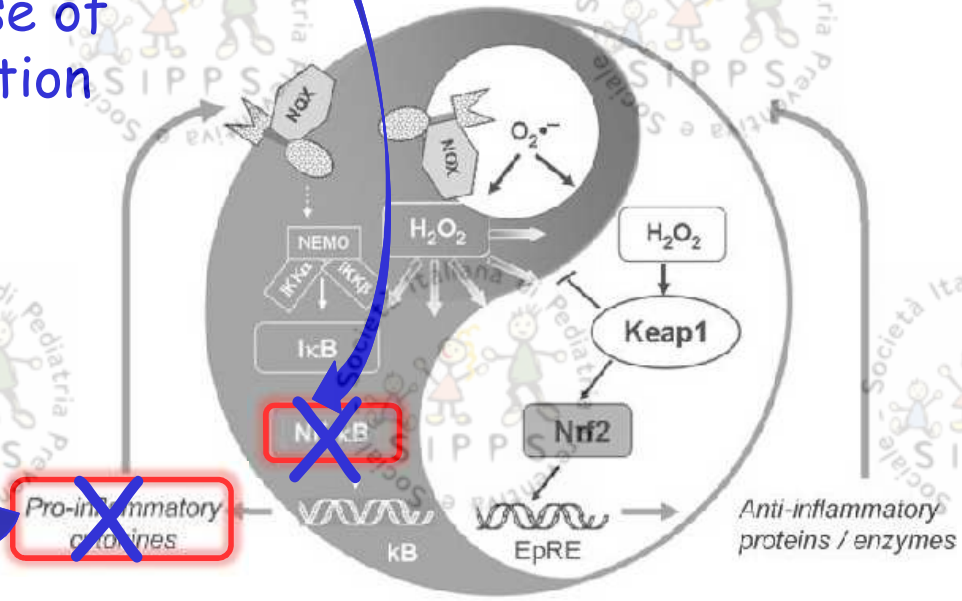
Human monocyte cell lines

exposed to Cigarette Smoke Extract in vitro

Inhibition of NF-kappaB with curcumin resulted in a decrease of IL-8 secretion

Activation of NF-KB and increased production and secretion of IL-8 and up-regulation of certain C-C chemokines.

(-)

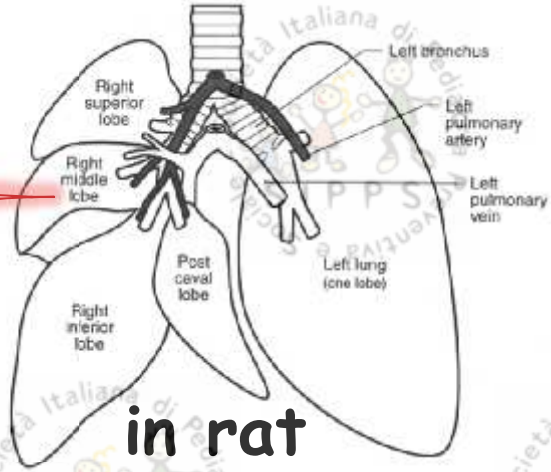


Quercetin attenuates airway inflammation and mucus production induced by cigarette smoke in rats.

Yang T, Int Immunopharmacol. 2012;13(1):73-81.

exposed to CS for 28 days.

- goblet cell hyperplasia,
- inflammation,
- oxidative stress,
- epidermal growth factor receptor phosphorylation
- NF-κB pathway activation.



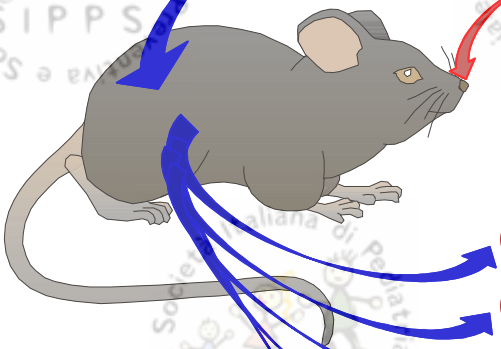
in rat lung

Quercetin attenuates airway inflammation and mucus production induced by cigarette smoke in rats.

Yang T, Int Immunopharmacol. 2012;13(1):73-81.

pretreatment with Quercetin aqueous solution administered intraperitoneally to rats,

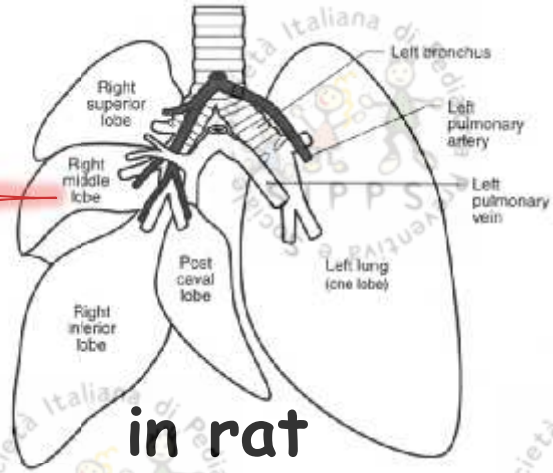
exposed to CS for 28 days.



ogoblet ell hyp lasia,
oinflamm ion
ooxidative ess,
oepiderma th factor receptor phosph ylati
oNF-k pathway tivation.

suppressed

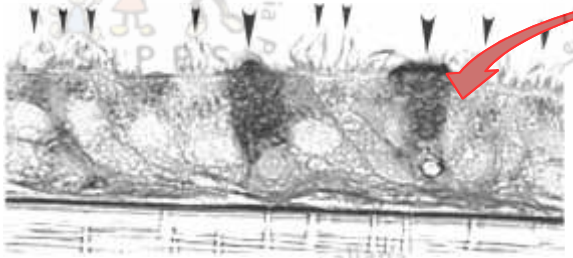
sambuco



in rat lung

Quercetin attenuates airway inflammation and mucus production induced by cigarette smoke in rats.

Yang T, Int Immunopharmacol. 2012;13(1):73-81.



human airway epithelial NCI-H292 cells

exposed to CS

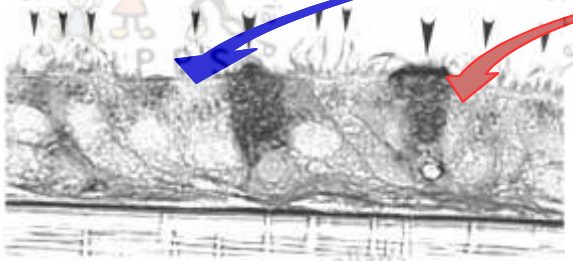
- o Muc5ac expression,
- o epidermal growth factor receptor phosphorylation
- o NF-κB pathway activation

In Cell lysates

Quercetin attenuates airway inflammation and mucus production induced by cigarette smoke in rats.

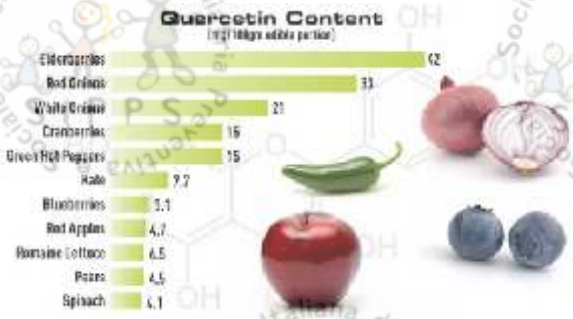
Yang T, Int Immunopharmacol. 2012;13(1):73-81.

pretreatment with Quercetin



human airway epithelial NCI-H292 cells

exposed to CS



attenuated

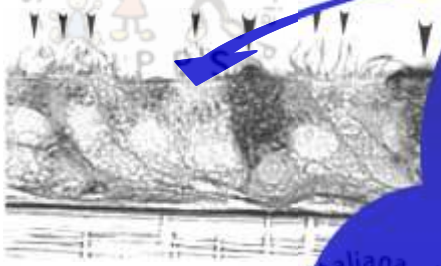
- Muc5ac expression,
- epidermal growth factor receptor phosphorylation
- NF-κB pathway activation

In Cell lysates

Quercetin attenuates airway inflammation and mucus production induced by cigarette smoke in rats.

Yang T, Int Immunopharmacol. 2012;13(1):73-81.

sambuco



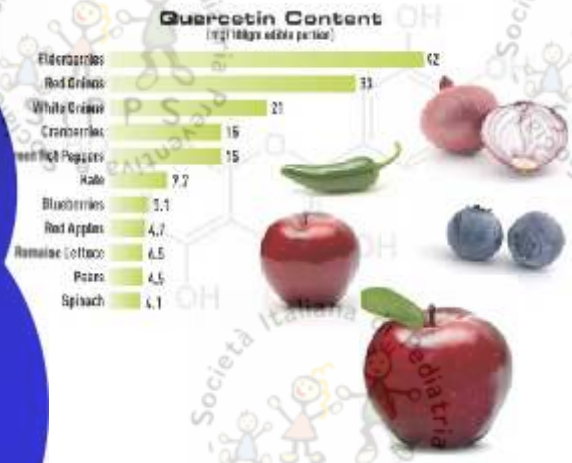
human airway
NCI-H29

atten

pretreatment with Quercetin

Our results suggest that quercetin attenuates CS-induced mucin protein synthesis in rat lung, possibly by inhibiting oxidative stress and inflammation via a mechanism involving NF-κB pathway activation and EGFR phosphorylation.

These findings suggest that quercetin has a potential for treating chronic airway diseases.



mela rossa

In Cell lysates

Cipolle rosse e bianche

mirtilli

peperoni verdi piccanti

cavolo riccio o nero

Fruits and vegetables in general health

soy

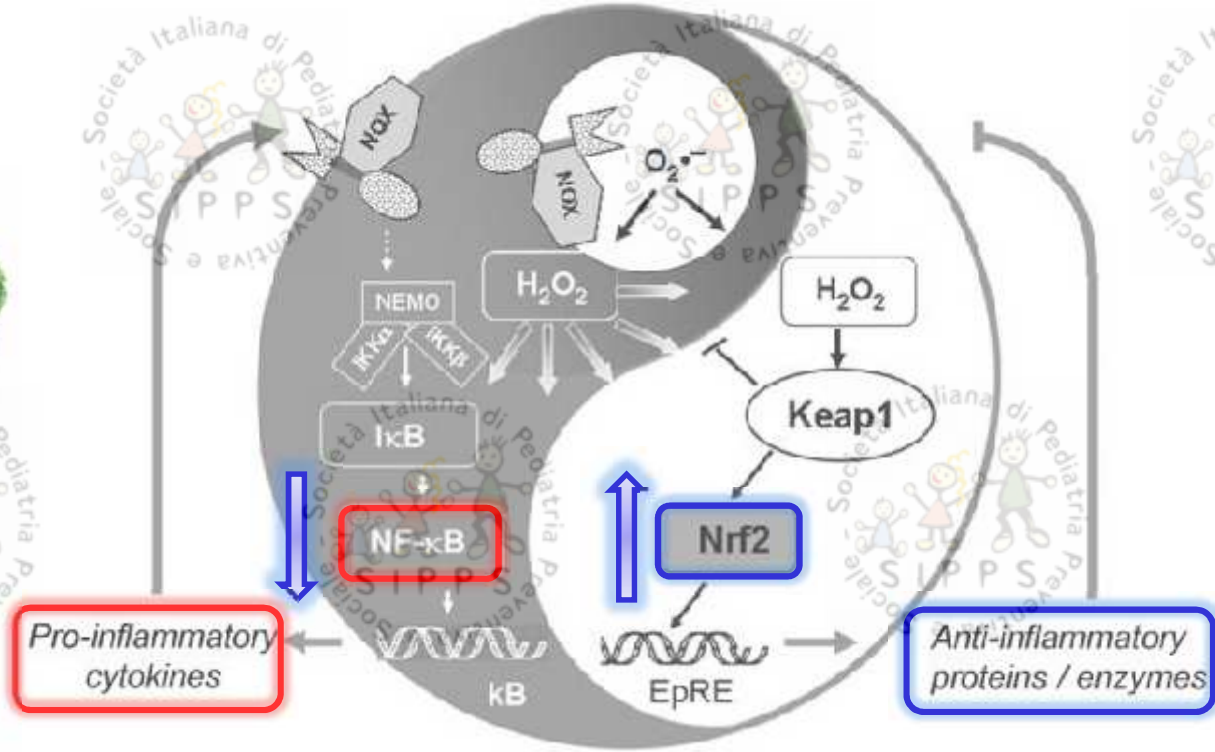
curcumin

sulforaphane

quercitin

resveratrol

Transcription factors involved in the process of converting, or transcribing, DNA into RNA.



NF-κB = nuclear factor kappa-light-chain-enhancer of activated B cells

Nrf2 = Nuclear factor (erythroid-derived 2)-like 2

Interaction of sulforaphane with DNA and RNA.

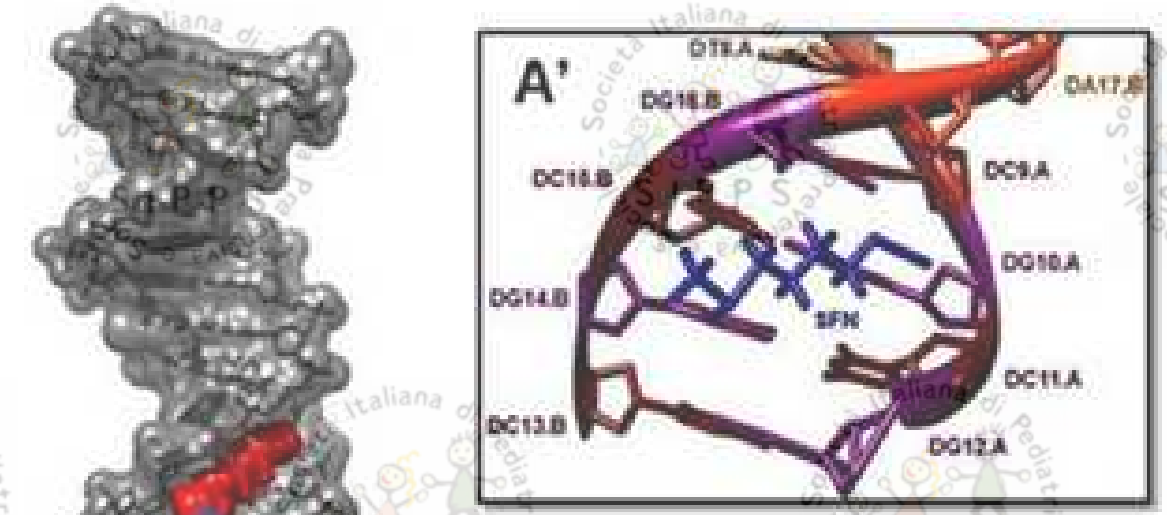
Abassi Joozdani F, PLoS One. 2015 Jun 1;10(6):e0127541.

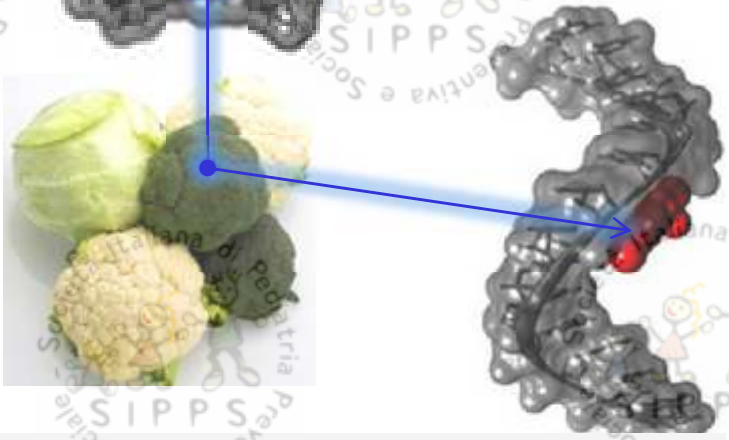
✓Sulforaphane (SFN) is an isothiocyanate found in cruciferous vegetables with anti-inflammatory, anti-oxidant and anti-cancer activities.

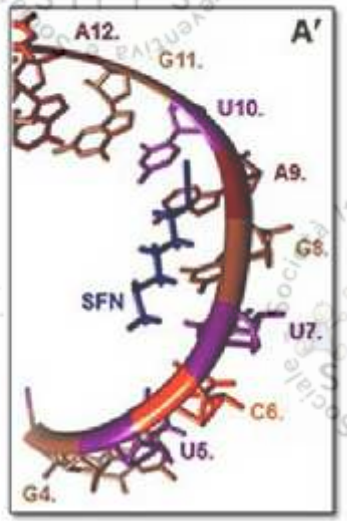
✓Sodium–DNA or sodium–RNA were dissolved in NaCl solution for 24 h with sulforaphane

✓we reported binding modes, binding constants and stability of SFN-DNA and -RNA complexes by Fourier transform infrared (FTIR) and UV-Visible spectroscopic methods.

Surface representation of DNA complexes with Sulforaphane







Surface representation of RNA complexes with Sulforaphane

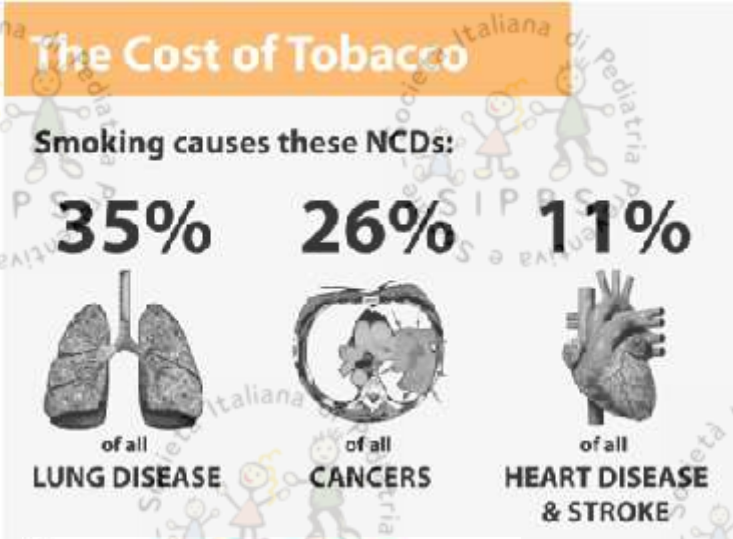
Cigarette smoking and Surroundings

live fit

- ✓ Introduction
- ✓ Cigarette smoking in pregnancy
- ✓ Smoking in pregnancy surroundings
- ✓ Passive smoking
- ✓ Passive smoking surroundings
- ✓ Active smoking
- ✓ Active smoking surroundings
- ✓ The e-cigarettes' problem
- ✓ What can we do?
- ✓ **Conclusions**

Attilio Boner
University of Verona, Italy
attilio.boner@univr.it

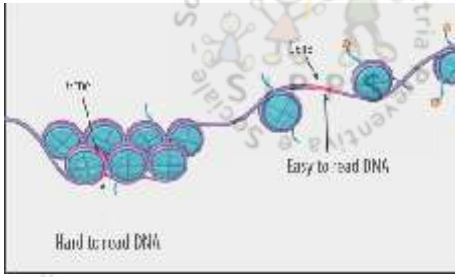
Conclusions



- Tobacco smoke contains thousands of chemicals with carcinogenic, cardiovascular, respiratory effects and pro-oxidant effects.

- It is one of the most abused substances in the world. Nicotine is the main addictive chemical in tobacco.

- Smoking in pregnancy is extremely dangerous as it deteriorates development of the lung, cardiovascular, neuro and metabolism system.
Furthermore, it has a multi-generation effect throughout an epigenetic effect.



- Active smoking, second-hand smoking as well as third-hand smoking are dangerous and one in two smoking person will loose around 10 years of life.

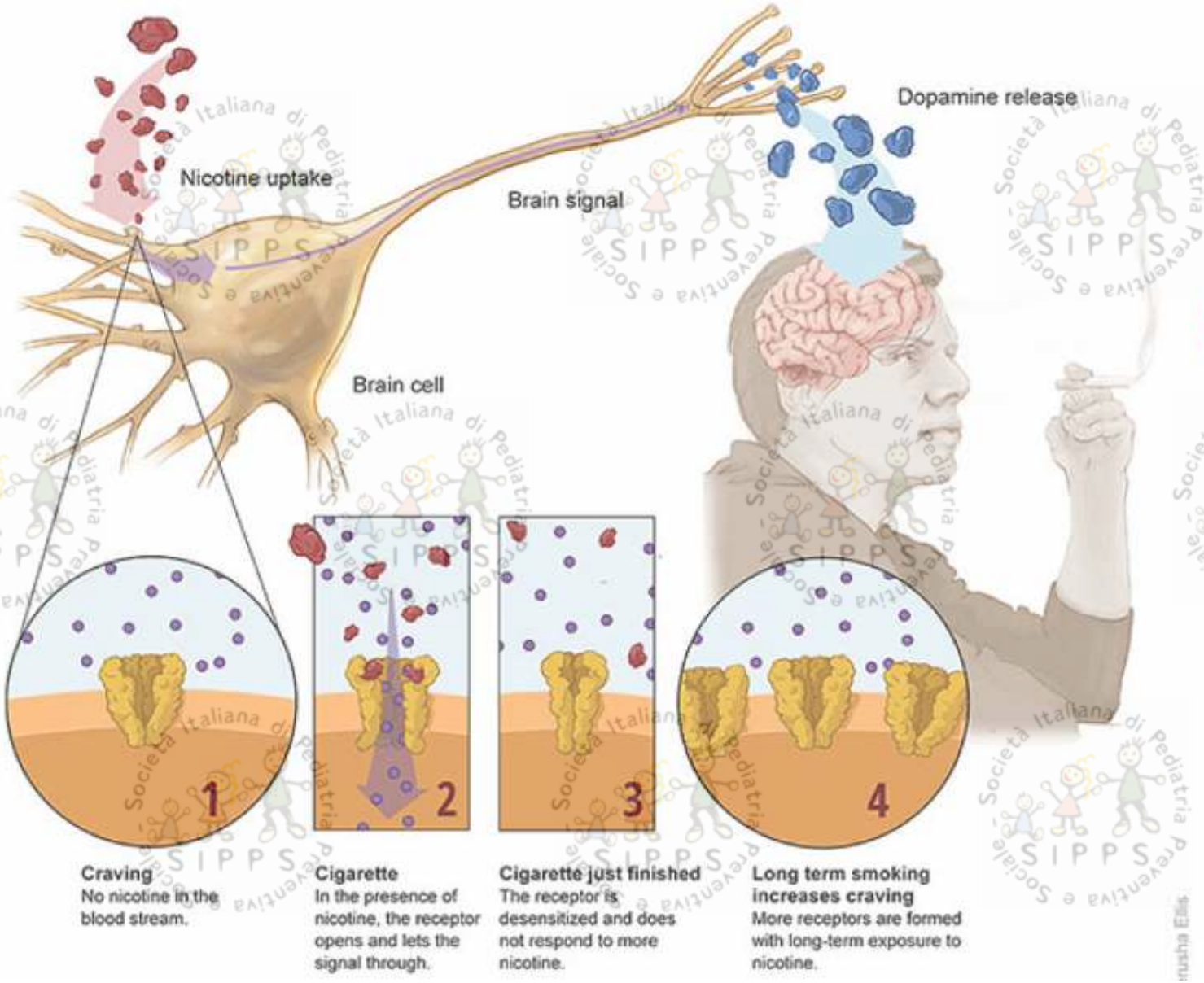
Conclusions

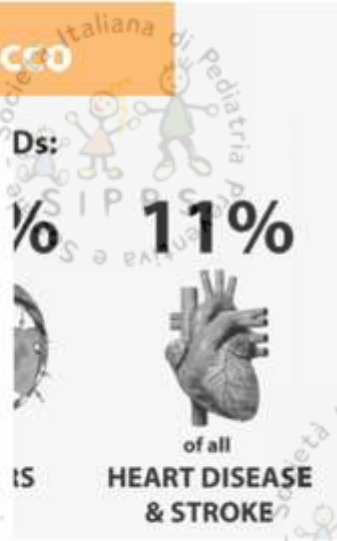
- Tobacco sr
with carcin
effects anc

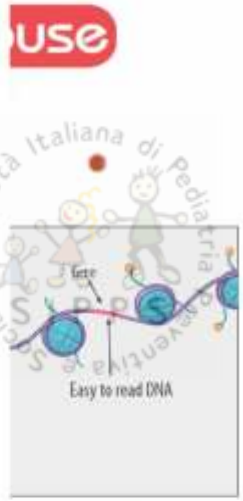
- It is one o
Nicotine is

- Smoking in
it deterior
neuro and n
Furthermor
an epigenet

- Active smc
are dangerc
10 years of







Conclusions

- E-cigarettes are perceived as innocuous product but they aren't!

- These device should be also avoided during pregnancy, they do not help to quit smoking by adults, and they are mostly used to smoke in places where smoking is forbidden.

- The society and paediatricians have a principal role in the prevention of smoking and helping to quit smoking.
At this regards cytisine is an attractive options.

- The most important thing we can do for smoking prevention is to help parents to quit smoking.

- We must investigate smoking in adolescents, an age where parents loose some of their influence on the health of their children while the role of pediatricians is still present.


Grazie per
la vostra attenzione
The time has come to have
my granpa only for me.
Mia Charlize Powell
Richmond Park