

## Calculating the potential environmental impact of a menthol cigarette ban in the USA

Among the many harms of tobacco products are those that were the focus of the 2022 WHO World No Tobacco Day: the widespread environmental impacts of tobacco.<sup>1,2</sup> These environmental impacts are also recognised in the WHO Framework Convention on Tobacco Control, which obligates Parties to address environmental concerns in Article 17 (Provide support for economically viable alternative activities) and Article 18 (Protect the environment and health of persons).<sup>3</sup>

Cigarette butts are some of the most littered items on earth,<sup>4</sup> totalling 4.5 trillion littered cigarettes per year globally.<sup>5</sup> A large-scale observational study of littering behaviour in the USA estimated a littering rate of 65% for cigarette butts.<sup>6</sup> In addition to the contents of unsmoked tobacco, such as nicotine, and chemicals from additives, cigarette butts include filters, composed of paper and cellulose acetate, which is a nearly non-biodegradable plastic that may persist in the environment as small particles of toxic-infused plastic waste that can leach into soil and water supplies, posing a threat to aquatic and non-aquatic organisms.<sup>2,7</sup>

Tobacco control policies that reduce tobacco consumption and prevalence not only reduce the public health and economic costs associated with smoking and exposure to secondhand smoke, but also offer the additional benefit of reducing substantial harms to the environment across the entire tobacco life-cycle, from farming and cultivation to disposal and residual tobacco waste that remains in the environment.<sup>2</sup> To illustrate this, we used the effect of the Canadian menthol cigarette ban on post-ban smoking cessation to compute the impact of the US Food and Drug Administration's (FDA) proposed ban of menthol in cigarettes, announced on 28 April 2022,<sup>8</sup> on reducing littered cigarettes.

Canada's ban on menthol cigarettes led a significant proportion of menthol smokers to quit, compared with non-menthol smokers. Specifically, pooled data from two population-level cohort studies (the International Tobacco Control (ITC) Canada Survey and the

Ontario Menthol Ban Study) found that menthol smokers were more likely to quit after the ban compared with non-menthol smokers. This effect size (7.3%) for daily and non-daily smokers was used to estimate that a US menthol ban would lead 1 337 988 US smokers to quit.<sup>9</sup>

We estimated the impact of a US menthol ban on reducing littered cigarettes in three steps:

1. We multiplied the projected number of post-menthol ban quitters (1 337 988) by the average daily number of cigarettes smoked among US adult menthol smokers in the 2020 ITC Four Country Smoking and Vaping Survey (11.9 cigarettes) and then by 365 days.
2. This total is 5 811 550 878 cigarettes per year that would no longer be smoked by smokers who quit due to the US menthol ban.
3. We then multiplied this number by Schultz *et al's*<sup>6</sup> estimate that 65% of cigarettes are littered.

These calculations yield an estimate that the US menthol ban would lead to a reduction in littering of 3 777 508 071 cigarettes per year, or 755 502 kg of waste annually if each butt is estimated to weigh about 0.2 g.<sup>10</sup> A recent US study indicates high public awareness that discarded cigarettes are harmful to the environment and strong support for measures to reduce cigarette filter waste.<sup>11</sup> Thus, swift adoption and implementation of the FDA's menthol rule would not only offer substantial environmental benefits, but would also be in line with public support for reducing cigarette waste. More extensive product sales restrictions, such as banning the sale of filtered cigarettes as recommended by the WHO,<sup>2</sup> would even further reduce one of the leading sources of plastic waste worldwide.

These calculations offer an example of a rarely pursued assessment of the impact of tobacco control policies on reducing the enormous environmental toll of tobacco products, in addition to their impact on reducing tobacco use and consumption.

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