Second-hand tobacco smoke and children

Children’s Health and the Environment

CHEST Training Package for the Health Sector

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First draft prepared by Stephan Boese-O'Reilly, Thomas Lob-Corzilius and Wojciech Hanke, based on material prepared by Wolf-Ruediger Horn, Ursel Heudorf, Sabine Schmidt, Annette Bornhaeuser, Martina Poetschke-Langer and Leda Nemer
Second-hand tobacco smoke and children

Learning objectives

- Definition of second-hand tobacco smoke
- Health relevance
- Epidemiology of second-hand tobacco smoke
- Environmental history and diagnostics
- Primary prevention
- Smoking and breastfeeding
- Secondary prevention
Second-hand tobacco smoke and children

Definition of second hand tobacco smoke

- Second-hand tobacco smoke:
  - Inhalation of tobacco smoke in the air
  - Comprises 80–85% of the sidestream smoke coming from the burning tip of the cigarette
  - The second-hand tobacco smoke is up to 10 times more burdened than the mainstream smoke, such as with carcinogenic substances

- Second-hand tobacco smoke is a new technical term for what was previously called environmental tobacco smoke

Ref.: Courage C.M.: Environmental tobacco smoke. In: Children’s health and environment: A review of evidence - a joint report from the European Environment Agency and the WHO Regional Office for Europe. Edited by: Giorgio Tamburlini, Ondine S. von Ehrenstein, Roberto Bertollini. WHO Regional Office for Europe, ISBN 92-9167-412-5, Copenhagen 2002, http://www.euro.who.int/ecehrome. Page: 142: “Environmental tobacco smoke (SHTS) is an aged, diluted mixture of mainstream smoke, that is smoke exhaled by smokers, and sidestream smoke, that is smoke emitted from the burning tip of the cigarette. The inhalation of ETS is known as ‘involuntary smoking’ or ‘passive smoking’. More than 4 000 compounds have been identified in laboratory-based studies as components of mainstream smoke and at least 42 of these were classed as carcinogenic to laboratory animals, many of them known or suspected human carcinogens (NRC, 1986).”
Second-hand tobacco smoke and children

Tobacco smoke – windows of exposure

- **Prenatal exposure**
  - Actively smoking or passively exposed mother is exposing the unborn child via the umbilical cord

- **Passive childhood exposure**
  - A smoking mother exposes the child via breast-milk
  - Smoking household members expose the child via indoor air

- **Active smoking**
  - Some teenagers are starting to smoke in the early years of life

In the US, it has been estimated that 43% of children aged 2 months to 11 years live in a home with at least one person that smokes. The prevalence of passive infant smoking was reported to be around 40% also in Europe. (Samet, 2001)


It seems that based on statistical data, the number of adult smokers in Europe is showing a decreasing trend. In addition, regulation on smoking is being implemented in Europe with the aim to reduce numbers of smokers. However it is also observed that the number of smoking women in reproductive age is not decreasing or is even increasing. Large differences in smoking prevalence exist between countries and in different environments (urban vs rural, socioeconomic classes, etc) (Samet, 2001).
Second-hand tobacco smoke and children

Toxic and carcinogenic substances in tobacco smoke

- Toxic substances:
  - Carbon monoxide
  - Nitrogen dioxide
  - Ammonia

- Carcinogenic substances:
  - Formaldehyde
  - Phenols
  - Acrylaldehyde
  - Quinoline
  - Benzene
  - Hydrazine
  - Benzo-a-pyrene
  - 2-Toluidine
  - 2-Naphthylamine
  - 4-Aminodiphenol
  - N-Nitrosodimethylamine
  - N-Nitrosopyrrolidine
  - Cadmium
  - Nickel
  - Polonium-210


Second-hand tobacco smoke and children

**Tobacco smoke – exposure data**

- 43% of children in the United States live in a home with at least one smoker
- The prevalence of passive infant smoking is about 40% in Europe
- The proportion of adult smokers in Europe is decreasing
- Regulations on smoking have been implemented in Europe to reduce the numbers of smokers
- The number of women of reproductive age who smoke is increasing
- The smoking prevalence differs greatly between countries and in different environments (urban versus rural, socioeconomic classes, etc.)

-In a study by Samet, the prevalence of passive infant smoking in Europe was reported to be around 40%. (Samet, 2001)

-It seems that based on statistical data, the number of adult smokers in Europe is showing a decreasing trend.

-In addition, regulation on smoking is being implemented in Europe with the aim to reduce numbers of smokers.

-However it is also observed that the number of smoking women in reproductive age is not decreasing or is even increasing.

-Large differences in smoking prevalence exist between countries and in different environments (urban vs rural, socioeconomic classes, etc) (Samet, 2001).

Second-hand tobacco smoke and children

Exposure to Environmental Tobacco Smoke in Europe – A review.
Olenka Brynczka
World Health Organization Regional Office for Europe, Bonn 2003
www.euro.who.int/air
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Nordic countries = Denmark, Finland, Iceland, Norway, Sweden
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Second-hand tobacco smoke and children

Smoking trends in the WHO European Region

- 38% male smokers and an increasing gap between east and west
- Eleven Member States have prevalence rates exceeding 50%; four Member States have prevalence rates of less than 30%
- Nearly 23% female smokers and a narrowing east-west gap
- The smoking prevalence among young people is about 27–30%, with an upward trend generally (and a potential slight decline in the past few years, such as in Germany)
- A rising trend among adolescent girls, who have the highest incidence of smoking initiation
- Smoking in the WHO European Region still remains at a rate that could have direct and indirect devastating public health effects for Europe

Exposure to Environmental Tobacco Smoke in Europe – A review.
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www.euro.who.int/air

* Very slow downward trend in some regions possible in the last few years, e.g. Germany

WHO Europe consists of 52 Member States and goes from Western Europe to the Newly Independent States (including Uzbekistan).
Second-hand tobacco smoke and children

Maternal smoking and prenatal exposure

Scientifically proven

- ↓ birth weight, birth length, head circumference
- ↑ risk of sudden infant death syndrome due to possible changes in the “arousal” centre
- ↑ miscarriage
- ↑ stillbirth

†↑ risk of SIDS

Surgeon General

↓ birth weight, birth length, head circumference Windham GC, Hopkins B, Fenster L, Swan SH: Prenatal active or passive tobacco smoke exposure and the risk of preterm delivery or low birth weight. Epidemiology 2000,11,427-33

↑ miscarriage


↑ still birth

Second-hand tobacco smoke and children

Maternal smoking and prenatal exposure

- Under investigation:
  - ↑ risk of birth defects
  - ↓ pulmonary growth and maternal smoking (in utero exposure > postnatal)
  - ↑ childhood cancer
  - ↑ preterm birth
  - ↑ neurobehavioural abnormalities
  - ↓ IQ

We identified more than 30 studies on the association between exposure to maternal tobacco smoke during pregnancy and cancer in childhood. We combined their results in meta-analyses based on a random effects model. The results of the meta-analyses suggest a small increase in risk of all neoplasm's [relative risk (RR) 1.10; 95% confidence interval (CI), 1.03-1.19; based on 12 studies] ... The results on exposure to paternal tobacco smoke suggest an association with brain tumours (RR 1.22; CI, 1.05-1.40; based on 10 studies) and lymphomas (RR 2.08; CI, 1.08-3.98; 4 studies


Smoking in late pregnancy is linked to lower IQ in offspring
http://bmj.bmjjournals.com/cgi/content/full/330/7490/499?ehom

Mothers who smoke in late pregnancy risk having children with lower intelligence. Young men whose mothers smoked 20 or more cigarettes a day had IQs that were on average 6.2 points below those of sons of non-smokers, research has found (Paediatric and Perinatal Epidemiology 2005;19:4-11). The more cigarettes a woman smoked, the greater the risk. The association was as strong in children with high social status as in low status offspring.
Second-hand tobacco smoke and children

Maternal smoking –
more smoke, less baby

Nonsmoker
1–5 cigarettes per day
>20 cigarettes per day

.birth weight or ‘More smoke less baby’: 19 studies ⇒ consistent slight effect of SHTS exposure on birth weight— pooled weight decrement of 31g (95%CI (-42, -20))

↑ risk (about 20%) intrauterine growth restriction (IUGR)
⇒ smaller birth weight than expected based on pregnancy duration

Ref.: California Environmental Protection Agency. Health effects of exposure to environmental tobacco smoke. San Francisco (CA): California Environmental Protection Agency 1997

Windham GC, Hopkins B, Fenster L, Swan SH: Prenatal active or passive tobacco smoke exposure and the risk of preterm delivery or low birth weight. Epidemiology 2000,11,427-33

Ref.:
<table>
<thead>
<tr>
<th>Second-hand tobacco smoke and children</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking parents – sudden infant death syndrome</td>
</tr>
</tbody>
</table>

- Sudden infant death syndrome is defined as a sudden, unexpected death of an infant without any evidence of a fatal illness at autopsy.
- Postulated mechanisms in relation to exposure to second-hand tobacco smoke:
  - Second-hand tobacco smoke promotes direct irritation of the airways and respiratory infection.
  - Exposure to nicotine may alter the infant’s response to hypoxia (abnormal control of cardiorespiratory activity).
  - Exposure to nicotine may alter the infant’s catecholamine metabolism.

SIDS is defined as a sudden, unexpected death of an infant, without evidence of any fatal illness at autopsy. After congenital anomalies, SIDS is the most common cause of death among infants 1 month to 1 year old in the US, accounting for 5,417 deaths in 1990. Active maternal smoking during pregnancy is established risk factor of SIDS. Role of paternal smoking – elevated risk of SIDS while accounting for maternal smoking in 3 out of 6 studies.

California Environmental Protection Agency (1997) states that current studies support an elevated risk of SIDS associated with postnatal ETS exposure, independent of maternal smoking during pregnancy.

Postulated mechanisms in relation to SHTS exposure:

- SHTS promotes direct irritation of the airways and respiratory infection.
- Exposure to nicotine may alter infant’s response to hypoxia (abnormal control of cardio-respiratory activity).
- Exposure to nicotine may alter infant’s catecholamine metabolism.


## Second-hand tobacco smoke and children

### Maternal smoking – sudden infant death syndrome

Prenatal and postnatal maternal smoking and risk of sudden infant death syndrome (meta-analysis of 39 studies)

<table>
<thead>
<tr>
<th>Exposure to second-hand tobacco smoke</th>
<th>Pooled odds ratio</th>
<th>95% confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prenatal maternal smoking (unadjusted)</td>
<td>2.77</td>
<td>2.45–3.13</td>
</tr>
<tr>
<td>Prenatal maternal smoking (adjusted)</td>
<td>2.08</td>
<td>1.83–2.38</td>
</tr>
<tr>
<td>Postnatal maternal smoking (after controlling for prenatal smoking)</td>
<td>1.94</td>
<td>1.55–2.43</td>
</tr>
</tbody>
</table>

Most studies found dose-response relationships with both prenatal and postnatal maternal smoking.

Studies controlled for maternal factors (age, parity); infant factors (sex, birth weight, gestational age), socioeconomic status (ethnicity, social class, education) and infant care practices (breastfeeding, sleeping position, wrapping), prenatal maternal smoking (4 studies)

OR = odds ratio, CI = confidence interval

Second-hand tobacco smoke and children

Smoking parents

- Scientifically proven:
  - ↑ 94% sudden infant death syndrome
  - ↑ 60% acute respiratory illnesses
  - ↑ 24–40% chronic respiratory symptoms
  - ↑ 21% asthma and exacerbation of asthma symptoms
  - ↓ growth in lung functioning
  - ↑ 50% recurrent otitis media (repeated ear infection)


• 60% increase in acute respiratory illnesses (ARI) (Strachan DP, Cook DG: Parental smoking and lower respiratory illness in infancy and early childhood. Thorax 1997, 52, 905-14)

• 24-40% increase in chronic respiratory symptoms (Cook DG, Strachan DP: Health effects of passive smoking 3. Parental smoking and prevalence of respiratory symptoms and asthma in school age children. Thorax 1997, 52, 1081-94)

• 21% increase in asthma and exacerbation of asthma symptoms (Cook DG, Strachan DP: Health effects of passive smoking 3. Parental smoking and prevalence of respiratory symptoms and asthma in school age children. Thorax 1997, 52, 1081-94)


• ↑ 50% recurrent otitis media (Strachan DP, Cook DG. Parental smoking, middle ear disease and adenotonsillectomy in children, Thorax 1997; 53:50-6)
Second-hand tobacco smoke and children

Smoking parents – neurodevelopment

Under investigation:

- Neurobehavioural deficits
- Neurodevelopmental deficits
- Childhood cancer

Studies on behavioural and neuro-developmental deficits in children exposed to SHTS are difficult to interpret influence of uncontrolled (parental intelligence, home environment, environmental and personal exposures, child rearing practices, depression, other characteristics of smokers) imprecision in measurement of smoking exposure.

McCartney JS, Fried PA, WatkinsonB: Central auditory processing in school-age children prenatally exposed to cigarette smoke. Neurotoxicol Teratol 16,269-276, 1994

Second-hand tobacco smoke and children

Smoking parents – respiratory symptoms in children

- The first reports of an effect of parental smoking on children’s respiratory symptoms were published in the early 1970s
- Risk if either parent smokes (meta-analysis of 60 studies)

<table>
<thead>
<tr>
<th>Respiratory symptoms</th>
<th>Number of studies</th>
<th>Odds ratio</th>
<th>95% confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheezing</td>
<td>41</td>
<td>1.24</td>
<td>1.17−1.31</td>
</tr>
<tr>
<td>Cough</td>
<td>34</td>
<td>1.40</td>
<td>1.27−1.53</td>
</tr>
<tr>
<td>Phlegm</td>
<td>7</td>
<td>1.35</td>
<td>1.13−1.62</td>
</tr>
<tr>
<td>Breathlessness</td>
<td>6</td>
<td>1.31</td>
<td>1.08−1.59</td>
</tr>
</tbody>
</table>

The measures of effect were lower for one parent smoking and higher for both parents smoking.

The effect of maternal smoking was stronger than paternal smoking. This can be due to a higher exposure of the child to maternal than to paternal smoking, because mothers are more often at home, or because the mother also smoked in pregnancy, so the effect found could be due to prenatal exposure rather than to exposure during childhood.

The increased risk found in households where the father but not the mother smoked supports an effect of SHTS exposure independent of in utero exposure.

Conclusions of California EPA (1997): There is sufficient evidence that ETS exposure at home is causally associated with chronic respiratory symptoms (cough, phlegm or wheezing) in children, particularly infants and young children. California Environmental Protection Agency. Health effects of exposure to environmental tobacco smoke. San Francisco (CA): California Environmental Protection Agency 1997

Ref.: Cook DG, Strachan DP: Parental smoking and prevalence of respiratory symptoms and asthma in school age children, Thorax 1997; 52:1081-94
Second-hand tobacco smoke and children

Smoking parents – asthma in children

- 21% increase in clinically diagnosed asthma among children with either parent being a smoker
- Developing asthma or wheezing is more related to maternal than paternal smoking
- The effect was stronger for the first 5–7 years of life than for school age

Meta-analysis (37 studies):
- Clinically diagnosed asthma: odds ratio OR = 1.44 (95%CI (1.27-1.64))

Meta-analysis (25 studies):
- The pooled odds ratio for either parent smoking: odds ratio OR = 1.21 (95%CI (1.1-1.34))

Incidence of asthma or wheezing was related to maternal smoking
Effect was stronger for the first 5-7 years of life than school age

ETS increases airway hyper responsiveness.


While exposure to ETS increases the risk of sensitization to food allergens in the first few years of life it does not appear to increase the sensitivity to inhalant allergens.

Kulig M et al.: Effect of re- and postnatal tobacco smoke exposure on specific sensitization to food and inhalant allergens during the first 3 years of life. Allergy 1999, 54, 220–228


Likewise exposure to ETS is not associated with increase in IgE in children Gergen, P. J.; Environmental Tobacco Smoke As a Risk Factor for Respiratory Disease in Children; Respir.Physiol; 128 (1) p.39-46, 2001

OR = odds ratio, CI = confidence interval
Second-hand tobacco smoke and children

Smoking parents – prognosis of asthma

- Disease severity increased, as assessed by:
  - Frequency and intensity of asthma attacks
  - Number of emergency room visits during a year
  - Use of asthma medication
  - Occurrence of severe asthma attacks (requiring intubation)

Ref.:

California Environmental Protection Agency. Health effects of exposure to environmental tobacco smoke. San Francisco (CA): California Environmental Protection Agency 1997

Second-hand tobacco smoke and children

Tobacco smoke – children’s lung

- In early childhood (up to 3 years) lung development is completed with the formation of alveoli
- Growth in lung functioning parallels the change in height throughout childhood
- Second-hand tobacco smoke increases the risk of respiratory infections, which may adversely affect lung functioning
- In utero exposure to maternal smoking may have lasting effects on the airways of the lung
- Lung functioning declines with active smoking among older children

Ref.:


California Environmental Protection Agency. Health effects of exposure to environmental tobacco smoke. San Francisco (CA): California Environmental Protection Agency 1997
Second-hand tobacco smoke and children

**Lung functioning**

8706 schoolchildren (6–18 years) were followed annually: small reductions in lung functioning through adolescence were associated with both current and preschool exposure to maternal smoking:

- Maternal smoking is a stronger determinant of lung functioning than the smoking of the father or other household members
  - Exposure in utero?
  - Closer contact of the child with the mother?
- Second-hand tobacco smoke more strongly affected FEV₁ among boys than girls

<table>
<thead>
<tr>
<th>Spirometry parameter</th>
<th>Decrement ml/year</th>
<th>95% confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEV₁</td>
<td>3.8</td>
<td>6.4 to 1.2</td>
</tr>
<tr>
<td>FVC</td>
<td>2.8</td>
<td>5.5 to 0</td>
</tr>
<tr>
<td>FEF₂₅₋₇₅</td>
<td>14.3</td>
<td>29.0 to 0.3</td>
</tr>
</tbody>
</table>


FEV₁, FVC and FEF₂₅₋₇₅ are lung function parameters

CI = confidence interval
Second-hand tobacco smoke particles are small and can penetrate the airways and alveoli of the lung.

The gaseous components of second-hand tobacco smoke may adversely affect lung defences, with effects on:

- Cilia
- Macrophage function
- Immune response

Second-hand tobacco smoke may increase the severity of acute respiratory illnesses by irritating and inflaming the lungs.

Ref.: 


Second-hand tobacco smoke and children

Acute respiratory illnesses

Results of epidemiological studies
- 60% if either parent smokes
- 70% if only the mother smokes
- 30% if another household member smokes

Each year children younger than 18 months in the United States have 150,000 to 200,000 cases of lower respiratory tract illness related to second-hand tobacco smoke, about 5% of which require hospitalization.

Meta-analysis (36 studies):
- Either parent smoking: odds ratio OR = 1.6 (95%CI (1.4 –1.7))
- Maternal smoking only: odds ratio OR = 1.7 (95%CI (1.6 – 1.9))
- Other household member smoking: odds ratio OR = 1.3 (95%CI (1.2 – 1.4))

Ref.: Strachan DP, Cook DG: Parental smoking and lower respiratory illness in infancy and early childhood. Thorax 1997, 52, 905

ETS particles are small and can penetrate the airways and alveoli of the lung. Gaseous components of ETS may adversely affect lung defences (effects on cilia, macrophage function, immune responses).

ETS may increase ARI severity through irritation and inflammation of the lung. (Surgeon General 1986, US EPA 1992, UK Scientific Committee on Tobacco and Health 1998)

Risk of ARI from SHTS is highest in the first year of life, and remains elevated until about the age of 3 years.

Direct effects of ETS exposure on the risk of ARI in young children’s, independent of in utero exposure to ETS.

The effects of ETS on the susceptibility to infections can be protected, at least to some extent, by breastfeeding the child for a lengthy period.
Second-hand tobacco smoke and children

Acute and chronic middle ear disease

- Eustachian tube dysfunction is central to the development of middle ear disease
- Second-hand tobacco smoke may contribute to eustachian tube dysfunction through:
  - ↓ mucociliary clearance
  - ↑ adenoidal hyperplasia
  - ↑ mucosal swelling
  - ↑ frequency of upper respiratory tract infections
- Parental smoking is linked with middle ear disease among children and is likely to be a cause

Ref.:
Second-hand tobacco smoke and children

Smoking parents –
neurobehavioural and neurodevelopmental deficits

- Biological plausibility of exposure to second-hand tobacco smoke causing adverse neurodevelopmental effects
  - Second-hand tobacco smoke exposure may be potentially more hazardous than in utero exposure to maternal smoking
  - Inhalation exposure provides a higher dose than transplacental exposure
- Childhood may be the critical period for neurodevelopmental effects of smoking
- Children have a longer duration of exposure than do foetuses
- Animal experiments – brain development is altered by postnatal but not prenatal exposure to second-hand tobacco smoke

Ref.:
Second-hand tobacco smoke and children

Neurodevelopment

- Poorer academic performance in relation to paternal, maternal or household smoking has been reported at the time of a follow-up during childhood
- One study controlled for maternal smoking during pregnancy
- Clearly worse performance on a range of cognitive, perceptual, central auditory and linguistic abilities was associated with postnatal exposure in three of six studies that controlled for prenatal maternal smoking
- Children of mothers who smoked only after pregnancy performed somewhat worse than children of mothers who smoked only during pregnancy
- Cognitive abilities (reading and math) were reduced among children 6–16 years old if exposed to second-hand tobacco smoke (adjusted data)

Ref.: Poorer academic performance in relation to paternal, maternal or household smoking was reported at the time of a follow-up during childhood (Rentekallio1983, Bauman 1989, Byrd 1994). Only one study (Rentekallio 1983) controlled for maternal smoking during pregnancy.

Clear decrement in performance on a range of cognitive, perceptual, central auditory and linguistic abilities associated with postnatal exposure was observed in three (Bauman 1991, Eskenazi 1995, Fried 1997) out of six studies that controlled for prenatal maternal smoking.

Children of mothers who smoked only after pregnancy performed somewhat worse than children of mothers who smoked only during pregnancy (Bauman 1989, Eskenazi 1995).


Second-hand tobacco smoke and children

Parental smoking – childhood cancer

- Paternal tobacco smoke
  - 22% increase in the risk of brain tumour
  - 200% increase in the risk of lymphoma
  - The results on exposure to tobacco smoke from maternal smoking before or after pregnancy are too sparse to allow for conclusion

- Brain tumours among the children of nonsmoking women exposed to tobacco smoke from the husband's smoking:
  - 80% increase for early pregnancy exposure
  - 70% increase for late pregnancy

Paternal tobacco smoke
- Brain tumours (10 studies): relative risk RR = 1.22 (95%CI (1.05-1.40))
- Lymphomas (4 studies): relative risk RR = 2.08 (95%CI (1.08-3.98))

Brain tumours among children of non-smoking women exposed to tobacco smoke from the husband’s smoking:
- For early pregnancy: relative risk RR = 1.8 (95%CI (1.2-2.5))
- For late pregnancy: relative risk RR = 1.7 (95%CI (1.2-2.6))

Ref.: Paolo Boffetta, Jean Trédaniel, and Antonia Greco: Risk of Childhood Cancer and Adult Lung Cancer After Childhood Exposure to Passive Smoke: A Meta-Analysis. Environmental Health Perspectives; 108 (1) p.73-82, 2000

More than 30 studies on the association between exposure to maternal tobacco smoke during pregnancy and cancer in childhood were identified. The results of the meta-analyses suggest a small increase in risk of all neoplasms [relative risk (RR) 1.10; 95% confidence interval (CI), 1.03-1.19; based on 12 studies] ... The results on exposure to paternal tobacco smoke suggest an association with brain tumours (RR 1.22; CI, 1.05-1.40; based on 10 studies) and lymphomas (RR 2.08; CI, 1.08-3.98; 4 studies)."

Second-hand tobacco smoke and children

Environmental history and diagnostic procedures

- **History**
  - Taking the history is essential to recognize the problem and to advise parents.
  - Questions on smoking habits in the family should be asked at the very first consultation (such as other questions about family, home and pets).

- **Diagnostic procedures**
  - No routine diagnostic procedures are necessary.
  - For scientific purposes, cotinine analysis of urine or serum can be used to document exposure.

*Picture: TFI/WHO www.who.int/tobacco/health_priority/en/*
Second-hand tobacco smoke and children

Example: the US National Cancer Institute's ask, advice, assist and arrange model for physician-based smoking cessation

- Ask parents about smoking at every opportunity
  - I've noticed that your daughter has had a large number of respiratory problems. Do you or your spouse smoke cigarettes?
  - How many cigarettes do you smoke each day?
- Advise parents to stop smoking
  - As your child's paediatrician, I must advise you to stop smoking, both for your own health and that of your son.
  - One of the best ways for you to help your daughter is to quit smoking.
  - Are you willing to attempt to quit smoking?


"The National Cancer Institute's 4-A Approach to Physician-Based Smoking Cessation

As an example from the U.S. the 4 A Approach to Physician Based Smoking Cessation is given. It is a very directive way of interaction.
Second-hand tobacco smoke and children

The US National Cancer Institute's ask, advice, assist and arrange model for physician-based smoking cessation

- Assist the parent in quitting
  - Let’s set a quit date in the next couple of weeks.
  - Here are some materials from the National Cancer Institute that many smokers have found helpful.
  - Let’s talk about some medications that might help you to quit.

- Arrange follow-up visits with the parent
  - I’d like us to arrange an appointment a week after your quit day.
  - My nurse will be calling you next week to ask you about your quit day.


“The National Cancer Institute's 4-A Approach to Physician-Based Smoking Cessation
Second-hand tobacco smoke and children

Successful national actions to tackle second-hand tobacco smoke

• Introduce or strengthen legislation to make all public places smoke-free, including public transport and workplaces
• Ban smoking indoors and outdoors in all educational institutions, health care delivery and at all public events, indoors and outdoors
• Ban or severely restrict smoking in restaurants and bars to protect owner, employees and clients
• Classify tobacco smoke as a carcinogen to protect the rights of workers
• Labels on cigarettes should occupy a large part of the package
• Ban selling to children
• Ban tobacco advertising

Source: European Strategy for Tobacco Control, WHO Europe, Copenhagen 2002

The European Region of WHO, with only 15% of the world’s population, faces nearly one third of the worldwide burden of tobacco related diseases. At the end of the 1990s tobacco products were responsible for 1.2 million deaths (14% of all deaths), and unless more effective measures are implemented it is estimated that they will cause 2 million deaths (20% of all deaths) each year by 2020. While it has fallen from 45% to 30% over the past 30 years and has currently stabilized, smoking prevalence in the European Region still remains at a level that is devastating for public health and future generations. The negative trends in smoking prevalence among young people, women and lower socioeconomic groups, as well as the gap in tobacco control policies between Member States, are of a particular concern. To strengthen action and sustain progress, at the WHO European Ministerial Conference for a Tobacco-free Europe (Warsaw, 18–19 February 2002) Member States committed themselves to developing the European Strategy for Tobacco Control (ESTC) and declared their strong support for a comprehensive Framework Convention on Tobacco Control.

The ESTC sets out strategic directions for action in the Region, to be carried out through national policies, legislation and international cooperation. The ESTC recognizes that Member States and the European Community, when applicable, will have to adopt different sets of measures, based on their concrete needs, resources, and the stage they have reached with their tobacco control policy, according to a realistic time frame. The measures included in the Strategy cover the areas of reducing the demand for tobacco products (price and taxation, smoke-free environments, bans on advertising, promotion and sponsorship, information, training and public awareness, smoking cessation, product control and consumer information) and the supply of such products (illicit trade, availability to young people, tobacco subsidies). The ESTC also sets out recommendations regarding monitoring, evaluating and reporting on tobacco use and tobacco control policies. Finally the ESTC specifies mechanisms, tools and milestones for international cooperation; these include Region-wide political commitment, strengthening national capacity, promoting international coordination, and information exchange, technical cooperation and monitoring.
Second-hand tobacco smoke and children

**Recommended interventions**

- Smoking bans and restrictions
- Increasing unit price for tobacco products
- Mass-media educational campaign *when combined with other interventions*

- Community education to reduce exposure to second-hand tobacco smoke in the home

(Strong evidence)

(Insufficient evidence – more studies needed)

Ref: Guide to Community Preventive Services
Second-hand tobacco smoke and children

Primary prevention

- Start very early (during and before pregnancy) ⇒ gynaecologists and midwives
- Within the family, “strengthen the parents”
- Education style, consumption style, communication and stress management have to be considered
- Use the high acceptance of the doctor – patient – parent contact to sensitize for the dangers of active and passive smoking

Picture: CDC Media Campaign Resource Center. Copyright: WHO.
www.who.int/features/2003/08/en/

### Second-hand tobacco smoke and children

**Paediatricians as faithful partners**

- 72% of 105 interviewed parents had thought about the risks of second-hand tobacco smoke.
- 75% thought that asthma and allergies can be triggered by second-hand tobacco smoke.
- General practitioners talked to 46% of all parents about smoking, but only 15% of the paediatricians did so.
- Only 8% of all parents of children with asthma indicate that the paediatrician talked with them about their smoking habits and asthma.
- Parents consider a clear medical opinion and positive requests to reduce smoking as helpful (12%), a bit helpful (44%) and not really helpful (44%).
- Doctor-hopping did not occur as a result of medical advice.

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Page106: "Pediatricians have a unique and important role to play in the prevention and treatment of childhood and adolescent tobacco use, the protection of patients from the harmful effects of environmental tobacco smoke, and the encouragement of smoking cessation among parents. However, because recent research indicates that physician training in tobacco dependence is woefully weak and lacks a model for training, this article constructs a useful approach to this problem. ... A comprehensive model is presented for training pediatricians in the areas of reducing infant and child exposure to environmental tobacco smoke, preventing youth smoking initiation, and providing smoking cessation assistance for adolescents and parents."
Second-hand tobacco smoke and children

Primary prevention

- Preventive guidelines for paediatricians are very helpful:
  - German guidelines for advice on second-hand tobacco smoke for paediatricians
  - Modules should be used during regular contacts, such as check-ups, mainly in the first year of life for breastfeeding women and/or for fathers
- Main message: constructive, positive climate makes giving advice to parents easier
- Avoid negative comments and positively support all behavioural changes, such as during pregnancy


“Strategies for Reducing SHTS Exposure Among Children

- Initial SHTS interventions
- Identify sources of SHTS exposure for the child.
- Provide general information regarding the negative health effects of SHTS.
- Review strategies and potential barriers for reducing the child’s exposure to SHTS.
  - Suggest that parents discuss strategies to reduce the child’s SHTS exposure with other caretakers.
- Interventions at follow-up visits
  - Further identify sources of SHTS exposure, reinforce possible reductions brought about by the parents, and problem-solve barriers encountered in their endeavors.
  - Provide additional information about the health consequences of SHTS.
  - Assess parental smoking cessation efforts.”
The National Commission for Breastfeeding in Germany recommends to advise smoking breastfeeding women as follows.

- Smoking should be avoided during the months of breastfeeding
- A breastfeeding woman who does smoke should try continuously to reduce the number of cigarettes smoked
- Only if consumption is massive can the appropriateness of breastfeeding be questioned due to the possibility of retarding the growth of the child
- Given the possibility of passive uptake of smoke particles, people should never smoke near a child
- The burden of breast-milk with a few harmful substances can be reduced by the mother through special smoking breaks before breastfeeding
Children whose mothers smoke have an estimated 70% more respiratory problems than children whose mothers do not smoke.

Pneumonia and hospitalization is 38% more frequent among children in the first year of life when the mother smokes.

Infant mortality was 80% higher among children born to women smoking during pregnancy than among the children of nonsmokers.

An estimated 20% of all infant deaths could be avoided if all pregnant smokers stopped by the 16th week of gestation.

Infants of mothers who smoke have almost five times the risk of sudden infant death syndrome versus infants of mothers who do not smoke.

Smoke released from cigarettes, cigars and pipes, composed of more than 3800 different substances. Particulate matter is 2-3 times higher in homes of smokers. Exposure may occur at home, school, child care settings, relatives’ home and others. Important to reduce second-hand smoke justifies prohibiting smoke at home, schools and child care settings.


The authors examined the association between exposure to tobacco smoke in utero and the risk of stillbirth and infant death in a cohort of 25,102 singleton children of pregnant women scheduled to deliver at Aarhus University Hospital, Aarhus, Denmark, from September 1989 to August 1996. Exposure to tobacco smoke in utero was associated with an increased risk of stillbirth (odds ratio = 2.0, 95% confidence interval: 1.4, 2.9), and infant mortality was almost doubled in children born to women who had smoked during pregnancy compared with children of nonsmokers (odds ratio = 1.8, 95% confidence interval: 1.3, 2.6). Among children of women who stopped smoking during the first trimester, stillbirth and infant mortality was comparable with that in children of women who had been nonsmokers from the beginning of pregnancy. Conclusions were not changed after adjustment in a logistic regression model for the sex of the child; parity; or maternal age, height, weight, marital status, years of education, occupational status, and alcohol and caffeine intake during pregnancy. Approximately 25% of all stillbirths and 20% of all infant deaths in a population with 30% pregnant smokers could be avoided if all pregnant smokers stopped smoking by the sixteenth week of gestation.
Second-hand tobacco smoke and children

Prevent teenagers from starting to smoke

- Primary prevention: do not start to smoke
- Secondary prevention: smoking teenagers need support and advice to stop smoking
  - Special projects for target groups (children and teenagers) are rare:
    - In Germany the programme Just Be Smoke-free for teenagers and adolescents is promoted by the German Professional Association of Children’s and Young People’s Physicians and the German Medical Association (www.justbesmokefree.de)
    - Space for other local examples:

Picture: WHO

More national programs need to be added here (see line on slide)
Second-hand tobacco smoke and children

The German approach – based on paediatricians’ experience

- Advise parents to stop smoking indoors forever
  - “As your child’s paediatrician, I must advise you to stop indoor smoking for the benefit of your child”
  - “One of the best ways for you to help your child is to quit smoking”
- Advise parents to not smoke in the car
- Assist the parent in not smoking indoors
- Arrange follow-up visits with the parent
  - “I’d like to have another appointment with you in a week”
  - “My nurse will be calling you next week to ask you about your experience”

The German Paediatric Association has a guideline for paediatricians on SHTS, based on material from Martina Poetschke-Langer (ed): Tobacco prevention and control (No 2): Passive smoking in Germany, 2003, Germany Cancer Research Institute and WHO Collaboration Centre for Tobacco Control (www.dkfz.de):
Second-hand tobacco smoke and children

The German approach – use regular check-ups

- Avoid accusation – support every positive change, such as during pregnancy
- During every first visit, ask about smoking habits
- Promote healthy surroundings – clean air
- If parents are motivated to reduce or stop smoking, support them with practical tips
- Reassure parents at the following appointments
- Admire small changes as well, such as smoking outdoors only
- Talk to parents about their model role – smoking parents are more likely to have smoking children
- If parents regress, offer more support, such as nicotine replacement therapy
- If children have repeated airway problems, mainly asthma, ask again about second-hand tobacco smoke
Second-hand tobacco smoke and children

Health and environment professionals play a critical role

- Health promotion in general has to be at least as attractive for physicians as early diagnosis and treatment of diseases
- But changes are usually only possible in small steps
- Not only the smoker but also a hesitating physician or insecure outpatient or hospital staff have to be respected with their identity and then motivated and trained
- Change the framework conditions:
  - Stop the promotion of tobacco products
  - Increase the price of tobacco products
  - Restrict sale of cigarettes to teenagers
  - Protect nonsmokers

Pediatric Interventions for the Prevention of Tobacco Use

- **Office and setting factors**
  - Model a tobacco-free lifestyle
  - Provide a tobacco-free office environment
  - Place anti-tobacco messages (e.g., posters, pamphlets) in office
  - Seek continuing medical education on tobacco-use prevention
  - Encourage parents to create a tobacco-free home environment
- **Countering social influences**
  - Reinforce abstinence from all tobacco products
  - Teach about the immediate negative consequences of tobacco use
  - Provide counter advertising education
  - Teach tobacco refusal techniques
- **Community-based interventions**
  - Participate in organizations attempting to reduce tobacco use
  - Disseminate tobacco-use prevention messages in local media
  - Participate in school-based prevention programs
- **Policy interventions**
  - Provide expert testimony to legislative bodies
  - Lobby legislators to support tobacco-use prevention efforts
  - Support initiatives to increase excise taxes on tobacco products
  - Encourage enforcement of laws designed to prevent tobacco sales to minors

Picture: WHO
In this summary slide, we see the complexity of the issues related to children’s environmental health. Hazards (physical, chemical, biological – in many cases favored by social factors) are introduced into environmental media (water, air, food, soil objects, toys) with variable efficiency in different settings (urban and rural: home, school, field, playground, street, workplace). A child’s activities brings him into contact with these hazards.

<<READ SLIDE>>

Depending upon the individual susceptibility of the child based upon age, general health and social supports, the exposure may cause harm from subtle changes in function to death.

Children’s environmental health is the field which synthesizes these complexities and attempts to make fundamental changes to improve children’s environments and prevent environmental illnesses.
Health and environment professionals have a critical role to play in maintaining and stimulating changes that will restore and protect children’s environmental health.

While the human genome project is very important and scientifically exciting, we all know that genes express themselves within an environment and understanding gene-environment interactions is what will keep our children healthy. So, as we look to our political and personal lives to support sustainable development, we can look to our practices for ways to enhance the environmental health of our patients.

All of us can do something.

At the one on one patient level we can include environmental etiologies in our differential diagnoses and in our preventive advice. We can be dissatisfied with the diagnosis of "idiopathic" and look hard for potential environmental causes of disease and disability.

We can publish sentinel cases and develop and write up community based interventions.

We can educate our patients, families, colleagues and students didactically.

Finally, we must all become vigorous advocates for the environmental health of our children and future generations. It’s not enough to be an informed citizen, we need to write letters and articles, testify in hearings, approach our elected officials with education and positive messages, avoiding "scares" and "alarmism" but providing the evidence for action and clear remedial/preventive proposals.

And, we must all recognize that as professionals with understanding of both health and the environment, we are powerful role models. Our choices will be noticed: they should be thoughtful and sustainable.

Pic: Norwegian campaign for non smoking www.kreftforeningen.no
Second-hand tobacco smoke and children

We hold our future in our hands
and it is our children

Poster contest by HRIDAY with support from the WHO Regional Office for South-East Asia

I end with this beautiful reminder to us from a child in India, We must recognize the risks to our children and assume our responsibilities of preventing them, because we hold our future in our hands—and it is our children.

Thank you.
Separate Sections DON'T WORK!

Tobacco smoke doesn't read signs either.

NO SMOKING in Public Places
It's not about personal freedoms... it's about public health.
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