

## How long is the yardstick for smoking bans in Switzerland?

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In the mid-eighties, Switzerland was one of the first countries worldwide admitting to the public health burden of ambient air pollution and thus initiating rigorous measures to reduce air pollution levels. For instance, in 1986 Switzerland was the first country in Europe to introduce compulsory catalysers for new cars. As a consequence, levels of ambient air pollution such as sulphur dioxide (SO<sub>2</sub>), nitrogen dioxide (NO<sub>2</sub>) and particulate matter (e.g., PM<sub>10</sub>) noticeably decreased in the nineties. This striking public health success story resulted in observable health benefits like a decline in respiratory symptoms in children (Bayer-Oglesby et al. 2005) or lung function improvements in adults (Schikowski et al. 2013). Since 2000 the decrease of NO<sub>2</sub> and PM<sub>10</sub> has slowed down and nowadays typical annual Swiss PM<sub>10</sub> averages range between 14 µg/m<sup>3</sup> in rural background sites and 24 µg/m<sup>3</sup> in the proximity of traffic (Federal Office for the Environment FOEN 2013). Apparently, today a further reduction of air pollution levels needs more elaborate and cost-intensive efforts than before and such measures are partly counterbalanced by the increasing number of cars as well as other sources. The question thereby arises which other low hanging fruits are ready to be harvested to further reduce the population's exposure to fine particles.

An obvious candidate is environmental tobacco smoke (ETS). In terms of ETS, however, Switzerland is far away from a success story. The WHO Framework Convention on

Tobacco Control has still not been ratified. By 2006, smoking restrictions in public places were rare (Friedrich et al. 2009) and associated health costs were estimated at 419 million Swiss Francs (Hauri et al. 2011). In May 2010, after controversial debates, a Federal ban was introduced in public places but the regulation leaves room for a lot of exceptions in hospitality venues. The loosely interpreted rules leave ETS exposure at public places like railway stations or in entrance areas still common nowadays. In a representative survey that was conducted after the Federal smoking ban introduction among individuals between 14 and 65 years of age, 10 % still reported exposure to ETS for at least 1 h/day and 58 % for at least 1 h/week (Krebs 2011). It can easily be calculated that this has a considerable impact on the overall fine particulate exposure. Measured average PM<sub>2.5</sub> levels range between 150 and 200 µg/m<sup>3</sup> in smoking areas of hospitality venues and between 50 and 100 µg/m<sup>3</sup> in adjoining non-smoking areas (Huss et al. 2010). Spending 1 h/day at a concentration level of 100 µg/m<sup>3</sup> corresponds to an average ambient PM<sub>2.5</sub> concentration of 4 µg/m<sup>3</sup>, which corresponds to the population weighted average exposure to traffic-related PM<sub>10</sub> concentration in Switzerland (Sommer et al. 2008).

Obviously, personal PM<sub>2.5</sub> exposure is much higher for hospitality workers who are forced to spend much more time in highly polluted areas. Their average ETS exposure is estimated to correspond to the consumption of 2–3 cigarettes per day (Rajkumar et al. 2013).

For the benefit of the population's health (U.S. Department of Health and Human Services 2006; Rösli 2011) ETS exposure in the daily environment needs to be further minimized. The supporting evidence is clear and beyond doubt. A common exposure–response function for fine particles from tobacco smoke and ambient air pollution has been demonstrated (Pope et al. 2011). Acceptance of

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smoking bans is increasing all over the world (Lazuras et al. 2012; Usmanova and Mokdad 2013) even in smokers (Moore et al. 2012). However, inconsistent and heterogeneous rules such as the ones implemented in Switzerland lessen the acceptance (Hyland et al. 2009). In addition, they are ineffective when it comes to exposure minimization (Lopez 2010) and generate never ending public debates including new initiatives to further weaken existing laws. Negative economic consequences, as often brought up by opponents (Halpern and Taylor 2009), could neither be observed in a Swiss region with a comprehensive smoking ban (Schulz et al. 2012) nor be confirmed in comprehensive reviews (Fromme et al. 2009). Strict rules have a positive impact on the smoking behaviour, particularly in adolescents (Chuang and Huang 2012), leading to further public health benefits. Thus, for Switzerland it is time to measure ETS exposure with the same yardstick as ambient air pollution exposure and take rigorous measures to reduce exposure to ETS in the daily environment.

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