



**Health Effects of Tobacco Secondhand Smoke: focus on Children Health  
A Review of the Evidence and Self-Assessment**

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## **Needs Statement:**

Smoking continues to be a major global health problem by exposing many individuals to second hand, and also third hand smoke from tobacco by-products. Tobacco consumption threatens population health in many developing countries. Infant and children, are the most vulnerable population, especially in residential or other living environments [such as cars, day care centers and schools]

## **Learning Objectives:**

At the conclusion of this activity, participants will:

1. Understand the strength of the evidence supporting the health effects of tobacco second hand smoke (TSHS) in children, and
2. Review the efficacy of interventions, including policies and legislations, designed to minimize TSHS exposures of infants and children.

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## OVERVIEW

Tobacco *secondhand smoke* [SHS] is a major health hazard, especially for infants and children. The *Centers for Disease Control and Prevention* (CDC) reports that yearly, six million deaths worldwide are attributable to the use of tobacco products (CDC 2015). Rising tobacco consumption is also responsible for increasing exposures to SHS where more than 50 carcinogens and 4,000 potentially harmful chemicals and toxins are present. These compounds are implicated in lung cancer, heart disease, and other illnesses among nonsmokers (WHO 2011).

Policy makers and health advocates continue to express concerns over the health care and societal economic impacts from chronic health effects of SHS on nonsmokers, particularly pregnant women and young children. It is estimated that 50 million pregnant women and 700 million children are exposed to SHS on a daily basis (Callinan et al. 2010). According to the World Health Organization (WHO) *Framework Convention on Tobacco Control* (FCTC), there is “no safe level of exposure to tobacco smoke” with approximately thirty-one percent of all deaths from SHS involving children (WHO 2013b). WHO argues that the reduction in tobacco use could significantly contribute to *United Nations Millennium Development Goals* by directing scarce resources to more productive programs such as education, health literacy and maternal and child health (WHO 2004).

The SHS exposure challenge, especially faced by emerging market economy countries, can be summarized as follows:

- SHS disproportionately affects vulnerable populations including women and children.
- About 40% of children are regularly exposed to SHS at *home*. These children are 1.5-2 times more likely to become smokers (WHO 2013a).
- Approximately 5% of global burden of disease is attributable to SHS, a slightly higher number than the burden from direct tobacco smoking of 4% (Singh and al. 2011).
- 10% of tobacco-use-related economic costs are from SHS: provision of care for related illnesses and indirect costs such as loss of productivity (WHO 2013a).

### WHO Statements

- Tobacco kills up to half of its users. Over 6 million people die from tobacco each year.
  - More than 5 million of those deaths are the result of direct tobacco use while more than 600 000 are the result of non-smokers being exposed to second-hand smoke.
  - Nearly 80% of the world's 1 billion smokers live in low- and middle-income countries.
- [Source: WHO Tobacco Fact sheet N°339.  
Updated July 2015]

## SECTION ONE: Global Epidemiology of Secondhand Smoke Health Risks

### Learning Objective: To understand the health risks from secondhand smoke

#### Defining the Problem

Secondhand smoke (SHS) has been defined as “the combination of smoke emitted from the burning end of a cigarette or other tobacco products and smoke exhaled by the smoker” (WHO 2007). SHS is also known as *environmental tobacco smoke*, *passive smoking*, and *involuntary smoking*.

Two types of SHS are identified

- 1.) *Mainstream smoke* – the smoke that is exhaled from the smoker’s lungs
- 2.) *Sidestream smoke* – the smoke from the burning end of a tobacco product

Almost 15% of SHS exposure is mainstream and 85% is sidestream though the composition of toxins in both sources is similar (Callinan et al. 2010). Most SHS exposure occurs in homes, private vehicles, and workplaces but also in such public places as restaurants, bars, and casinos. The *International Agency for Research on Cancer* declared SHS to be carcinogenic risks to humans (IARC 2004).

Several categories of SHS exposure are described as it refers to one or both parents or another person in an enclosed space (Oberg et al. 2011). National and international organizations, such as the *World Health Organization* (WHO), the *International Agency for Research on Cancer* (IARC), the *World Medical Association* (WMA), the United States Surgeon General (DHHS), and the U.S. *Environmental Protection Agency* (EPA) have developed a consensus on the negative health effects of SHS exposure on nonsmoking adults and children.

*World Health Organization (WHO) Report on the Global Tobacco Epidemic (2009) states that:*

“Second-hand smoke accounts for one in 10 tobacco-related deaths. Creating 100% smoke-free environments is the only way to protect people from the harmful effects of second-hand tobacco smoke.”

#### Magnitude of the Problem

According to the *World Health Organization Framework Convention on Tobacco Control* (WHO FCTC), there is “no safe level of exposure to tobacco smoke”. Worldwide, SHS is responsible for an estimated 603,000 premature deaths and the loss of 10.9 million Disability-Adjusted Life Years (DALYs) (Oberg et al 2011). Thirty-one percent of the premature deaths are children (WHO 2013a). In China, the latest estimates suggest that between 38.9% and 75.1% of pregnant women are exposed to SHS, most often by their spouse (Zhang et al. 2015). **Table 1** shows the percentage of children under 15 years of age, and adult men and women who are exposed to SHS by world regions.

**Table 1: Estimates of the Percent Population by Age Groups Exposed to SHS  
[WHO Regions]**

WHO Regions	Percentage of Children under 15 years exposed to SHS	Percentage of men (ages 15 and over) exposed to SHS	Percentage of women (ages 15 and over) exposed to SHS
Global	40	33	35
All high income (WHO income)	39	32	31
Low- and Middle-income			
Africa	12	6	10
Americas	28	15	22
Eastern Mediterranean	35	22	33
Europe	58	60	61
Southeast Asia	39	25	27
Western Pacific	68	53	51

*Source: adapted from the World Health Organization (2004)*  
<http://apps.who.int/gho/data/node.main.159?lang=en>

Women and children are disproportionate victims of SHS exposure. Approximately 30% of men smoke, compared to 13% women and 12% of youth ages 13-15 (Tobacco Atlas 2009). It has been reported that as many as 40% of children and 35% of nonsmoking women were exposed to SHS in 2004 (Oberg et al. 2011). It is likely that women and children who are exposed to SHS have male family members who smoke in the homes or in private vehicles. In low-income Southeast Asian countries, women are at least 50% more likely to become victims of SHS exposure than are men (Singh and Lal 2011). Children with smoking parents are also significantly more likely to be exposed to SHS (Vitoria et al. 2015).

While smoking bans in workplaces in high-income countries are commonplace, occupational SHS exposure remains a critical issue in many parts of the world. According to the *International Labor Organization* [ILO 2015], an estimated 168 million children are in the global workforce. Many of these young workers are either smokers or at risk of SHS exposure. **Figure 1** shows the percentage of non-smoking adults who are exposed to SHS in the workplace for countries that completed the Global Adult Tobacco Survey (GATS)<sup>1</sup> between 2008 and 2010.

Worldwide health professionals continue to smoke and will more likely not encourage patients to stop smoking. A study of medical and dental students' habits in Southeast Asia region showed no significant reduction in smoking trends between 2005-2006 and 2009-2011. There was a significant increase in tobacco use among dental students during the same period. The findings also suggest no significant decline in SHS exposure at home and in public places in most

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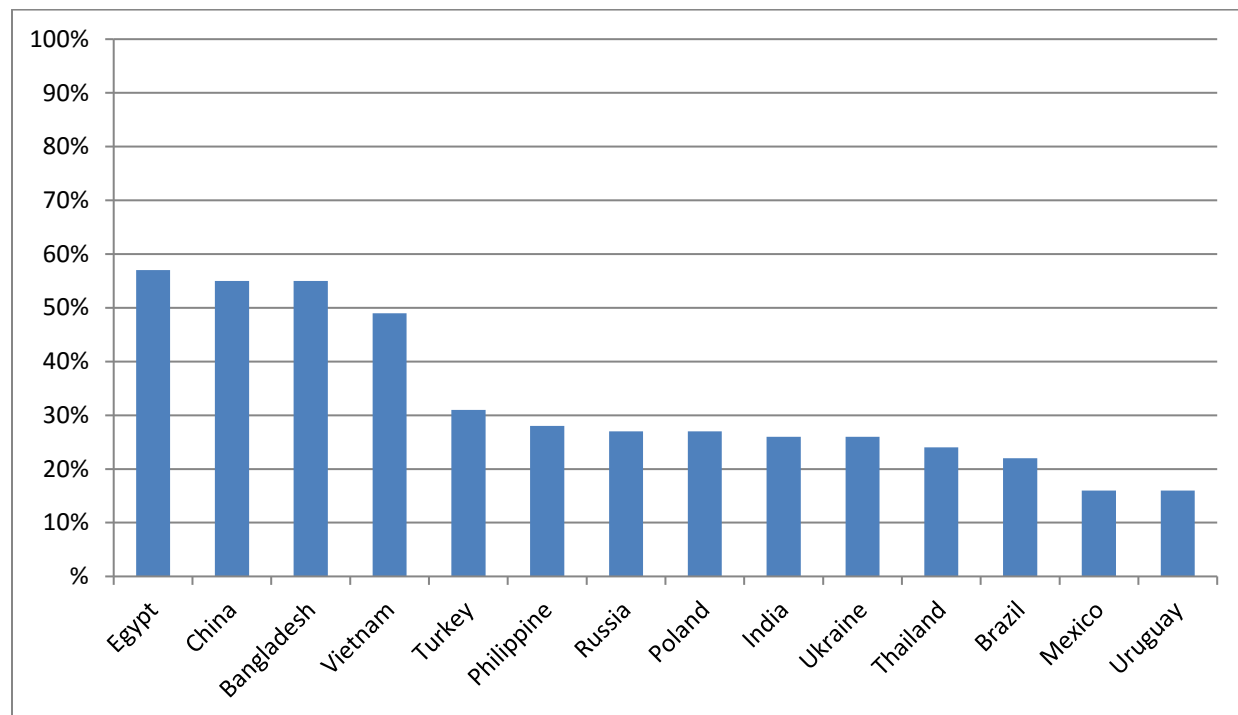
<sup>1</sup> The Global Adult Tobacco Survey (GATS) is a nationally representative household survey launched by the WHO in 2007 as part of the Global Tobacco Surveillance System (GTSS). Participating countries are mainly from low- and middle-income countries where the majority of the world's smokers reside.



countries in this region. Of concern is the ability to effectively participate in and contribute to the smoking cessation campaigns by these professionals (Sinha et al. 2012).

Often neglected from the discussion of vulnerable populations to the exposure of SHS are people with disabilities. Those with disabilities are more likely to be smokers than abled-body population by as much as 50% (Armour et al. 2007). They are more likely to be older, non-Hispanic white, female, and have lower levels of education. They are also more likely to report having been exposed to SHS (Hall et al. 2013).

**Figure 1: The Percentage of Non-Smoking Adults who are Exposed to SHS in the Workplace**



Source: Adapted from WHO Report on the Global Tobacco Epidemic, 2011

### Measuring the level of Tobacco SHS Exposures

Evidence documenting SHS exposures is obtained through survey questionnaires, direct observation of smoking behavior, measurement of tobacco residues in the air, and of cotinine level in human urine [Source: Johns Hopkins Bloomberg School of Public Health 2015 [http://www.shsmonitoring.org/SHS\\_Overview/how/index.html](http://www.shsmonitoring.org/SHS_Overview/how/index.html)] .

## SECTION TWO: Health Effects from Secondhand Smoke

**Learning Objective: To explore the impact of secondhand smoke exposure on health**

### Health Effects of SHS exposure

International studies repeatedly demonstrate tobacco SHS exposure in private settings to be harmful to nonsmokers. In New Zealand, Edwards et al. showed that air particulate levels in a car with a person smoking inside when windows are partially or wholly down were as high as those found in a typical smoky bar, and twice as high when the car windows are closed (Edwards et al. 2006). In the UK, a British Medical Association (BMA) report provided a strong evidence for SHS and exacerbation of childhood illnesses such as asthma (Wang et al. 2015) and middle ear infections. Both asthma and otitis media are correlated with poor school attendance, scholastic attainment, and increased hospital admissions (Muller 2007).

**Reminder: SHS Health Effects in Adults:**  
*evidence is good and supportive of the increased risk of association with:*

- Coronary heart disease (Japuntich et al. 2015)
- Stroke (Olasky et al. 2012)
- Dementia (Barnes et al. 2010).
- Breast cancer (WHO 2007)
- Chronic respiratory illnesses (WHO 2007)

Decline in pulmonary function due to SHS exposure has been reported (WHO 2007)

There is a strong link between active smoking and incidence of depression (Kassel et al. 2003), and in recent years evidence has been obtained to suggest the association between SHS exposure and mental illnesses, especially among adults. An analysis of the 2005-2006 *National Health and Nutrition Examination Survey* (NHANES) found association between SHS exposure and depressive symptoms even after adjusting for potential confounders including age, race/ethnicity, gender, education, alcohol consumption, and medical comorbidities (Bandiera et al. 2010). A 6-year prospective study of 5,560 nonsmoking adults found association between SHS exposure and psychiatric hospital admission (Hamer et al. 2010). These findings could also be indicative of potential threat to children mental health, and deserve further evaluation.

The effects of SHS exposure in pregnant women on fetal development has been the subject of many studies. A meta-analysis of 19 studies found that women who are exposed to tobacco SHS during pregnancy are 23% more likely to experience stillbirth and their babies are 13% more likely to be born with some form of congenital malformations (Leonardi-Bee et al. 2011).

## SHS and Health Risks in Children

SHS is particularly worrisome for infants and children as they are

1. Still developing mentally and physically,
2. Less aware of the consequences,
3. Less in control of their environments, and
4. At greater risk of morbidity and mortality than adults. WHO estimated 700 million children to be victims of SHS by the 1.2 billion adults who smoke annually (Ash Research Report 2011).

In the United States, more than half (almost 60%) of children ages 3-11 years are exposed to SHS. An analysis of multiple waves of NHANES showed that children had significantly higher cotinine concentrations than adults (Pirkle et al. 2006).

The 2006 Surgeon General Report found causal evidence for tobacco SHS effects on infants and children's health such as *Sudden Infant Death Syndrome* (SIDS), low birth weight, lower respiratory illnesses, lung growth and pulmonary function<sup>2</sup>. Children may be more prone to SHS-related respiratory illnesses due to their smaller airways and higher demand for oxygen and because their immune systems have yet to fully develop (Kabir et al. 2009). There is fair evidence that in-home SHS exposure of premature African American infants is associated with poorer growth of head circumference and development of otitis media (Brooks et al. 2011). Recent studies have started to detect association between SHS and gross motor development (Evlampidou et al. 2015) and attention deficit hyperactivity disorder (Padron et al. 2015).

It is suspected that SHS induced vascular changes in early childhood can trigger the onset of cardiovascular disease (CVD) in adulthood, caused by exposures to parental tobacco use (Tanski and Wilson 2012).

The link between SHS exposure and mood disorders in children is unclear. In animal experiments, nicotine exposure in adolescence appears to induce depression-like state in adulthood (Iniguez et al. 2008). SHS exposure may be a direct cause of psychiatric disorders. In humans, a longitudinal study of 151 adolescents with 5 year follow-up found that tobacco smoking elevates the risk of depressive episodes (Rao et al. 2009).

### SHS Health Effects in Infants and Children: *evidence is fair to good*

1. Sudden Infant Death Syndrome.
2. Low Birth Weight.
3. Pulmonary and Cardiovascular developmental risks.
4. Increased incidence and severity of asthma (Wang et al. 2015)
5. Susceptibility to respiratory infections.
6. Otitis media.
7. Susceptibility to invasivemeningococcal infections (Murray et al. 2012)
8. Mood changes and depression.
9. Lifelong risk of obesity

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<sup>2</sup> For a full list of the findings from the 2006 US Surgeon General report regarding health effects of SHS, see Appendix C and Appendix D

Finally, children exposed to smokers are also more likely to become smokers themselves. (Milton et al. 2004). Exposure to SHS is also independently related to higher likelihood of smoking initiation for this population regardless of whether or not children live with smokers. Other factors influencing smoking uptake include age, exposure to tobacco products, having friends that smoke, being offered tobacco products by peers, risk perceptions<sup>3</sup>, and use of other tobacco products such as chewing tobacco and cigars (Voorhees et al. 2011). In pre-adolescents, exposure to SHS in cars is significantly associated with early smoking uptake (Glover et al. 2011). Recent studies are suggestive of an association between exposure to SHS and obesity (McConnell et al. 2015).

### **Third Hand Tobacco Smoke Exposures (THS)**

Smoking and SHS are harmful to the health of both smokers and nonsmokers. Recently, evidence on health effects from the remaining tobacco residues deposited on surfaces, smokers' clothes and hair, began to accumulate. Nonsmokers who are exposed to such environments are considered to be victims of third-hand tobacco smoking (THS) (Escoffery et al. 2013).

There is evidence that trace levels of nicotine remains in the air, dust, and surfaces of residential settings which can be harmful especially to children. Nonsmokers who reside in homes previously occupied by smokers have demonstrated elevated levels of nicotine on hands and in urine compared to those residing in homes where no one has smoked (Matt et al. 2011). Furthermore, non-smoking rooms in hotels with partial smoking bans also show elevated level of surface nicotine, compared with hotels with complete smoking bans (Matt et al. 2011).

Potential in-vitro THS harm to human cells DNA has been reported (Hang et al. 2013). Studies in rodents found that THS exposure increases the likelihood of alterations in liver metabolism that carry implications for the development of coronary thrombosis, stroke, or type 2 diabetes (Karim et al. 2015). Children who play on exposed floor and put contaminated items in their mouth are especially prone to the danger of THS (Hang et al. 2013, Ferrante et al. 2013). In light of this evidence, it has been suggested that the term "*passive smoke*" can no longer be an equivalent of SHS as it should also include THS.

Studies on THS thus far have focused primarily on nicotine residues as an indicator of health risks. The role of particulate in the smoke such as *polycyclic aromatic hydrocarbons* (PAHs), from incomplete combustion of carbon-containing materials, is suspected to be carcinogenic (Fleming et al. 2012).

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<sup>3</sup> Youth in the study were asked about their perceptions on 4 items 1) whether smoking presents any risk, 2) whether smoking presents short-term risk, 3) whether nicotine is addictive, and 4) whether smoking light cigarettes is safer (Voorhees et al. 2011).



## SECTION THREE: Control and Prevention of Secondhand Smoke Exposure

**Learning objective: To explore SHS exposure control and interventions.**

Tobacco control efforts have been seen in the US for over 50 years. Such efforts have resulted in a substantial decrease in tobacco use from 42% in 1965 to 18% today but the issue remains high on the health agenda for the 21<sup>st</sup> century (Brennan and Schroeder 2014). The US 2010 *Affordable Care Act* (ACA) expands access to and insurance coverage of most smoking cessation services. The ACA also allows employers to charge smokers a higher percentage of their insurance premiums. In addition, there has been a trend against hiring smokers. The most important effect from these initiatives is the hope there will be a decrease in smoking uptake among young people (Ibid). This section describes some of the ways governments and organizations around the world are using to control the use of tobacco.

### Smoking Cessation Campaigns

As part of the *Master Settlement Agreement* (MSA) between U.S. states and tobacco companies, the *American Legacy Foundation* was created to fund the “Truth” mass media campaign to prevent teen smoking and encourage smokers to quit. Several studies have confirmed the social and cost effectiveness of *Truth* ads since its launch in 2012 through the reduction in youth smoking prevalence and tobacco-related healthcare costs (Ferrelly et al. 2005, Ferrelly et al. 2009, Niederdeppe et al. 2004, Sly et al. 2002, Holtgrave et al. 2009, and Richardson et al. 2010). Similar media campaigns have been introduced following such success, including the *Tips From Former Smokers* (*Tips*) and *Finish It* campaigns in 2012 and 2014 respectively.

In 2008, WHO introduced *MPOWER* measures, a package of six evidence-based tobacco control measures, which provide guidelines for country-level implementation of effective demand-side interventions to reduce tobacco use. The six measures include

1. monitoring tobacco use and prevention policies
2. protecting people from tobacco smoke
3. offering help to quit tobacco use
4. warning about the dangers of tobacco
5. enforcing bans on tobacco advertising, promotion and sponsorship, and
6. raising taxes on tobacco

At the international level, efforts are under way to encourage smoking cessation. The WHO Framework Convention on Tobacco Control (FCTC) comprises 173 countries, covering 87% of the world’s population, pledging strong actions against tobacco smoking (WHO 2012). Tobacco control does not impede the economic development such as causing job losses and decreasing government revenue (World Bank 2011). Instead, tobacco control measures are effective and efficient in reducing its consumption (Esson and Leeder 2004). Progress continues to be made on measures aimed at reducing the demand for tobacco, mostly in low- and middle- income

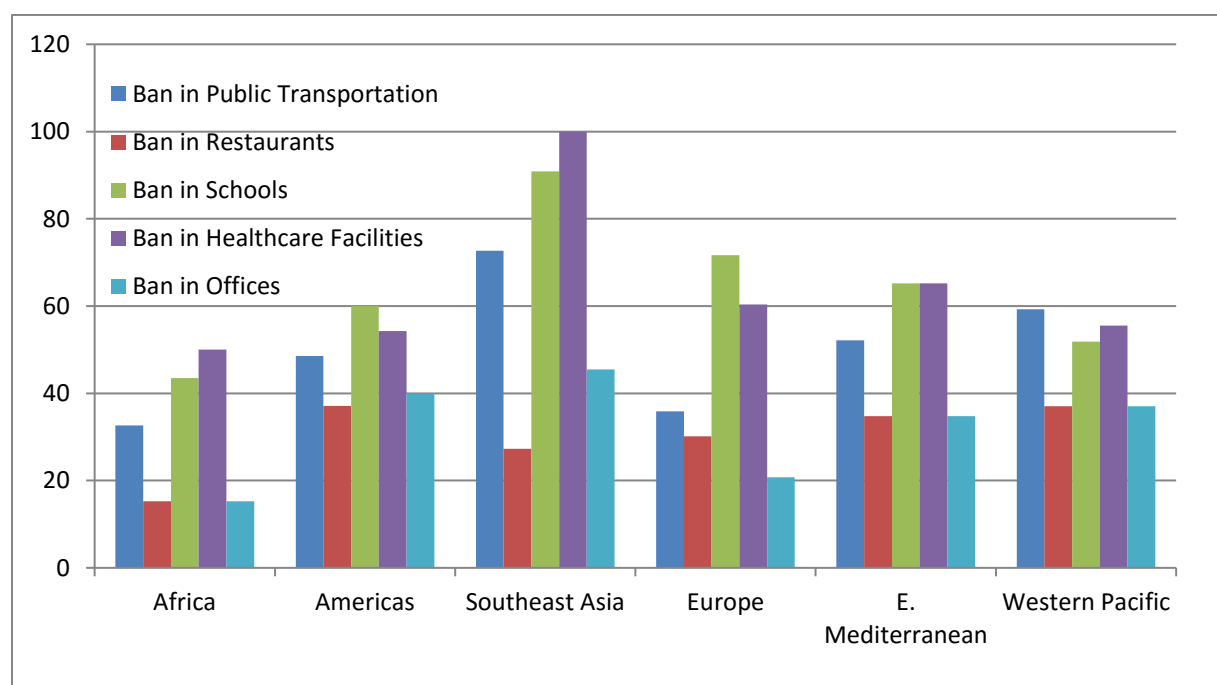
countries. In 2011, the WHO reported that 3.8 billion people were effectively covered by tobacco control laws. The FCTC has been one of the most successful treaties in the history of the United Nations (WHO 2011).

## Smoking Bans

### *Public Spaces*

In addition to reducing the demand for tobacco, the global public health community also aims to protect the public from the hazards of SHS exposure by encouraging the implementation of comprehensive smoke-free laws. Having separate smoking sections, smoking rooms, and better ventilation systems do not protect people from SHS exposure. Creating a completely smoke-free environment is the only proven way. **Figure 2** shows the implementation percentage of five types of smoking bans around the world. Article 8 of the FCTC mandates members to “protect citizens from exposure to tobacco smoke in workplaces, public transport and indoor public places,” (WHO 2007). Comprehensive smoke-free legislation has been implemented in many countries in public places such as bars and restaurants. It has shown to be popular with the public, not harmful to the economy, and beneficial to people’s health (WHO 2010). These restrictions are supported and recommended by the Article 8.

**Figure 2: Five Types of Smoking Bans in Public Places (% of Countries categorized by WHO Regions)**



Source: WHO Report on the Global Tobacco Epidemic, 2013

In the United States, the CDC considers a state smoking ban to be comprehensive if it prohibits smoking in privately-owned workplaces, restaurants, and bars (CDC 2011). Twenty six states passed such legislation by the end of 2010. As of October 2, 2015, according to the *American Nonsmokers' Rights Foundation*, 81.9% of the U.S. population are protected by a smoking ban in "workplaces, and/or restaurants, and/or bars, by either a state, commonwealth, or local law"(ANR 2015).

Few developing countries have comprehensive smoke-free legislation (Barnoya and Navas-Acien 2013). Where bans exist, nonetheless, evidence is encouraging. Santa Fe, Argentina, in 2005, was the first subnational jurisdiction in Latin America to implement a comprehensive smoke-free policy. A review of the process of approval and implementation between 2005 and 2009 shows success despite some opposition, setting an example for other jurisdictions in Argentina as well as in Mexico and Brazil (Sebrie and Glantz 2010). In 2009, Mexico City passed a similar legislation (Crosbie et al. 2011).

As indoor smoking bans become increasingly common, there has been a concern whether an increase in outdoor smoking is subjecting others to SHS. The FCTC was revised in 2007 to further recommend that quasi-outdoor and certain outdoor public places should be smoke-free. The guidelines encourage countries to “*adopt the most effective protection against exposure wherever the evidence shows that hazard exists*” (WHO 2009). Support for smoking bans in selected outdoor settings such as terraces, patios, and building entrances of healthcare facilities and hotels where children may be present is on the rise (Thomson et al. 2009). While critics have argued that such bans violate individual rights with insufficient evidence of impact on health (Chapman 2008), a review of 18 studies found that SHS levels in some outdoor areas may be significant, particularly those that are semi-enclosed (Sureda et al. 2013).

Smoking bans in bars and restaurants have been enacted in Norway, New Zealand, England, Scotland, Wales, Northern Ireland, Italy, Spain, Malta, and France. Recently middle-income countries have also enacted smoke-free laws. Between 2008 and 2010, 16 countries adopted comprehensive smoke-free legislation which means 31 countries around the world now have taken steps to provide the highest level of protection against SHS for their citizens (WHO 2011).



## *Private Spaces*

With more countries adopting public smoking bans, homes are becoming a predominant place for smoking. Anti-smoking legislation for public places may also help smokers who struggle to quit and encourage people to create smoke-free environment in their homes and private vehicles (WHO 2010). Consensus is lacking with regard to whether smoking bans in public places positively influence smoking bans in private spaces. On the one hand, the *International Agency for Research on Cancer* (IARC) reports that workers in smoke-free environments are more likely to implement smoking restrictions at home, and that home smoking restrictions have greater influence on smoking behavior than those in workplaces (IARC 2009). A study also found a reduction in in-home smoking rates after the enforcement of anti-smoking law in public spaces (Aslan et al. 2015). On the other hand, a research conducted in Spain reveals that smoking bans in public spaces have not reduced the exposure of SHS in children in the home (Fernandez et al. 2015).

Unlike homes, cars represent private properties in the public sphere. Laws governing seatbelt, child seat, and mobile phone use are already in place to protect both the public and occupants of the vehicles. With existing evidence of harmfulness of SHS exposure on children, similar measures should be considered regarding smoking in the presence of children (Freeman et al. 2008). An increasing number of state and local governments, in the United States and other industrialized countries, enacted legislations to prohibit smoking in private vehicles when children are present. Examples of U.S.A. jurisdictions that passed legislations are the states of Louisiana (under age 13, August 2006), Maine (under age 18, January 2007), California (under age 18, January 2008), Arkansas (under age 14, March 2011), and internationally counties of Newfoundland, Canada (under age 16, May 2011), Victoria, Australia (under age 18, January 2010), South Africa (under age 12, September 2009) (GASP 2015).

The American Cancer Society 2013:

“Making your home smoke-free may be one of the most important things you can do for the health of your family. Any family member can develop health problems related to SHS.

Children’s growing bodies are especially sensitive to the poisons in SHS. Asthma, lung infections, and ear infections are more common in children who are around smokers. Some of these problems can be serious and even life-threatening. Others may seem like small problems, but they add up quickly — the expenses, time for doctor visits, medicines, lost school time, and often lost work time for the parent who must stay home with a sick child.”

The World Health Organization:

“Article 11 of the WHO FCTC requires that health warning labels on tobacco packaging (to):

- Be approved by the competent national authority;
- Should cover 50% or more of the principal pack display areas, but should be no less than 30%;
- Be large, clear, visible and legible;
- Not use misleading terms like “light” and “mild”;
- Be rotated periodically to remain fresh and novel to consumers;
- Display information on relevant constituents and emissions of tobacco products as defined by national authorities;
- Appear in the principle language (s) of the country.”

Despite a significant support, public compliance is still problematic and difficult to enforce since it impinges on the individual privacy and freedom of choice. Introduction of preventive measures continue to be inadequate in the face of the growing concerns over the health effects on children from SHS exposure. A study in the United Kingdom found that 86% of smoking parents believed that SHS exposure was harmful for their children. However, less than 20% of these parents ban smoking in their homes (Blackburn et al. 2003). Though smoking in cars and homes is decreasing children, especially in the lower socio-economic strata, continue to be exposed to SHS (Moore et al. 2011, Moore et al. 2015).

### **Packaging and Labeling**

As the tobacco industry faces stricter marketing restrictions by governments around the world, many tobacco companies turn to cigarette packaging as a main avenue for product advertisement. *Article 11 of the WHO FCTC* addresses this issue. It sets standards for packaging and labeling of tobacco products for member states. This mandate reflects the emerging evidence strongly supporting the effectiveness of displaying text and pictorial warning labels. WHO has established a data base for pictorial health warnings and messages. In addition, the WHO provides guidelines and technical assistance for implementation of *Article 11* (WHO 2011)<sup>4</sup>.

### **Availability and Limitations of Tobacco Sales**

Usually, age determines the purchase ability of tobacco. However, there are little restrictions on where cigarettes can be sold. The *WHO FCTC* does not provide guidelines or suggest tobacco retailing regulation. Cigarettes and other tobacco products can be sold freely at any business unlike alcoholic beverage retailing that is subjected to licensing and hours of day, among other

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<sup>4</sup> **Guidelines on packaging and labelling of tobacco products**

At its third session in November 2008, the Conference of the Parties (COP) adopted guidelines for implementation of Article 11 of the WHO FCTC on "Packaging and labelling of Tobacco Products" (decision FCTC/COP3(10)).

restrictions. There are few places and jurisdictions in the US, Australia, Canada, and Singapore that issue tobacco licensing, but the enforcement is lax and licensures are rarely revoked (Chapman and Freeman 2009).

In the US, recent debates focused on the wisdom of cigarette sale in pharmacies where health promoting medications and supplements are sold. In 2010, the American Pharmacists Association urged pharmacies to discontinue the sale of tobacco products. It also discouraged state pharmacy boards from issuing and renewing licenses for pharmacies that do not follow the recommendation. Since then, other entities such as the American Lung Association, the American Heart Association, and the American Cancer Society began to promote and encourage bans on tobacco sale in pharmacies (Brennan and Schroeder 2014). In February 2014, CVS Caremark announced that it will stop selling tobacco products at its more than 7,600 stores in the US even though it will cost about \$2 billion in annual revenue (Kenen and Cheney 2014). Although the move is unlikely to reduce smoking prevalence since people can still purchase cigarettes somewhere else, it is hoped that other businesses will follow suit and discontinue sale of tobacco products at their establishments which will further reduce access (Brennan and Schroeder 2014).

### **Legal Precedents on SHS and Children (US)**

In the US, neglect is the most common form of child maltreatment, its recognition is less apparent than child abuse, and therefore is often underreported (USDHHS 2009). Under the *Child Abuse Prevention and Treatment Act* (CAPTA) of 1974, the SHS exposures can be argued as child abuse and/or neglect, detailed under the health hazard section of inadequate supervision. The international community is catching on in this regard. In May 2013, Latvia's legislature adopted an amendment to the Protection of the Rights of the Child Law to include a smoking-ban in children's presence to protect their right to grow up in a smoke-free environment. The law added the "*intentional subjection of a child to a harmful environment, including tobacco smoke*" as a form of child abuse (Roudik 2013).

Review of the legal literature suggests that child custody is a primary motivator for reduced SHS exposure at home. Hundreds of legal cases, in over 20 US states, showed that, SHS was a factor in court rulings in child custody disputes and labeled as the '*best interest of the child*' (Sweda 2001). Only in one instance, SHS was judged a criminal offense (Sweda et al. 1998). The fair evidence and difficulty of enforcement in private spaces have been suggested as reasons for the current practice of *voluntary in-home smoking restrictions policies* (Jarvie and Malone 2008).

## SECTION FOUR: Effectiveness of Interventions

### **Learning objective: to evaluate the effectiveness of interventions aimed at reducing SHS exposure**

Many legislations and interventions aimed at smoking cessation or at reducing SHS exposure among nonsmokers have been implemented at various levels. These include but are not limited to smoke-free policies and bans, education campaigns, health promotion, social-behavioral therapies, and clinical interventions. The effectiveness of these approaches varies from jurisdiction to jurisdiction depending on factors such as perceptions, funding, and infrastructure. This section gathers existing evidence of the impact interventions have had on SHS exposure.

A systematic review of infants and children aged 0-12 years old and focused on family members, child care workers, and teachers in community as well as healthcare settings did not find one intervention to be more effective over others. There is fair evidence that intensive counseling in a clinical setting may be beneficial to reduce SHS exposure (Priest et al. 2008). Among the adult population in Australia, smoking cessation care and support procedures are shown to be suboptimal (Anderson et al. 2013).

More recent studies involved special populations and combinations of interventions. While smoking uptake rate has decreased in the general populations, the same trend is not occurring among Native American youth. There is a lack of studies on the population to provide evidence whether interventions for smoking cessation are effective (Carson et al 2012). In young people in general, in-school interventions appear more effective when led by adults than by young people while increasing the number of sessions does not lead to a greater success rate (Thomas et al. 2013). Multicomponent interventions which involve various stakeholders such as the media, retailers, and teachers have been studied but have shown no long-term effectiveness in preventing smoking uptake within this population (Carson et al 2013). Interventions that utilize behavioral counseling in conjunction with medication have shown some evidence of effectiveness. A review of 41 studies found that using combination interventions may increase cessation success rate by 70 to 100 percent compared

#### **Sources of bias**

Often published studies use different definitions for smoking, smokers, and quit attempts. It is also unclear whether intensity and duration of mass media campaigns influence effectiveness of interventions (Bala et al. 2013)

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“Further significant progress in tobacco control is possible. Strong state policies that protect nonsmokers from second-hand smoke, use of media to graphically show the human impact of smoking, well-funded tobacco control programs, and implementation of other key evidence-based policies will decrease the number of smokers and save lives.”

with counseling intervention alone. Cessation counseling ranged between 4 to 8 sessions and up to 30 minutes each time. There is little evidence that longer or higher number of counseling sessions can increase rate of success (Stead and Lancaster 2012).

Mass media campaigns and financial support have also been explored as ways to encourage smoking cessation. Such campaigns can be effective when combined with other interventions but their effects on smoke cessation alone are difficult to determine. In April 2013, the Community Preventive Services Task Force, established by the US Department of Health and Human Services (USDHHS), an equivalent of a ministry of health, issued a statement recommending mass-reach health interventions. Their systematic review of over 90 studies showed strong evidence of effectiveness in

1. Decreasing the prevalence,
2. Increasing quit rates, and
3. Decreasing smoking uptakes (Community Preventive Services Task Force 2013).

Financial costs of treatments to help smokers quit can be itself a barrier to cessation. A review of eleven trials involving financial interventions suggests that provision of full financial coverage for cessation treatments significantly increased the intention to and success rates of quitting compared to interventions without financial support (Reda et al. 2012).

Currently, there are no rigorous, peer-reviewed studies exploring the safety and effectiveness of electronic cigarettes as a smoking cessation treatment due to its relatively recent introduction to the world market. A New Zealand study revealed that although the use of e-cigarettes is uncommon, most people view them in a positive light and as a potential useful aid in cessation effort (Bullen et al. 2013). The WMA concludes from the uncertainty about electronic cigarettes that “the manufacture and sale of e-cigarettes and other electronic nicotine delivery systems be subject to national regulatory bodies prior approval based on testing and research as either a new form of tobacco product or as a drug delivery device,” (WMA Statement on Electronic Cigarettes and Other Electronic Nicotine Delivery Systems). In addition, the WMA urges “the WHO to add tobacco cessation medications with established efficacy to the WHO’s Model List of Essential Medicines,” (WMA Statement on Health Hazards of Tobacco Products and Tobacco-Derived Products).

Evidence suggests that anti-smoking legislation reduces SHS exposure and incidents of certain health conditions. A systematic review of 50 studies in 5 countries showed consistent evidence of reduction of SHS exposure in workplaces, restaurants, bars and in public places (Callinan et al. 2010). Other studies on smoking bans have shown effectiveness in reducing the incidents of heart attack (Sargent et al. 2004; Seo and Torabi 2007; Lemstra et al. 2008;). A meta-analysis on the effect of smoke-free legislation and the rates of community heart attacks provides evidence that public and workplace smoking bans are significantly associated with declines in relative risk

of heart disease among individuals exposed to SHS. Strong anti-smoking laws are effective in lowering the incidents of acute myocardial infarctions and greater benefits are realized as time passes (Lightwood and Glantz 2009). A case study of legislation to ban smoking in public places in a Canadian city of Saskatoon showed a reduction in rates of heart attack as well as a decrease in smoking prevalence. Seventy-nine percent of the city residents supported the ban (Lemstra et al. 2008).

At the national and global levels, the WHO conducted a 3-year study involving 41 countries that adopted **MPOWER**<sup>5</sup> policies between 2007 and 2010. The results showed that among these countries, the number of smokers dropped by about 14.8 million. Approximately 7.4 million people were saved from smoking-related deaths. The most effective policy was an increase in taxes to 75% of the final retail price which was implemented in 14 countries. The policy is estimated to have averted 3.5 million smoking-related deaths. Smoke-free air laws at worksites, restaurants, and bars averted 2.5 million deaths. Other policies such as health warnings and advertising, smoking cessation treatments, and bans on tobacco advertising (Levy et al. 2013) claim reduction in mortality attributed to SHS. A study from Scotland stresses the importance of smoking cessation rather than reduction. Current evidence provides a robust support for legislative smoking bans leading to improved health outcomes by limiting SHS exposures, especially for coronary artery disease (Frazier et al. 2016). Unfortunately the evidence on respiratory and perinatal health outcomes, smoking prevalence and tobacco consumption, is inconsistent and requires further epidemiological studies

### **Summary of Policies and Interventions (see also Appendix B)**

Interventions to encourage smoking cessation and reduce exposure to SHS vary widely and involve many stakeholders and components. On the other hand, tobacco policies implemented at the national level have shown effectiveness in averting smoking-related deaths. A minimum increase in taxes to 75% of the retail price appears most effective. The results, however, are based on a 3-year study by the WHO. Long-term effectiveness and policy spill-overs remain to be evaluated. Studies have suggested targeting vulnerable groups such as people with disabilities who are more likely to smoke but are also more likely to attempt quitting (Hall et al. 2013). Interventions should also be targeted to preventing smoking uptake in adolescents. The Cochrane Collaboration is undertaking a review of school-based interventions looking at the effectiveness of school tobacco control policies not just at the individual level but also the environmental level. Existing studies show mixed results and a systematic review will provide guidance as to what types of school policies are most likely to deter smoking uptake among adolescents (Coppo et al. 2012).

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<sup>5</sup> Monitoring use, protecting from smoke, offering help to quit, warning of health risks, enforcing bans, raising taxes on tobacco.

## **SECTION FIVE: Conclusions**

Exposure to SHS of nonsmokers is a major public health concern. Studies consistently show a strong evidence of SHS association with lower respiratory illnesses, cardiovascular disease, and coronary heart diseases. Risk of exposure to SHS is present everywhere smoking is permitted and is threatening the health of adults and children in particular. In the recent years, evidence has emerged for the deleterious health effects from third-hand smoking (THS). This has resulted in some health care facilities issuing guidelines to minimize exposures of patient to health care workers' tobacco impregnated clothing and other personal effects. The impact of THS on health warrants further research and it is essential that standard definitions be set for related terms in order to be able conduct meta-analyses to increase the strength of evidence (Ueta et al. 2010, Ferrante et al. 2013, Protano and Vitali 2011, Escoffery et al. 2013).

Smoking bans are common in public places such as bars and restaurants in developed countries and developing countries are swiftly following suit. The majority of the world's smokers today reside in developing countries and the respective governments are acutely aware of the negative health consequences of tobacco smoking. They are at the forefront in advocacy of smoking restriction legislation although most of them do not yet have comprehensive legislation (Barnoya and Navas-Acien 2013). Smoking bans in the homes have not been legislated anywhere in the world despite overwhelming support. Only a few places ban smoking in vehicles when children are present. Homes and vehicles are the main settings where nonsmokers are exposed to SHS.

The WHO FCTC provides guidelines aimed at curbing the demand for cigarettes such as restricting advertisements and displaying graphics of harms on packages and labels but does not interfere with the supply side. Although demand side control has shown substantial success in various places, there have been recent talks about limiting the sale of tobacco products in certain establishments such as pharmacies as recommended by the American Pharmacists Association.

Interventions to encourage smoking cessation and to reduce exposure to SHS among nonsmokers have been implemented at many levels. However, the wide variety of interventions and insufficient number of trials does not allow conclusions to be drawn with regard to effectiveness of different methods or combination of methods. National level policies, on the other hand, appear promising as the WHO has shown that they have averted millions of smoking-related deaths around the world.

In 2012, the WHO created the Protocol to Eliminate Illicit Trade in Tobacco Products as supplement to the FCTC. Illicit trade increases availability and affordability of tobacco products. As its name indicates, the protocol aims to combat illicit trade in tobacco products with the ultimate goal of eradication. As of May 2015, it has 180 parties and has been ratified by 53 states (WHO 2015). China has created the Policy Performance Indicator (PPI) to measure policy

success based on protection of non-smokers from SHS and is being implemented across the country (Wan et al. 2013). The focus on developing countries is critical as they are where the majority of SHS victims reside. International philanthropic donations may play a role in changing the norms and the perceptions of tobacco use leading to major health gains (Redmon et al. 2013). It is important to build tobacco control capacity in order to effectively implement the FCTC (Stillman et al. 2013). Bans on SHS exposure of children in indoor spaces, such as cars and homes, have been implemented by several countries, and are considered by others<sup>6</sup> (Moore et al. 2012, Moore et al. 2015).

The e-cigarettes is welcomed, by the world community as an alternative to tobacco. E-cigarettes effectiveness as smoking cessation treatment is still under investigation and the its SHS health effects is inconclusive. Concerns over health effects from e-cigarettes vapor exposure, in closed environments, led to recommendations for surveillance and additional epidemiological studies (Burstyn 2014, Akl et al. 2010). Since 2015 legislation and regulations for the use of e-cigarettes were enacted or being considered by over 70 countries. Such legislations usually follow similar restrictions as the use of tobacco. The U.S. Food and Drug Administration (FDA), introduced a new regulation of the e-cigarettes to enter in effect in August 2016 (Abbas 2016). The summaries of evidence of SHS effects on health are presented in appendix A and B.

### Points to Remember

1. Robust evidence links tobacco use to pulmonary, cardiovascular and neurological diseases, including cancer.
2. Good evidence links SHS tobacco exposures to medical problems in infants, children and adults. Fair evidence supports health risks from exposure to the increasing use of hookah [narguileh, water pipe] around the world (Akl et al. 2010, Kumar et al. 2015).
3. SHS tobacco exposures in private place continues to be a major health threat to pregnant women, infants and children, and in several US litigation case were labeled as child neglect [rarely as abuse].
4. Developing market economy countries continue to have higher tobacco use and SHS exposure levels. (Akl et al. 2010),

### Legislative Status as of 2016

Even though progress has been steady, policy implementation has been slow. There is an urgent need for further research in areas such as smoking bans in indoor and outdoor spaces and the health impact of SHS and THS on socio-economically disadvantaged and vulnerable populations (Barnoya and Navas-Acien 2013, Moore et al. 2015)

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<sup>6</sup> Smoking bans in cars with children and/or passengers. Smoking bans inside housing have been implemented only in few countries. The US bans vary from state to state.



5. According to the American Cancer Society (ACS 2015) the estimated health care costs for tobacco use between 2000 and 2012 in billions of dollars, in several countries, amounted to:
  - a. USA 133
  - b. France 16.6
  - c. United Kingdom 9.5
  - d. China 6.2 (conservative estimates)
  - e. Canada 2.8
6. There is no single effective preventive intervention, but rather a combination of measures such as smoking bans, penalties and fines, taxations, education, systematic and sustained outreach campaigns, package labeling, and improved health literacy.

## Appendix A: Summary Table of Evidence from Epidemiological Studies

First Author	Study Title	Methods	Findings	Conclusions	Subjective Strength of Evidence
Hyland et al. 2014	Associations of lifetime active and passive smoking with spontaneous abortion, stillbirth and tubal ectopic pregnancy: a cross-sectional analysis of historical data from the Women's Health Initiative.	Cross sectional self-assessment of reproductive outcomes of 80,762 women enrolled in the <i>Women's Health Initiative</i> . <i>lifetime active and passive tobacco use</i> . Reporting on spontaneous abortions, stillbirths and ectopic pregnancies.	Comparison of never-smoking women with active smokers and SHS life time exposures 1. had OR of 1.16 (CI 1.08 to 1.26) for 1 or more spontaneous abortions, 1.44 (CI 1.20 to 1.73) for 1 or more stillbirths, and 1.43 (CI 1.10 to 1.86) for 1 or more ectopic pregnancies. 2. Life time exposures had ORs of 1.17 (CI 1.05 to 1.30) for spontaneous abortion, 1.55 (CI 1.21 to 1.97) for stillbirth, and 1.61 (CI 1.16 to 2.24) for ectopic pregnancy.	Smokers exhibited greater estimates of risk for spontaneous abortion, stillbirth and tubal ectopic pregnancy. Never-smoking women with the highest levels of lifetime exposure to SHS had also increased risk for spontaneous abortion, stillbirth and tubal ectopic pregnancy.	Good
Priest et al. 2014	Self-reported history of childhood smoking is associated with an increased risk for peripheral arterial disease independent of lifetime smoking burden.	multivariate regression model in a cohort of 1,537 adults at high risk for cardiovascular disease	Childhood smoking history was linked with peripheral arterial disease (PAD) (OR=2.86; 95% CI, 1.99-4.11; P<0.001), after controlling for lifetime smoking burden OR 1.55; 95% CI, 1.00-2.41; P=0.049).	There is some evidence of smoking effect on PAD, but further research into the mechanism and clinical data on childhood smoking and smoke exposure is required.	Good
Matsunaga et al. 2014	The relationship between cotinine concentrations and inflammatory markers among highly secondhand smoke exposed non-smoking adolescents.	Participants were 68 non-smoking adolescents, aged 12-17.5. Smoking and SHS exposure was assessed using serum cotinine concentrations. Multivariate linear regression analysis was conducted controlling for age, sex and BMI.	Cotinine concentrations were significantly raised (geometric mean 0.82ng/ml, 95%CI 0.62-1.07). Analysis showed a decrease in IL-4 (130.09 vs. 25.77pg/ml, p=0.014) and IL-6 (19.52 vs. 5.52pg/ml, p=0.008) concentrations between the upper 75th percentile cotinine level group and lower 25th percentile cotinine level group. Cotinine concentrations displayed a weak inverse association with IL-4 and IL-6 (p=0.028 and p=0.06) but was not statistically significant.	Cotinine levels showed weak non-significant inverse association with IL-4 and IL-6 within the highly SHS exposed population. There is potential for an immunosuppressive role of SHS. Further research is required.	Fair

First Author	Study Title	Methods	Findings	Conclusions	Subjective Strength of Evidence
Huntington-Moskos 2014	Tobacco Exposure, Weight Status, and Elevated Blood Pressure in Adolescents.	A sample of 148 adolescents ages 15-18 (88 female and 60 male) were evaluated for tobacco exposure, weight status, and blood pressure. Chi-squares and ANOVA tests were used.	35% of the variance in systolic blood pressure and 18% in diastolic blood pressure was attributable to age, gender, waist circumference and salivary cotinine. 25% of males and 11% of females had high systolic blood pressure. 22% of the sample had elevated salivary cotinine.	Total smoke exposure and waist circumference were associated with high blood pressure in adolescents. This has implications on the risks of CVD and warrants public health attention.	Poor
Hur et al. 2014	The role of secondhand smoke in sinusitis: a systematic review.	A systematic review includes 19 articles on SHS with at least 7 subjects and original data spanning 25 years. Quality assessment was conducted using the Newcastle-Ottawa scale.	SHS was found to significantly correlate with sinusitis (13 studies) and chronic rhinosinusitis (5 studies). Seventeen studies were case control. Six studies used computed tomography (CT) or endoscopy to diagnose sinusitis.	SHS is significantly linked to sinusitis. More research using objective diagnosis method and quantification of SHS exposure are warranted to further strengthen the evidence.	Robust
Max et al. 2014	The cost of secondhand smoke exposure at home in California.	Costs were calculated from California SHS home exposure rates and published relative risks. Three measures were used to estimate healthcare costs: deaths, years of potential life lost (YPLL), and the value of lost productivity.	SHS is estimated to cost over \$241 in healthcare. Attention deficit hyperactivity disorder (\$7.8 mil) and middle ear disease (\$5.6 mil) in adolescents, and ischaemic heart disease (IHD) (\$130.0 mil) and asthma (\$67.4 mil) in adults were the most costly conditions. SHS exposure in the home was related to 821 deaths including 27 infants whose mothers smoke during pregnancy and 700 adults with IHD, representing over 13,000 YPLL and \$119 mil in lost productivity.	In 2009, SHS exposure in the home is estimated to cost \$360 million in California. Public health measures are needed to reducing such healthcare and mortality costs.	Fair
Hanioka et al. 2011	Does secondhand smoke affect the development of dental caries in children? A systematic review	Methodological quality was evaluated on one cohort study and 14 case-control studies.	Weak to moderate association between early childhood caries and SHS was found in 10 studies. Dose-response relationships were significant in five studies. Weak association between permanent teeth and SHS was also found in five studies.	Causal relationship between SHS and early childhood caries is possible. Evidence is insufficient for maternal smoking during pregnancy and permanent teeth. Further studies are needed to determine the mechanism.	Good

First Author	Study Title	Methods	Findings	Conclusions	Subjective Strength of Evidence
Olasky et al. 2012	Second hand smoke and cardiovascular disease in Low and Middle Income Countries: a case for action	A systematic review of 12 studies to examine the link between self-reported SHS exposure and cardiovascular harms in low or middle income nations.	Results show a strong positive relationship between SHS and ischemic heart disease (OR 1.17-2.36) and SHS and stroke (OR 1.41-1.49)	SHS exposure is prevalent among women in low and middle income countries while SHS harms are the same as in high income nations. Smoke-free legislation and public education are necessary measures.	Robust
Boffetta et al. 2000	Risk of childhood cancer and adult lung cancer after childhood exposure to passive smoke: A meta-analysis.	A meta-analysis on 30 studies examining maternal smoking during pregnancy and cancer in childhood. A random effects model was used.	The results show a small increase in risk of all neoplasms RR 1.10 (95% CI 1.03-1.19), but not for specific neoplasms such as leukemia and central nervous system tumors. Paternal smoking showed association with brain tumors RR 1.22 (CI 1.05-1.40) and lymphomas RR 2.08 (CI 1.08-3.98).	Further research is necessary to implicate parental smoking risk for childhood cancer.	Good
Burke et al. 2012	Prenatal and passive smoke exposure and incidence of asthma and wheeze: systematic review and meta-analysis.	A systematic review and meta-analysis of cohort studies examining SHS effects on asthma or wheeze in children up to 18 years old. Random effects model was used.	Maternal smoking increases the risk of wheezing OR 1.70 (CI 1.24-2.34) and asthma OR 1.85 (CI 1.35-2.53) in children ages 2 years and over.	Measures should be taken to prevent parental smoking pre- and post-natal.	Robust
Ino 2010	Maternal smoking during pregnancy and offspring obesity: meta-analysis.	A systematic review and meta-analysis of 17 studies examining the effect of maternal smoking during pregnancy and child obesity	All 17 studies showed positive relationship between maternal smoking and childhood obesity OR 1.64 (CI 1.42-1.90). After adjusting for publication bias, the OR was 1.52 (CI 1.36-1.70).	Maternal smoking during pregnancy may influence childhood obesity and metabolic syndrome.	Robust

First Author	Study Title	Methods	Findings	Conclusions	Subjective Strength of Evidence
Jones et al. 2012	Parental Smoking and the Risk of Middle Ear Disease in Children	A systematic review and meta-analysis of 61 studies examining the effects of SHS on middle ear disease (MED).	Higher risk of MED in children is linked with maternal postnatal smoking by OR 1.62 (CI 1.33-1.97), with any household member smoking by OR 1.37 (CI 1.25-1.50). Prenatal maternal smoking and paternal smoking were not significantly associated with an increased risk of MED. For those already diagnosed with MED, the risk of surgery is significantly increased with maternal OR 1.86 (CI 1.31-2.63) and paternal smoking OR 1.83 (CI 1.61-2.07).	Exposure to SHS increases the risk of MED in children.	Robust
Jones 2011	Parental and household smoking and the increased risk of bronchitis, bronchiolitis and other lower respiratory infections in infancy: systematic review and meta-analysis	Systematic review and meta-analysis of 60 studies using random effect pooled odds ratios (OR).	Higher risk of lower respiratory infections (LRI) is associated with smoking by mother pre-natal OR 1.24 (CI 1.11-1.38), mother post-natal OR 1.58 (CI 1.45-1.73), father OR 1.22 (CI 1.10-1.35), by both parents OR 1.62 (CI 1.38-1.89), and by any household members OR 1.54 (CI 1.40-1.69). Bronchiolitis carried the greatest increased risk with any household smoking OR 2.51 (CI 1.96-3.21).	Exposure to SHS in the household significantly increases infants' risk of LRI, particularly in bronchiolitis and by post-natal maternal smoking.	Robust
Lee et al. 2010	Association of secondhand smoke exposure with pediatric invasive bacterial disease and bacterial carriage: a systematic review and meta-analysis.	A systematic review and meta-analysis of 30 case-control studies on SHS and invasive bacterial disease (IBD), and 12 cross-sectional studies on SHS and bacterial carriage.	Exposure to SHS is significantly associated with invasive meningococcal disease OR 2.02 (CI 1.52-2.69), <i>N. meningitidis</i> OR 1.68 (CI 1.19-2.36), and <i>S. pneumoniae</i> OR 1.66 (CI 1.33-2.07).	Further high quality studies are necessary to strengthen the evidence for effects of SHS on IBD, particularly in developing countries.	Good
Leonardi-Bee et al. 2011	Secondhand smoke and adverse fetal outcomes in nonsmoking pregnant women: a meta-analysis.	A systematic review and meta-analysis of 19 studies examining the effects of maternal exposure to SHS during pregnancy on fetal outcomes in nonsmokers using random effects models.	SHS during pregnancy significantly increases the risk of stillbirth OR 1.23 (CI 1.09-1.38) and congenital malformation OR 1.13 (CI 1.01-1.26), but no specific congenital malformation was independently significant.	There is some evidence of SHS exposure's adverse effects on fetal outcomes. The mechanism is unknown.	Good

First Author	Study Title	Methods	Findings	Conclusions	Subjective Strength of Evidence
Leonardi-Bee et al. 2008	Environmental tobacco smoke and fetal health: systematic review and meta-analysis	A systematic review and meta-analysis of 58 studies examining the effects of SHS and fetal health	SHS significantly decreases the birthweight by 33 g (CI 16-51) in prospective studies and by 40 g (CI 26-54) in retrospective studies. SHS also increases the risk of low birth weight by OR 1.32 (CI 1.07-1.63) in prospective studies and by OR 1.22 (CI 1.08-1.37) in retrospective studies. SHS is only linked with small for gestational age in retrospective studies OR 1.21 (CI 1.06-1.37).	Exposure to SHS in non-smoking pregnant women increases the risk of adverse fetal health.	Good
Milne et al. 2011	Parental Prenatal Smoking and Risk of Childhood Acute Lymphoblastic Leukemia (ALL)	A case-control study with 388 cases and 868 controls ages under 15 years. Parents reported their smoking habits for each year from child's birth. Analysis using logistic regression.	Parental prenatal smoking is not significantly associated with childhood ALL. Paternal smoking around the time of conception increases the risk of infant ALL by OR 1.15 (CI 1.06-1.24) and those smoking 20 cigarettes or more increases the risk by OR 1.44 (CI 1.24-1.68).	Heavy paternal smoking increases the risk of ALL in children.	Fair
Oken et al. 2008	Maternal smoking during pregnancy and child overweight: systematic review and meta-analysis	A systematic review and meta-analysis of 14 studies examining the link between maternal smoking during pregnancy and risk of overweight in children ages 2 and older.	Maternal prenatal smoking is significantly associated with overweight OR 1.50 (CI 1.36-1.65)	Further research is warranted for investigation into the effects of maternal smoking on risk of childhood overweight.	Good
Salmasi et al. 2010	Environmental tobacco smoke exposure and perinatal outcomes: a systematic review and meta-analyses	A systematic review and meta-analysis of 76 studies examining the effects of maternal SHS during pregnancy on fetal outcomes using random effect models.	Maternal SHS during pregnancy is significantly associated with lower infant weight by 60 g (CI 39-80 g), longer lengths by 1.75 cm (CI 1.37-2.12 cm), and increased risks of congenital deformations OR 1.17 (CI 1.03-1.34).	Public health measures are necessary to prevent SHS exposure during pregnancy.	Robust
Tinuoye et al. 2013	Meta-Analysis of the Association Between Secondhand Smoke Exposure and Physician-Diagnosed Childhood Asthma	A systematic review and meta-analysis of 20 studies examining the association between SHS and childhood asthma using random effects model.	SHS is significantly associated with childhood asthma OR 1.32 (CI 1.23-1.42).	The study provides further evidence to protect children against SHS exposure.	Good



First Author	Study Title	Methods	Findings	Conclusions	Subjective Strength of Evidence
Vork et al. 2008	Developing asthma in childhood from exposure to secondhand tobacco smoke: insights from a meta-regression	A systematic review and meta-analysis of 38 studies examining the link between SHS and childhood asthma	There is a significant association between SHS and asthma in children 6-18 years of age RR 1.33 (CI 1.14-1.56), adjusting for potential confounders.	Relationship is stronger in older children, compared with previous meta-analyses, indicating that the effects of SHS may accumulate over time.	Robust
Pineles et al. 2014	Systematic Review and Meta-Analysis of Miscarriage and Maternal Exposure to Tobacco Smoke During Pregnancy	A systematic review and meta-analysis of 98 articles examining the link between active or passive smoking and miscarriage.	Higher risk of miscarriage is associated with active smoking RR 1.23 (CI 1.16-1.30). The risk increased with the smoke level. SHS is not statistically significantly linked with miscarriage.	Active smoking during pregnancy should be prevented. Further research is necessary to link SHS with risk of miscarriage.	Robust
Montaldo et al. 2011	Association between exposure to secondhand smoke and sleep bruxism in children: a <u>randomised control study</u>	An RCT involving 153 children with sleep bruxism. Of those, 116 children were exposed to SHS by family members. Exposed children were randomly put into two groups; children in group 1 were not exposed to SHS for 6 months while those in group 2 were.	Exposed children had significantly higher risk of sleep bruxism ( $p < 0.05$ ). Children in group 1 who were protected from SHS for 6 months showed significantly lower prevalence of sleep bruxism, compared with children in group 2 who continued to be exposed ( $p < 0.05$ ). Within group 1, changes in prevalence were statistically significant in children who were heavily and moderately exposed ( $p < 0.05$ ) but not in children who were lightly and occasionally exposed.	SHS exposure level may be related to prevalence of sleep bruxism in children.	Good

## Appendix B: Summary Table of Evidence from Interventional Studies

First Author	Study Title	Methods	Findings	Conclusions	Subjective Strength of Evidence
Bean et al. 2014	Effect of smoke-free legislation on perinatal and child health: a systematic review and meta-analysis	14 online databases from January, 1975 to May, 2013 studies. The outcome measures included preterm birth, low birthweight, and hospital attendances for asthma. Effect estimates were calculated using random-effects meta-analysis.	11 studies including 2.5 million births and 247,168 asthma exacerbations were included. The studies used interrupted time-series analysis of local ban and national ban data. Smoke-free legislation was significantly linked to decreased preterm birth -10.4 (95% CI -18.8 to -2.0), and hospital attendances for asthma -10.1 (95% CI -15.2 to -5.0). No significant relationship was found for low birthweight	Smoke-free legislation is linked with decreased preterm births and hospital attendance for asthma.	Robust
Mathur et al. 2014	Transitions in Smoking Behavior During Emerging Adulthood: A Longitudinal Analysis of the Effect of Home Smoking Bans	Latent transition analysis was used to investigate the effect of a home smoking ban on the smoking transition from late adolescence (ages 16-18 years) to young adulthood (ages 18-20 years). Data were drawn from the Minnesota Adolescent Community Cohort study collected in 2004 to 2006.	Adolescents with a home smoking ban were less likely to become smokers and to increase smoking. This is true even when their parents smoke.	A home smoking ban is effective in protective adolescents from becoming smokers or to increase smoking	Fair
Waddell et al. 2014	Public support for smoke-free air strategies among smokers and nonsmokers, New York City, 2010-2012.	Awareness trends in smoke-free rules from new signage were examined using survey data from New York City smoking and nonsmoking adults (2010-2012). Logistic regressions were used in analysis, adjusting for sociodemographic characteristics.	There was an increase in awareness between 2010 and 2012 in both smokers and nonsmokers. Women, racial/ethnic minorities, and adults aged 25 - 44 years were more likely than men, non-Hispanic whites, and adults aged 65 years or older to support smoke-free initiatives.	New signage was effective in increasing awareness of smoke-free rules.	Fair



First Author	Study Title	Methods	Findings	Conclusions	Subjective Strength of Evidence
Bahraei et al 2011	Reduction of Secondhand Smoke Exposure Among Healthy Infants in Iran: Randomized Controlled Trial	An RCT involving 130 children aged less than 1 year who were exposed to parental smoking. Mothers of the treatment group received 3 counseling sessions by phone. Both parents received educational pamphlet and a sticker showing a smoke-free home. Infants' urinary cotinine levels were measured at baseline and at 3 month follow up. Parental smoking, in-home and in-car smoking bans were observed. Independent t-test and chi-square tests were used	The intervention significantly decreased infant urinary cotinine levels (1-tailed $p = .029$ ). Total daily cigarette smoked in a child's presence reduced in treatment group, compared with control group (1-tailed $p = .03$ ). The implementation of home-smoking bans is also significantly greater in treatment group (1-tailed $p = .049$ ).	Counseling may be an effective method of reducing SHS exposure by parental smoking among children.	Good
Borrelli et al. 2010	Motivating Latino caregivers of children with asthma to quit smoking: A randomized trial.	An RCT involving 133 smoking caregivers who had a child with asthma. Participants were randomly assigned to either a.) behavioral action model counseling (BAM; based on clinical guidelines for smoking cessation) or b.) precaution adoption model counseling (PAM; motivational interviewing of caregivers and feedback on carbon monoxide level and effects on children. Smoke exposure was measured using passive nicotine monitors	Neither counseling model achieved statistically significant abstinence rate at 2 months post-treatment. Secondhand smoke exposure, however, significantly decreased in the BAM group ( $p < 0.001$ ) because nonquitters did smoke less around the child post-treatment. Asthma morbidity significantly decreased in the PAM group post-treatment ( $p < 0.001$ ).	Evidence is weak regarding the effectiveness of smoking cessation interventions.	Fair
Butz et al. 2011	A Randomized Trial of Air Cleaners and a Health Coach to Improve Indoor Air Quality for Inner-City Children With Asthma and Secondhand Smoke Exposure	An RCT involving 126 children ages 6-12 years with asthma who live with a smoker. Children were randomly assigned to 1 of 3 groups in an experiment to improve air quality. Group 1) air cleaners only, group 2) air cleaners and a health coach, and group 3) delayed air cleaner (control group).	The reduction in mean fine and coarse particulate matter (PM) is significant at 6 month follow up for both treatment groups compared with the control group 3. For fine PM, the results were; control group (mean $3.5 \mu\text{g}/\text{m}^3$ ), air cleaners only group ( $-19.9 \mu\text{g}/\text{m}^3$ ), and air cleaners and a health coach group ( $-16.1 \mu\text{g}/\text{m}^3$ ); $p < 0.003$ . For coarse PM, the results were; control group ( $2.4 \mu\text{g}/\text{m}^3$ ), air cleaners only group ( $-8.7 \mu\text{g}/\text{m}^3$ ), and air cleaners plus a health coach group ( $-10.6 \mu\text{g}/\text{m}^3$ ); $p < 0.02$	Air cleaners help reduce indoor PM and increase asthma symptoms-free days. A health coach does not add to the benefits of intervention. Children are still exposed to SHS.	Good

First Author	Study Title	Methods	Findings	Conclusions	Subjective Strength of Evidence
Hovell et al. 2011	Providing Coaching and Cotinine Results to Preteens to Reduce Their Secondhand Smoke Exposure: A Randomized Trial	An RCT involving 201 families with smoking members and a child aged 8 to 13 years who was exposed to 2 or more cigarettes daily or had urinary cotinine concentration $\geq 2.0$ ng/mL. Families were randomly assigned to either control or SHSe reduction coaching groups. Children in the treatment group received 8 in-home coaching sessions over 5 months, presenting graphic charts of cotinine assay results as measuring outcomes and providing incentives for cotinine reductions.	At the end of the 5 month sessions, the treatment group had significantly lower urinary cotinine concentration ( $p=0.039$ ) and the number of cigarettes children are exposed to daily (child report $p=0.003$ ; parent report $p=0.078$ ). The positive effects disappeared at the 12 month follow up and both treatment and control groups returned toward baseline.	Coaching preteens to avoid SHS exposure may be effective intervention but the impacts are not sustained without continuous counseling.	Robust
Wilson et al. 2011	A Randomized Trial of Parental Behavioral Counseling and Cotinine Feedback for Lowering Environmental Tobacco Smoke Exposure in Children With Asthma: Results of the LET'S Manage Asthma Trial	An RCT involving 352 caregivers and children aged 3-12 years with asthma who are significantly exposed to SHS (cotinine $\geq 10$ ng/mL). Children and their caregivers were randomly assigned to either usual care (control group $n=174$ ) or the Lowering Environmental Tobacco Smoke (LET'S) Manage Asthma (treatment group $n=178$ ). Interventions included 3 in-person counseling sessions plus 3 follow up phone calls. Cotinine feedback is given at each session. Multivariate regressions were used for analyses.	There was no statistically significant difference in natural log of cotinine to creatinine ratio (lnCCR) between treatment and control group. Children with high-risk asthma, however, had significantly lower follow-up lnCCR values than children in control group ( $p=0.006$ )	The LET'S intervention did not significantly reduce SHS exposure in the overall sample, but appeared effective in high-risk asthma children.	Fair

## Appendix C: Health Effect of SHS in Adults

The 2006 United States Surgeon General report found the following evidence for health effects of SHS exposure in **adults**

Sufficient evidence to infer a causal relationship between SHS and

- lung cancer
- an increased risk of coronary heart disease morbidity and mortality
- odor annoyance
- nasal irritation

Suggestive evidence but not sufficient to infer a causal relationship between SHS and

- breast cancer
- an increased risk of stroke
- atherosclerosis
- acute respiratory symptoms; cough, wheeze, chest tightness, difficulty breathing
- chronic respiratory symptoms
- acute decline in lung function in persons with asthma
- small decrement in lung function in the general population
- adult-onset asthma
- worsening of asthma control
- risk for chronic obstructive pulmonary disease

Inadequate evidence to infer a causal relationship between SHS and

- risk of nasopharyngeal carcinoma
- risk of cervical cancer
- acute decline in lung function in health population
- accelerated decline in lung function
- morbidity in persons with chronic obstructive pulmonary disease

## **Appendix D: Health Effects of SHS in Infants and Children**

The 2006 United States Surgeon General report found the following evidence for health effects of SHS exposure in **infants and children**

Sufficient evidence to infer a causal relationship between SHS and

- Sudden Infant Death Syndrome
- low birth weight
- lower respiratory illnesses (the greatest risks found among children with smoking mother)
- middle ear disease, including acute and recurrent otitis media and chronic middle ear effusion.
- Cough, phlegm, wheeze, asthma, and breathlessness among school age children
- chronic adverse effects on lung function throughout childhood

Suggestive evidence but not sufficient to infer a causal relationship between SHS and

- preterm delivery
- childhood leukemia, lymphomas, and brain tumor
- natural history of middle ear effusion
- onset of childhood asthma

Inadequate evidence to infer a causal relationship between SHS and

- female fertility
- spontaneous abortion
- neonatal mortality
- congenital malformations
- cognitive functioning
- behavioral problems
- height/growth
- an increased risk of adenoidectomy or tonsillectomy
- risk of immunoglobulin E-mediated allergy

## **Appendix E: WMA 2011 Statement on Health Hazards of Tobacco Products and Tobacco-Derived Products**

[[www.wma.net/en/30publications/.../h4/](http://www.wma.net/en/30publications/.../h4/)]

*Adopted by the 40<sup>th</sup> World Medical Assembly, Vienna, Austria, September 1988  
and amended by the 49<sup>th</sup> WMA General Assembly, Hamburg, Germany, November 1997  
and the 58<sup>th</sup> WMA General Assembly, Copenhagen, Denmark, October 2007  
and the 62<sup>nd</sup> WMA General Assembly, Montevideo, Uruguay, October 2011*

### **PREAMBLE**

More than one in three adults worldwide (more than 1.1 billion people) smokes, 80 percent of whom live in low- and middle-income countries. Smoking and other forms of tobacco use affect every organ system in the body, and are major causes of cancer, heart disease, stroke, chronic obstructive pulmonary disease, fetal damage, and many other conditions. Five million deaths occur worldwide each year due to tobacco use. If current smoking patterns continue, it will cause some 10 million deaths each year by 2020 and 70 percent of these will occur in developing countries. Tobacco use was responsible for 100 million deaths in the 20th century and will kill one billion people in the 21st century unless effective interventions are implemented. Furthermore, secondhand smoke - which contains more than 4000 chemicals, including more than 50 carcinogens and many other toxins - causes lung cancer, heart disease, and other illnesses in nonsmokers.

The global public health community, through the World Health Organization (WHO), has expressed increasing concern about the alarming trends in tobacco use and tobacco-attributable disease. As of 20 September 2007, 150 countries had ratified the Framework Convention on Tobacco Control (FCTC), whose provisions call for ratifying countries to take strong action against tobacco use by increasing tobacco taxation, banning tobacco advertising and promotion, prohibiting smoking in public places and worksites, implementing effective health warnings on tobacco packaging, improving access to tobacco cessation treatment services and medications, regulating the contents and emissions of tobacco products, and eliminating illegal trade in tobacco products.

Exposure to secondhand smoke occurs anywhere smoking is permitted: homes, workplaces, and other public places. According to the WHO, some 200,000 workers die each year due to exposure to smoke at work, while about 700 million children, around half the world's total, breathe air polluted by tobacco smoke, particularly in the home. Based on the evidence of three recent comprehensive reports (the International Agency for Research on Cancer's Monograph 83, Tobacco Smoke and Involuntary Smoking; the United States Surgeon General's Report on The Health Consequences of Involuntary Exposure to Tobacco Smoke; and the California Environmental Protection Agency's Proposed Identification of Environmental Tobacco Smoke as

a Toxic Air Contaminant), on May 29, 2007, the WHO called for a global ban on smoking at work and in enclosed public places.

The tobacco industry claims that it is committed to determining the scientific truth about the health effects of tobacco, both by conducting internal research and by funding external research through jointly funded industry programs. However, the industry has consistently denied, withheld, and suppressed information concerning the deleterious effects of tobacco smoking. For many years the industry claimed that there was no conclusive proof that smoking tobacco causes diseases such as cancer and heart disease. It has also claimed that nicotine is not addictive. These claims have been repeatedly refuted by the global medical profession, which because of this is also resolutely opposed to the massive advertising campaigns mounted by the industry and believes strongly that the medical associations themselves must provide a firm leadership role in the campaign against tobacco.

The tobacco industry and its subsidiaries have for many years supported research and the preparation of reports on various aspects of tobacco and health. By being involved in such activities, individual researchers and/or their organizations give the tobacco industry an appearance of credibility even in cases where the industry is not able to use the results directly in its marketing. Such involvement also raises major conflicts of interest with the goals of health promotion.

## **RECOMMENDATIONS**

The WMA urges the national medical associations and all physicians to take the following actions to help reduce the health hazards related to tobacco use:

1. Adopt a policy position opposing smoking and the use of tobacco products, and publicize the policy so adopted.
2. Prohibit smoking, including use of smokeless tobacco, at all business, social, scientific, and ceremonial meetings of the National Medical Association, in line with the decision of the World Medical Association to impose a similar ban at all its own such meetings.
3. Develop, support, and participate in programs to educate the profession and the public about the health hazards of tobacco use (including addiction) and exposure to secondhand smoke. Programs aimed at convincing and helping smokers and smokeless tobacco users to cease the use of tobacco products and programs for non-smokers and non-users of smokeless tobacco products aimed at avoidance are both important.
4. Encourage individual physicians to be role models (by not using tobacco products) and spokespersons for the campaign to educate the public about the deleterious health effects of tobacco use and the benefits of tobacco-use cessation. Ask all medical schools, biomedical research institutions, hospitals, and other health care facilities to prohibit smoking, use of smokeless tobacco on their premises.
5. Introduce or strengthen educational programs for medical students and physicians to prepare them to identify and treat tobacco dependence in their patients.
6. Support widespread access to evidence-based treatment for tobacco dependence - including counseling and pharmacotherapy - through individual patient encounters, cessation classes, telephone quit-lines, web-based cessation services, and other appropriate means.

7. Develop or endorse a clinical practice guideline on the treatment of tobacco use and dependence.
8. Join the WMA in urging the World Health Organization to add tobacco cessation medications with established efficacy to the WHO's Model List of Essential Medicines.
9. Refrain from accepting any funding or educational materials from the tobacco industry, and to urge medical schools, research institutions, and individual researchers to do the same, in order to avoid giving any credibility to that industry.
10. Urge national governments to ratify and fully implement the Framework Convention on Tobacco Control in order to protect public health.
11. Speak out against the shift in focus of tobacco marketing from developed to less developed nations and urge national governments to do the same.
12. Advocate the enactment and enforcement of laws that:
  - Provide for comprehensive regulation of the manufacture, sale, distribution, and promotion of tobacco and tobacco-derived products, including the specific provisions listed below.
  - Require written and pictorial warnings about health hazards to be printed on all packages in which tobacco products are sold and in all advertising and promotional materials for tobacco products. Such warnings should be prominent and should refer those interested in quitting to available telephone quit-lines, websites, or other sources of assistance.
  - Prohibit smoking in all enclosed public places (including health care facilities, schools, and education facilities), workplaces (including restaurants, bars and nightclubs) and public transport. Mental health and chemical dependence treatment centers should also be smoke-free. Smoking in prisons should not be permitted.
  - Ban all advertising and promotion of tobacco and tobacco-derived products.
  - encourage the development of plain packaging legislation
  - Prohibit the sale, distribution, and accessibility of cigarettes, and other tobacco products to children and adolescents. Ban the production, distribution and sale of candy products that depict or resemble tobacco products.
  - prohibit smoking on all commercial airline flights within national borders and on all international commercial airline flights, and prohibit the sale of tax-free tobacco products at airports and all other locations.
  - Prohibit all government subsidies for tobacco and tobacco-derived products.
  - Provide for research into the prevalence of tobacco use and the effects of tobacco products on the health status of the population.
  - Prohibit the promotion, distribution, and sale of any new forms of tobacco products that are not currently available.
  - Increase taxation of tobacco products, using the increased revenues for prevention programs, evidence-based cessation programs and services, and other health care measures.
  - Curtail or eliminate illegal trade in tobacco products and the sale of smuggled tobacco products.
  - Help tobacco farmers switch to alternative crops.
  - Urge governments to exclude tobacco products from international trade agreements.

13. Recognize that tobacco use may lead to pediatric disease because of the harm done to children caused by tobacco use and second-hand smoke exposure, the relationship of tobacco use by children and exposure to adult tobacco use, and the existence of effective interventions to reduce tobacco use. Special efforts should be made by physicians to:
- provide tobacco-free environments for children
  - target parents who smoke for tobacco cessation interventions
  - promote programs that contribute to the prevention and decrease of tobacco use by youth
  - control access to and marketing of tobacco products, and
  - make pediatric tobacco-control research a high priority
14. Refuse to invest in companies or firms producing or promoting the use or sale of tobacco



## References

- Abbasi Jennifer 2016. FDA Extends Authority to e-Cigarettes: Implications for Smoking Cessation? *JAMA*. Published online July 15, 2016. doi:10.1001/jama.2016.8568 (Editoria)
- Akl Elie A, Swarna Gaddam Sameer K Gunukula Roland Honeine, Philippe Abou Jaoude and Jihad Irani. 2010. The effects of waterpipe tobacco smoking on health outcomes: a systematic review. *Int. J. Epidemiol.* (3): 834-857.
- American Nonsmokers' Rights Foundation (ANR). 2015. "Overview List – How Many Smokefree Laws?" <http://www.no-smoke.org/pdf/mediaordlist.pdf>.
- American Cancer Society (ACS). 2015. Tobacco: The True Cost of Smoking. [http://www.cancer.org/research/infographicgallery/tobacco-related-healthcare-costs?\\_ga=1.246313604.1878765257.1445355436](http://www.cancer.org/research/infographicgallery/tobacco-related-healthcare-costs?_ga=1.246313604.1878765257.1445355436) (accessed November 15, 2015]
- Anderson, Amy Elizabeth, Jenny A. Bowman, Jenny Knight, Paula M. Wye, Margaret Terry, Sonya Grimshaw, and John H. Wiggers. 2013. "Smoking Cessation Care Provision and Support Procedures in Australian Community Mental Health Centers." *Psychiatric Services* 64 (7) (July 1): 707–710. doi:10.1176/appi.ps.201200213.
- Armour, Brian S, Vincent A Campbell, John E Crews, Roland A Richard, Ann Malarcher, and Emmanuel Maurice. 2007. "State-Level Prevalence of Cigarette Smoking and Treatment Advice, by Disability Status, United States, 2004." *Preventing Chronic Disease* 4 (4) (September 15). <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2099284/>
- Ash: Action on Smoking and Health. 2011. "Secondhand Smoke: The Impact on Children." [http://www.sustainableguernsey.info/blog/wp-content/uploads/2011/09/secondhand-smoke-impact-on-children-ASH\\_596.pdf](http://www.sustainableguernsey.info/blog/wp-content/uploads/2011/09/secondhand-smoke-impact-on-children-ASH_596.pdf).
- Aslan, Dilek and Didem Daymaz. 2015. "Status of Exposure to Second-Hand Smoke at Home in Children under Five Years of Age: An Example from Ankara Province." *Turkish Thoracic Journal/Türk Toraks Dergisi* 16 (1): 16–21. doi:10.5152/ttd.2014.4180.
- Bala, Malgorzata M, Lukasz Strzeszynski, Roman Topor-Madry, and Kate Cahill. 2013. "Mass Media Interventions for Smoking Cessation in Adults." In *Cochrane Database of Systematic Reviews*, edited by The Cochrane Collaboration and Malgorzata M Bala. Chichester, UK: John Wiley & Sons, Ltd. <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0012958/>.
- Bandiera, Frank C., Kristopher L. Arheart, Alberto J. Caban-Martinez, Lora E. Fleming, Kathryn McCollister, Noella A. Dietz, William G. LeBlanc, et al. 2010. "Secondhand Smoke Exposure and Depressive Symptoms." *Psychosomatic Medicine* 72 (1) (January 1): 68–72. doi:10.1097/PSY.0b013e3181c6c8b5.
- Barnes, Deborah E., Thaddeus J. Haight, Kala M. Mehta, Michelle C. Carlson, Lewis H. Kuller, and Ira B. Tager. 2010. "Secondhand Smoke, Vascular Disease, and Dementia Incidence: Findings From the Cardiovascular Health Cognition Study." *American Journal of Epidemiology* 171 (3) (February 1): 292–302. doi:10.1093/aje/kwp376.
- Barnoya, Joaquin, and Ana Navas-Acien. "Protecting the World From Secondhand Tobacco Smoke Exposure: Where Do We Stand and Where Do We Go From Here?" *Nicotine & Tobacco Research* 15, no. 4 (April 2013): 789–804. doi:10.1093/ntr/nts200.
- Blackburn, C. 2003. "Effect of Strategies to Reduce Exposure of Infants to Environmental Tobacco Smoke in the Home: Cross Sectional Survey." *BMJ* 327 (7409): 257–0. doi:10.1136/bmj.327.7409.257.
- Boffetta, P, J Tredaniel, and A Greco. 2000. "Risk of Childhood Cancer and Adult Lung Cancer After Childhood Exposure to Passive Smoke: A Meta-analysis." *Environmental Health Perspectives* 108 (1) (January): 73–82.

- Brennan TA, and Schroeder SA. 2014. "Ending Sales of Tobacco Products in Pharmacies." *JAMA*. doi:10.1001/jama.2014.686. <http://dx.doi.org/10.1001/jama.2014.686>.
- Brooks, Jada, Diane Holditch-Davis, Mark A. Weaver, Margaret Shandor Miles, and Stephen C. Engelke. 2011. "Effects of Secondhand Smoke Exposure on the Health and Development of African American Premature Infants." *International Journal of Family Medicine* 2011 (May 18). doi:10.1155/2011/165687. <http://www.hindawi.com/journals/ijfm/2011/165687/abs/>.
- Bullen, Christopher, Colin Howe, Murray Laugesen, Hayden McRobbie, Varsha Parag, Jonathan Williman, and Natalie Walker. 2013. "Electronic Cigarettes for Smoking Cessation: A Randomized Controlled Trial." *The Lancet* 382 (9905): 1629–37.
- Burstyn Igor 2014. Peering through the mist: systematic review of what the chemistry of contaminants in electronic cigarettes tells us about health risks. *BMC Public Health*. 9;14:18. doi: 10.1186/1471-2458-14-18
- Callinan, Joanne E, Anna Clarke, Kirsten Doherty, and Cecily Kelleher. 2010. "Legislative Smoking Bans for Reducing Secondhand Smoke Exposure, Smoking Prevalence and Tobacco Consumption." In *Cochrane Database of Systematic Reviews*, edited by The Cochrane Collaboration and Joanne E Callinan. Chichester, UK: John Wiley & Sons, Ltd. <http://summaries.cochrane.org/CD005992/does-legislation-to-ban-smoking-reduce-exposure-to-secondhand-smoke-and-smoking-behaviour>.
- Carson, Kristin V, Malcolm P Brinn, Nadina A Labiszewski, Adrian J Esterman, Anne B Chang, and Brian J Smith. 2011. "Community Interventions for Preventing Smoking in Young People." In *Cochrane Database of Systematic Reviews*, edited by The Cochrane Collaboration and Kristin V Carson. Chichester, UK: John Wiley & Sons, Ltd. <http://summaries.cochrane.org/CD001291/can-community-interventions-deter-young-people-from-starting-to-smoke>.
- Centers for Disease Control and Prevention. 2015. "Smoking and Tobacco Use; Fact Sheet; Fast Facts." *Smoking and Tobacco Use*. Accessed May 5. [http://www.cdc.gov/tobacco/data\\_statistics/fact\\_sheets/fast\\_facts/](http://www.cdc.gov/tobacco/data_statistics/fact_sheets/fast_facts/).
- Centers for Disease Control and Prevention. 2015. "State Smoke-Free Laws for Worksites, Restaurants, and Bars --- United States, 2000--2010." Accessed November 27. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6015a2.htm>.
- Chapman, S, and B Freeman. 2009. "Regulating the Tobacco Retail Environment: Beyond Reducing Sales to Minors." *Tobacco Control* 18 (6): 496–501.
- Chapman, Simon. "Should Smoking in Outside Public Spaces Be Banned? No." *BMJ (Clinical Research Ed.)* 337 (2008): a2804.
- Community Preventive Services Task Force. 2013. "The Community Guide - Summary(a) - Tobacco: Mass-Reach Health Communication Interventions." Accessed July 6. <http://www.thecommunityguide.org/tobacco/massreach.html>.
- Coppo, Alessandro, Maria Rosaria Galanti, Daria Buscemi, Livia Giordano, and Fabrizio Faggiano. 2012. "School Policies for Preventing Smoking among Young People." In *Cochrane Database of Systematic Reviews*. John Wiley & Sons, Ltd. <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD009990/abstract>.
- Crosbie, Eric, Ernesto M Sebrie, and Stanton A Glantz. "Strong Advocacy Led to Successful Implementation of Smokefree Mexico City." *Tobacco Control* 20, no. 1 (January 2011): 64–72. doi:10.1136/tc.2010.037010.

- Edwards, Richard, Nick Wilson, and Nevil Pierse. 2006. "Highly Hazardous Air Quality Associated with Smoking in Cars: New Zealand Pilot Study." *The New Zealand Medical Journal* 119 (1244): U2294.
- Escoffery, Cam, Lucja Bundy, Michelle Carvalho, Debbie Yembra, Regine Haardörfer, Carla Berg, and Michelle C. Kegler. 2013. "Third-hand Smoke as a Potential Intervention Message for Promoting Smoke-free Homes in Low-income Communities." *Health Education Research* (May 13). doi:10.1093/her/cyt056. <http://her.oxfordjournals.org/content/early/2013/05/11/her.cyt056>.
- Esson, Katherine M., and Stephen R. Leeder. 2004. "The Millennium Development Goals and Tobacco Control: An Opportunity for Global Partnership". World Health Organization.
- Evlampidou, Iro, Manolis Bagkeris, Constantine Vardavas, Katerina Koutra, Evridiki Patelarou, Antonis Koutis, Leda Chatzi, and Manolis Kogevinas. 2015. "Prenatal Second-Hand Smoke Exposure Measured with Urine Cotinine May Reduce Gross Motor Development at 18 Months of Age." *The Journal of Pediatrics* 167 (2): 246–52.e2. doi:10.1016/j.jpeds.2015.03.006.
- Farrelly, Matthew C., Kevin C. Davis, M. Lyndon Haviland, Peter Messeri, and Cheryl G. Healton. 2005. "Evidence of a Dose—Response Relationship Between 'truth' Antismoking Ads and Youth Smoking Prevalence." *American Journal of Public Health* 95 (3): 425–31. doi:10.2105/AJPH.2004.049692.
- Farrelly, Matthew C., James Nonnemaker, Kevin C. Davis, and Altijani Hussin. 2009. "The Influence of the National Truth® Campaign on Smoking Initiation." *American Journal of Preventive Medicine* 36 (5): 379–84. doi:10.1016/j.amepre.2009.01.019.
- Fernández, Mariana F., Francisco Artacho-Cordón, Carmen Freire, Rocío Pérez-Lobato, Irene Calvente, Rosa Ramos, Ane M. Castilla, et al. 2015. "Trends in Children's Exposure to Second-Hand Smoke in the INMA-Granada Cohort: An Evaluation of the Spanish Anti-Smoking Law." *Environmental Research* 138 (April): 461–68. doi:10.1016/j.envres.2015.03.002.
- Ferrante, G, M Simoni, F Cibella, F Ferrara, G Liotta, V Malizia, G Corsello, G Viegi, and S La Grutta. 2013. "Third-hand Smoke Exposure and Health Hazards in Children." *Monaldi Archives for Chest Disease = Archivio Monaldi Per Le Malattie Del Torace / Fondazione Clinica Del Lavoro, IRCCS [and] Istituto Di Clinica Tisiologica e Malattie Apparato Respiratorio, Università Di Napoli, Secondo Ateneo* 79 (1) (March): 38–43.
- Fleming, Tyler, Chris Anderson, Sarang Amin, and Jeffrey Ashley. 2012. "Third-hand Tobacco Smoke: Significant Vector for PAH Exposure or Non-issue?" *Integrated Environmental Assessment and Management* 8 (4): 763–764. doi:10.1002/ieam.1337.
- Flouris, Andreas D., Constantine I. Vardavas, Giorgos S. Metsios, Aristidis M. Tsatsakis, and Yiannis Koutedakis. 2010. "Biological Evidence for the Acute Health Effects of Secondhand Smoke Exposure." *American Journal of Physiology - Lung Cellular and Molecular Physiology* 298 (1) (January 1): L3–L12. doi:10.1152/ajplung.00215.2009.
- Frazer Kate, Joanne E Callinan, Jack McHugh, Susan van Baarsel, Anna Clarke, Kirsten Doherty, and Cecily Kelleher 2016. Does legislation to ban smoking reduce exposure to secondhand smoke and smoking behaviour? *Cochrane Database of Systematic Reviews* Issue 2. Art. No.: CD005992. DOI: 10.1002/14651858.CD005992.pub3.
- Freeman, Becky, Simon Chapman, and Philip Storey. 2008. "Banning Smoking in Cars Carrying Children: An Analytical History of a Public Health Advocacy Campaign." *Australian and New Zealand Journal of Public Health* 32 (1) (February): 60–65. doi:10.1111/j.1753-6405.2008.00167.x.
- Global Advisors Smokefree Policy (GASP). 2015. "Smoke-Free Vehicles When Children Are Present." <http://www.njgasp.org/wp-content/uploads/2014/05/sf-cars-white-paper-8-14-15-455pm-FINAL-ON-WEBSITE.pdf>.

- Glover, Marewa, Robert Scragg, Sandar Min, AnetteKira, ViliNosa, Judith McCool, and Chris Bullen. 2011. "Driving Kids to Smoke? Children's Reported Exposure to Smoke in Cars and Early Smoking Initiation." *Addictive Behaviors* 36 (11) (November): 1027–1031. doi:10.1016/j.addbeh.2011.06.003.
- Hall, Allyson G., Jessica R. Schumacher, Michael Brad Cannell, Joyce Balls Berry, Melody Schiaffino, and SinYoung Park. 2013. "Tobacco Use in Florida: Comparisons Between Adults Living with and Without Disabilities." *Disability and Health Journal* 6 (3) (July): 213–219. doi:10.1016/j.dhjo.2013.01.008.
- Hamer, Mark, Emmanuel Stamatakis, and G. David Batty. 2010. "Objectively Assessed Secondhand Smoke Exposure and Mental Health in Adults: Cross-Sectional and Prospective Evidence from the Scottish Health Survey." *Archives of General Psychiatry* 67 (8): 850–55. doi:10.1001/archgenpsychiatry.2010.76.
- Hang, Bo, Altaf H. Sarker, Christopher Havel, Saikat Saha, Tapas K. Hazra, Suzaynn Schick, Peyton Jacob, et al. 2013. "Thirdhand Smoke Causes DNA Damage in Human Cells." *Mutagenesis*, March. doi:10.1093/mutage/get013.
- Holtgrave, David R., Katherine A. Wunderink, Donna M. Vallone, and Cheryl G. Heaton. 2009. "Cost–Utility Analysis of the National Truth® Campaign to Prevent Youth Smoking." *American Journal of Preventive Medicine* 36 (5): 385–88. doi:10.1016/j.amepre.2009.01.020.
- Iñiguez, Sergio D, Brandon L Warren, Eric M Parise, Lyonna F Alcantara, Brittney Schuh, Melissa L Maffeo, ZarkoManojlovic, and Carlos A Bolaños-Guzmán. 2009. "Nicotine Exposure During Adolescence Induces a Depression-like State in Adulthood." *Neuropsychopharmacology: Official Publication of the American College of Neuropsychopharmacology* 34 (6) (May): 1609–1624. doi:10.1038/npp.2008.220.
- International Agency for Research on Cancer World Health Organization. 2004. "IARC Monographs on the Evaluation of Carcinogenic Risks to Humans." Tobacco Smoke and Involuntary Smoking. Lyon, France. <http://monographs.iarc.fr/ENG/Monographs/vol83/mono83.pdf>.
- International Labour Organization. 2015. "Child Labour." *Child Labor*. <http://www.ilo.org/global/topics/child-labour/lang--en/index.htm>.
- Japuntich SJ, Eilers MA, Shenhav S, and et al. 2015. "SEcondhand Tobacco Smoke Exposure among Hospitalized Nonsmokers with Coronary Heart Disease." *JAMA Internal Medicine* 175 (1): 133–36. doi:10.1001/jamainternmed.2014.5476.
- Jarvie, Jill A., and Ruth E. Malone. 2008. "Children's Secondhand Smoke Exposure in Private Homes and Cars: An Ethical Analysis." *American Journal of Public Health* 98 (12): 2140–45. doi:10.2105/AJPH.2007.130856.
- Johns Hopkins Bloomberg School of Public Health. "How to Measure SHS." *Secondhand Smoke Monitoring*. Accessed May 2, 2013. [http://www.shsmonitoring.org/SHS\\_Overview/how/index.html](http://www.shsmonitoring.org/SHS_Overview/how/index.html).
- Kabir, Z., P. J. Manning, J. Holohan, S. Keogan, P. G. Goodman, and L. Clancy. 2009. "Second-hand Smoke Exposure in Cars and Respiratory Health Effects in Children." *European Respiratory Journal* 34 (3) (September 1): 629–633. doi:10.1183/09031936.00167608.
- Karim, Zubair A., Fatima Z. Alshbool, Hari Priya Vemana, Neema Adhami, Sandeep Dhall, Enma V. P. Espinosa, Manuela Martins-Green, and Fadi T. Khasawneh. 2015. "Third Hand Smoke: Impact on Hemostasis and Thrombogenesis." *Journal of Cardiovascular Pharmacology*, April. doi:10.1097/FJC.0000000000000260.

- Kassel, Jon D, Laura R Stroud, and Carol A Paronis. 2003. "Smoking, Stress, and Negative Affect: Correlation, Causation, and Context Across Stages of Smoking." *Psychological Bulletin* 129 (2) (March): 270–304.
- Kenen, Joanne, and KYLE CHENEY | 2/5/14 7:07 AM EST Updated: 2/5/14 2:49 PM EST. 2014. "CVS to Stop Tobacco Sales." *POLITICO*, February 5.  
<http://www.politico.com/story/2014/02/cvs-caremark-tobacco-cigarette-sales-103145.html>.
- Sumit R Kumar, Shelby Davies, Michael Weitzman and Scott Sherman 2015 A review of air quality, biological indicators and health effects of second-hand waterpipe smoke exposure. *Tob Control*. 2015 Mar;24 Suppl 1:i54-i59. doi: 10.1136/tobaccocontrol-2014-052038
- Lemstra, Mark, Cory Neudorf, and Johnmark Opono. 2008. "Implications of a Public Smoking Ban." *Canadian Journal of Public Health. Revue Canadienne de Santé Publique* 99 (1) (February): 62–65.
- Leonardi-Bee, Jo, John Britton, and Andrea Venn. 2011. "Secondhand Smoke and Adverse Fetal Outcomes in Nonsmoking Pregnant Women: A Meta-analysis." *Pediatrics* 127 (4) (April 1): 734–741. doi:10.1542/peds.2010-3041.
- Levy, David T, Jennifer A Ellis, Darren Mays, and An-Tsun Huang. 2013. "Smoking-related Deaths Averted Due to Three Years of Policy Progress." *Bulletin of the World Health Organization* 91 (7) (July 1): 509–518. doi:10.2471/BLT.12.113878.
- Lightwood, James M., and Stanton A. Glantz. 2009. "Declines in Acute Myocardial Infarction After Smoke-Free Laws and Individual Risk Attributable to Secondhand Smoke." *Circulation* 120 (14) (October 6): 1373–1379. doi:10.1161/CIRCULATIONAHA.109.870691.
- Matt, Georg E., Penelope J. E. Quintana, Hugo Destailats, Lara A. Gundel, Mohamad Sleiman, Brett C. Singer, Peyton Jacob, et al. 2011. "Thirdhand Tobacco Smoke: Emerging Evidence and Arguments for a Multidisciplinary Research Agenda." *Environmental Health Perspectives* 119 (9): 1218–26. doi:10.1289/ehp.1103500.
- McConnell, Rob, Ernest Shen, Frank D. Gilliland, Michael Jerrett, Jennifer Wolch, Chih-Chieh Chang, Frederick Lurmann, and Kiros Berhane. 2015. "A Longitudinal Cohort Study of Body Mass Index and Childhood Exposure to Secondhand Tobacco Smoke and Air Pollution: The Southern California Children's Health Study." *Environmental Health Perspectives* 123 (4): 360–66. doi:10.1289/ehp.1307031.
- Milton, B., P. A. Cook, L. Dugdill, L. Porcellato, J. Springett, and S. E. Woods. 2004. "Why Do Primary School Children Smoke? A Longitudinal Analysis of Predictors of Smoking Uptake during Pre-Adolescence." *Public Health* 118 (4): 247–55. doi:10.1016/j.puhe.2003.10.006.
- Moore, Graham F., Jo C. Holliday, and Laurence A. R. Moore. 2011. "Socioeconomic Patterning in Changes in Child Exposure to Secondhand Smoke After Implementation of Smoke-Free Legislation in Wales." *Nicotine & Tobacco Research*, May, ntr093. doi:10.1093/ntr/ntr093.
- [Moore, Graham F.](#), [Currie D.](#), [Gilmore G.](#), Jo C. [Holliday](#), Laurence A. R. Moore 2012. Socioeconomic inequalities in childhood exposure to secondhand smoke before and after smoke-free legislation in three UK countries.. *J Public Health (Oxf)*. 34(4):599-608. doi: 10.1093/pubmed/fds025. Epub 2012 Mar 23.
- Moore, Graham F., Laurence A. R. Moore, Hanna J. [Littlecot](#), Nilufar Ahmed, Sophia Lewis, [Gillian Sulley](#), [Elen Jones](#), and [Jo Holliday](#) 2015. Prevalence of smoking restrictions and child exposure to secondhand smoke in cars and homes: a repeated cross-sectional survey of children aged 10-11 years in Wales. *BMJ Open*. 30;5(1):e006914. doi: 10.1136/bmjopen-2014-006914.
- Muller, T. 2007. "Breaking the Cycle of Children's Exposure to Tobacco Smoke.," xii + 62 pp.

- Niederdeppe Jeff, Matthew C. Farrelly, and M. Lyndon Haviland. 2004. "Confirming 'truth': More Evidence of a Successful Tobacco Countermarketing Campaign in Florida." *American Journal of Public Health* 94 (2): 255–57. doi:10.2105/AJPH.94.2.255.
- Murray Rachel L, John Britton and Jo Leonardi-Bee. 2012. Second hand smoke exposure and the risk of invasive meningococcal disease in children: systematic review and meta-analysis. *BMC Public Health*. 12:1062. DOI: 10.1186/1471-2458-12-1062
- Öberg, Mattias, Maritta S Jaakkola, Alistair Woodward, Armando Peruga, and Annette Prüss-Ustün. 2011. "Worldwide Burden of Disease from Exposure to Second-hand Smoke: a Retrospective Analysis of Data from 192 Countries." *The Lancet* 377 (9760): 139–146. doi:10.1016/S0140-6736(10)61388-8.
- Office of the Surgeon General. 2013. "The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General." Accessed April 1. <http://www.surgeongeneral.gov/library/reports/secondhandsmoke/index.html>.
- Olasky, Sheera Joy, David Levy, and Andrew Moran. "Second Hand Smoke and Cardiovascular Disease in Low and Middle Income Countries: A Case for Action." *Global Heart* 7, no. 2 (July 1, 2012): 151–160.e5. doi:10.1016/j.ghheart.2012.05.002.
- Padrón, Alicia, Iñaki Galán, Esther García-Esquinas, Esteve Fernández, Montse Ballbè, and Fernando Rodríguez-Artalejo. 2015. "Exposure to Secondhand Smoke in the Home and Mental Health in Children: A Population-Based Study." *Tobacco Control*, March, tobaccocontrol – 2014–052077. doi:10.1136/tobaccocontrol-2014-052077.
- Phillips, Richard, Amanda Amos, Deborah Ritchie, Sarah Cunningham-Burley, and Claudia Martin. 2007. "Smoking in the Home After the Smoke-free Legislation in Scotland: Qualitative Study." *BMJ (Clinical Research Ed.)* 335 (7619) (September 15): 553. doi:10.1136/bmj.39301.497593.55.
- Pirkle, James L., John T. Bernert, Samuel P. Caudill, Connie S. Sosnoff, and Terry F. Pechacek. 2006. "Trends in the Exposure of Nonsmokers in the U.S. Population to Secondhand Smoke: 1988–2002." *Environmental Health Perspectives* 114 (6) (June): 853–858. doi:10.1289/ehp.8850.
- Priest, Naomi, Rob Roseby, Elizabeth Waters, Adam Polnay, Rona Campbell, Nick Spencer, Premila Webster, and Grace Ferguson-Thorne. 2008. "Family and Carer Smoking Control Programmes for Reducing Children's Exposure to Environmental Tobacco Smoke." *Cochrane Database of Systematic Reviews (Online)* (4): CD001746. doi:10.1002/14651858.CD001746.pub2.
- Protano, Carmela, and Matteo Vitali. 2011. "The New Danger of Thirdhand Smoke: Why Passive Smoking Does Not Stop at Secondhand Smoke." *Environmental Health Perspectives* 119 (10): a422. doi:10.1289/ehp.1103956.
- Rao, Uma, Constance L Hammen, Edythe D London, and Russell E Poland. 2009. "Contribution of Hypothalamic-pituitary-adrenal Activity and Environmental Stress to Vulnerability for Smoking in Adolescents." *Neuropsychopharmacology: Official Publication of the American College of Neuropsychopharmacology* 34 (13) (December): 2721–2732. doi:10.1038/npp.2009.112.
- Reda, Ayalu A, Daniel Kotz, Silvia M A A Evers, and Constant Paul van Schayck. 2012. "Healthcare Financing Systems for Increasing the Use of Tobacco Dependence Treatment." In *Cochrane Database of Systematic Reviews*, edited by The Cochrane Collaboration and Constant Paul van Schayck. Chichester, UK: John Wiley & Sons, Ltd. <https://www.pubmedcentral.nih.gov/pubmedhealth/PMH0012686/>.
- Redmon, Pamela, Lincoln C Chen, Jacob L Wood, Shuyang Li, and Jeffrey P Koplan. "Challenges for Philanthropy and Tobacco Control in China (1986-2012)." *Tobacco Control* 22, no. Suppl 2 (September 2013): ii4–ii8. doi:10.1136/tobaccocontrol-2012-050924.

- Richardson, Amanda Kalaydjian, Molly Green, Haijun Xiao, Natasha Sokol, and Donna Vallone. 2010. "Evidence for Truth®: The Young Adult Response to a Youth-Focused Anti-Smoking Media Campaign." *American Journal of Preventive Medicine* 39 (6): 500–506. doi:10.1016/j.amepre.2010.08.007.
- Rigotti Nancy A. e-Cigarette use and subsequent tobacco use by adolescents: new evidence about a potential risk of e-cigarettes. *JAMA*. 2015;314(7):673-674. (editorial)
- Ritchie, Deborah, Amanda Amos, Richard Phillips, Sarah Cunningham-Burley, and Claudia Martin. 2009. "Action to Achieve Smoke-free Homes- an Exploration of Experts' Views." *BMC Public Health* 9 (1) (April 22): 112. doi:10.1186/1471-2458-9-112.
- Roudik, Peter. 2013. "Global Legal Monitor: Latvia: Smoking Parents Will Be Prosecuted | Global Legal Monitor | Law Library of Congress | Library of Congress." Web page. June 5. [http://www.loc.gov/lawweb/servlet/lloc\\_news?disp3\\_l205403608\\_text](http://www.loc.gov/lawweb/servlet/lloc_news?disp3_l205403608_text).
- Rubenstein, David, JolyonJesty, and Danny Bluestein. 2004. "Differences Between Mainstream and Sidestream Cigarette Smoke Extracts and Nicotine in the Activation of Platelets Under Static and Flow Conditions." *Circulation* 109 (1) (January 6): 78–83. doi:10.1161/01.CIR.0000108395.12766.25.
- Sargent, R. P. 2004. "Reduced Incidence of Admissions for Myocardial Infarction Associated with Public Smoking Ban: Before and After Study." *BMJ* 328 (7446) (April 24): 977–980. doi:10.1136/bmj.38055.715683.55.
- Sebrie, Ernesto M, and Stanton A Glantz. "Local Smoke-Free Policy Development in Santa Fe, Argentina." *Tobacco Control* 19, no. 2 (April 2010): 110–16. doi:10.1136/tc.2009.030197.
- Seo, Dong-Chul, and Mohammad R Torabi. 2007. "Reduced Admissions for Acute Myocardial Infarction Associated with a Public Smoking Ban: Matched Controlled Study." *Journal of Drug Education* 37 (3): 217–226.
- Singh, Rana J., and Pranay G. Lal. 2011. "Second-Hand Smoke: A Neglected Public Health Challenge." *Indian Journal of Public Health* 55 (3): 192–98.
- Sinha, D N, S Rinchin, K M Palipudi, Nang Naing Naing Shein, P de Silva, B B Khadka, M Pednekar, et al. 2012. "Tobacco Use, Exposure to Second-Hand Smoke, and Cessation Training among the Third-Year Medical and Dental Students in Selected Member States of South-East Asia Region: A Trend Analysis on Data from the Global Health Professions Student Survey, 2005-2011." *Indian Journal of Cancer* 49 (4): 379–86. doi:10.4103/0019-509X.107743.
- Sly, David F., Ed Trapido, and Sarah Ray. 2002. "Evidence of the Dose Effects of an Antitobacco Counteradvertising Campaign." *Preventive Medicine* 35 (5): 511–18. doi:10.1006/pmed.2002.1100.
- Stead, Lindsay F, and Tim Lancaster. 2012. "Combined Pharmacotherapy and Behavioural Interventions for Smoking Cessation." In *Cochrane Database of Systematic Reviews*, edited by The Cochrane Collaboration and Lindsay F Stead. Chichester, UK: John Wiley & Sons, Ltd. <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0049377/>.
- Stillman, Frances A., Annette M. David, Naseeb Kibria, and Hai Thi Phan. "Building Capacity for Implementation of the Framework Convention for Tobacco Control in Vietnam: Lessons for Developing Countries." *Health Promotion International*, February 14, 2013, dat005. doi:10.1093/heapro/dat005.
- Sureda, Xisca, Esteve Fernandez, Maria J. Lopez, and Manel Nebot. "Secondhand Tobacco Smoke Exposure in Open and Semi-Open Settings: A Systematic Review." *Environmental Health Perspectives* 121, no. 7 (July 2013): 766–73. doi:10.1289/ehp.1205806.

- Sweda, Edward L., Mark A. Gottlieb, and Raymond C. Porfiri. 1998. "Protecting Children from Exposure to Environmental Tobacco Smoke." *Tobacco Control* 7 (1): 1–2. doi:10.1136/tc.7.1.1.
- Tanski, Susanne E., and Karen M. Wilson. 2012. "Children and Secondhand Smoke: Clear Evidence for Action." *Pediatrics* 129 (1) (January 1): 170–171. doi:10.1542/peds.2011-3190.
- Thomas, Roger E, Julie McLellan, and Rafael Perera. 2013. "School-based Programmes for Preventing Smoking." In *Cochrane Database of Systematic Reviews*, edited by The Cochrane Collaboration and Roger E Thomas. Chichester, UK: John Wiley & Sons, Ltd. <https://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0010967/>.
- Thomson, George, Nick Wilson, and Richard Edwards. "At the Frontier of Tobacco Control: A Brief Review of Public Attitudes toward Smoke-Free Outdoor Places." *Nicotine & Tobacco Research: Official Journal of the Society for Research on Nicotine and Tobacco* 11, no. 6 (June 2009): 584–90. doi:10.1093/ntr/ntp046.
- Tinuoye, Olaitan, Jill P Pell, and Daniel F Mackay. 2013. "Meta-analysis of the Association Between Secondhand Smoke Exposure and Physician-Diagnosed Childhood Asthma." *Nicotine & Tobacco Research: Official Journal of the Society for Research on Nicotine and Tobacco* (March 28). doi:10.1093/ntr/ntt033.
- Ueta I, Saito Y, Teraoka K, Miura T, Jinno K 2010. Determination of volatile organic compounds for a systematic evaluation of third-hand smoking. *Anal Sci.* 26(5):569-74
- US Department of Health and Human Services, Administration on Children, Youth and Families. 2009. "Child Maltreatment 2007." Washington, DC. <http://archive.acf.hhs.gov/programs/cb/pubs/cm07/cm07.pdf>.
- Vitória, Paulo D., José Cunha Machado, Ana Carolina Araújo, Sofia B. Ravara, Catarina Samorinha, Henedina Antunes, Manuel Rosas, Elisardo Becoña, and José Precioso. 2015. "Children's Exposure to Second Hand Smoke at Home: A Cross-Sectional Study in Portugal." *Revista Portuguesa de Pneumologia (English Edition)*. Accessed April 16. doi:10.1016/j.rppnen.2014.09.003.
- Voorhees, Carolyn C., Cong Ye, Olivia Carter-Pokras, Laura MacPherson, Mariano Kanamori, Guangyu Zhang, Lu Chen, and Robert Fiedler. 2011. "Peers, Tobacco Advertising, and Secondhand Smoke Exposure Influences Smoking Initiation in Diverse Adolescents." *American Journal of Health Promotion* 25 (3) (January): e1–e11. doi:10.4278/ajhp.090604-QUAN-180.
- Wan, Xia, Frances Stillman, Huilin Liu, Mark Spires, Zhen Dai, Stephen Tamplin, Daiwei Hu, Jonathan M Samet, and Gonghuan Yang. "Development of Policy Performance Indicators to Assess the Implementation of Protection from Exposure to Secondhand Smoke in China." *Tobacco Control* 22, no. Suppl 2 (September 2013): ii9–ii15. doi:10.1136/tobaccocontrol-2012-050890.
- Wang Zhen, Sara M May, Suvanee Charoenlap, Regan Pyle, Nancy L Ott, Khalid Mohammed, and Avni Y Joshi 2015. Effects of secondhand smoke exposure on asthma morbidity and health care utilization in children: a systematic review and meta-analysis. *Ann Allergy Asthma Immunol.* 115(5):396-401.e2.
- Warner KE, and J. Mackay. 2006. The global tobacco disease pandemic: nature, causes, and cures. *Glob Public Health.* 1(1):65-86.
- "WHO | Ratification." 2015. WHO. Accessed May 5. <http://www.who.int/fctc/protocol/ratification/en/>.
- World Health Organization. 2004. "Second-hand Smoke: Exposure by Region." <http://apps.who.int/gho/data/view.main.34800>.



- World Health Organization. 2007. "Protection from Exposure to Second-Hand Tobacco Smoke." Policy Recommendations. France.  
[http://www.who.int/quantifying\\_ehimpacts/publications/shsarticle2010/en/](http://www.who.int/quantifying_ehimpacts/publications/shsarticle2010/en/).
- World Health Organization. 2013a. "WHO | 10 Facts on Second-hand Smoke."  
[http://www.who.int/features/factfiles/tobacco/tobacco\\_facts/en/index9.html](http://www.who.int/features/factfiles/tobacco/tobacco_facts/en/index9.html).
- World Health Organization. 2013b. "WHO | Worldwide Burden of Disease from Exposure to Second-hand Smoke." *WHO*. [http://www.who.int/quantifying\\_ehimpacts/publications/shsarticle2010/en/](http://www.who.int/quantifying_ehimpacts/publications/shsarticle2010/en/).
- World Health Organization. 2008. "WHO Report on the Global Tobacco Epidemic, 2008: The MPOWER Package."
- World Health Organization. 2009. "WHO Report on the Global Tobacco Epidemic, 2009: Implementing Smoke-free Environments." <http://www.who.int/tobacco/mpower/2009/en/>.
- World Health Organization. 2011. "WHO Report on the Global Tobacco Epidemic, 2011: Warning About the Dangers of Tobacco." [http://www.who.int/tobacco/global\\_report/2011/en/index.html](http://www.who.int/tobacco/global_report/2011/en/index.html).
- World Medical Association. 1997. "WMA Statement on Health Hazards of Tobacco Products and Tobacco-Derived Products." January 11. <http://www.wma.net/en/30publications/10policies/h4/>.
- World Medical Association. 2012. "WMA Statement on Electronic Cigarettes and Other Electronic Nicotine Delivery Systems." October 13. <http://www.wma.net/en/30publications/10policies/e19/>.
- Zhang, Liying, Jason Hsia, Xiaoming Tu, Yang Xia, Lihong Zhang, Zhenqiang Bi, Hongyan Liu, Xiaoming Li, and Bonita Stanton. 2015. "Exposure to Secondhand Tobacco Smoke and Interventions Among Pregnant Women in China: A Systematic Review." *Preventing Chronic Disease* 12 (March). doi:10.5888/pcd12.140377.