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## EDITORIAL

## Secondhand smoke exposure in children: It is time to move forward



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The article published by Antunes et al.,<sup>1</sup> in this volume of the *Portuguese Journal of Pulmonology* shows the prevalence of second hand smoke (SHS) exposure in Portuguese children at home and in cars, comparing the exposure between asthmatic and non-asthmatic children. The paper shows that the prevalence of exposure is 32%, with no differences between asthmatic and non-asthmatic children. It covers an important public health issue; since SHS exposure has been causally associated with a number of diseases, such as lung cancer, cardiovascular and respiratory diseases, fetal damage, low birth weight, sudden death syndrome, middle ear infection, intrauterine growth restriction and atopy.<sup>2</sup> This is important because children are especially vulnerable to the detrimental health effects of SHS exposure, mainly due to their less developed immune and respiratory systems, which are more sensitive than in adults; and their faster breathing rate, which means that they do inhale more particles per kilogram of body weight than adults. An additional factor that would increase SHS exposure in younger children is their tendency to be (in arms or on laps) very close to their parents, relatives or caregivers, which makes them be closer to the source of exposure than adult passive smokers. Finally, tobacco smoke may be deposited onto surfaces, leading to an additional risk of exposure (thirdhand smoke). Children are also especially susceptible to this sort of exposure due to their normal hand-to-mouth behaviors and their closer exposure to surfaces.

Following the implementation of smoking control laws in most European countries during the last years, SHS exposure has been significantly reduced in public and workplaces.<sup>3,4</sup> Therefore, private and outdoor settings tend to be the current main sources of SHS exposure in many countries. A recent study<sup>5</sup> carried out in 21 countries showed that an estimated 50,774 million out of the approximately one billion children younger than 15 years of age, living in the 21 countries under study, would be exposed to SHS at home. Homes are one of the main sources of SHS exposure in younger children since they might spend most of the day at home. A high prevalence of SHS exposure in children may result in an

important impact in terms of burden of morbidity and mortality. In this sense, it is important to notice that, according to a study published in 2011 in *The Lancet*,<sup>6</sup> 165,000 children could die every year due to respiratory infections caused by SHS exposure. Furthermore, it has been shown that absenteeism among children aged 6–11 who live with smokers is between 24% (if they lived with a smoker) and 34% (if living with 2 or more smokers) higher than among children not living with smokers.<sup>7</sup> Regarding the levels of exposure at home, Wipfli et al.<sup>8</sup> measured the concentration of nicotine in a sample of households from 31 countries, showing that the median airborne nicotine levels in homes of smokers was 17 times higher than that found in homes without smokers. Also Rumchev et al. measured nicotine and particles in a sample of homes with similar results.<sup>9</sup>

SHS exposure in cars has been one of the least studied areas in relation to other settings such as home or work. However, in recent years, an increasing number of studies have been focused on the SHS exposure in cars. The available evidence supports the fact that smoking in cars leads to extremely high SHS levels often exceeding international indoor air quality guidance,<sup>10</sup> even under high ventilation or with the windows open.<sup>10,11</sup> In 2015, the WHO European Regional Committee for Europe presented a roadmap to denormalize tobacco,<sup>12</sup> which included banning smoking in children's environment, such as cars carrying children, among others. So far, several countries such as Canada, the USA, Australia, Cyprus, South Africa, France and the UK, have already adopted legislation to ban smoking in the car with children on board. Additionally, other countries such as Finland, Italy or Latvia are planning to ban smoking in cars.

Other settings where children might be still exposed are outdoor settings, since in most countries these settings are not regulated. Playgrounds, terraces of restaurants and bars and entrances of schools or kindergartens are some of the places where children may spend time every day. Although some of them might be already regulated (mainly outdoor terraces of hospitality venues), there is still a great variability among countries. In outdoor settings the SHS concentration might be lower than in indoor spaces

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like homes and cars. However, some studies have shown that the concentrations might be relevant in some outdoor settings.<sup>13,14</sup> Furthermore, in terms of public health, banning smoking in some selected outdoor settings could help to establish positive smoke-free models for children and reduce youth opportunities to initiate smoking.

Among the factors associated with SHS exposure in children, the main related factors – apart from parental smoking – would be having a low socioeconomic status (SES) and being less educated.<sup>15</sup> In this context, Moore et al.<sup>16</sup> interviewed schoolchildren in 304 primary schools in Scotland, Wales and Northern Ireland before and after a smoking control law. SHS exposure was highest, and private smoking restrictions less frequently reported, among lower SES children. Furthermore, among children from the poorest families, 97% of post-legislation biological samples contained detectable cotinine, compared with 38% among the most affluent.

Studies analyzing SHS exposure in children, especially in non-regulated settings, like the one carried out by Antunes and colleagues<sup>1</sup> are essential to find out the true extent of the problem and to assess the need for interventions focused on reducing SHS exposure in children. Future research should go deeper into the assessment of SHS in private and outdoor settings, using objective environmental measurements when possible, and paying special attention to low-socioeconomic areas.

Evidence-based interventions with an equity perspective may play a key role in reducing the SHS exposure in private and outdoor settings. These interventions might include programs promoting smoke-free homes by supporting parents and children through education and counseling, smoking cessation programs and regulations banning smoking in cars and selected outdoor settings. So far, an important (and effective) effort has been made in order to minimize the SHS exposure in work and public places. It is time to move forward to protect children from the adverse effects of SHS.

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