



OPEN ACCESS

# Tobacco industry responsibility for butts: a Model Tobacco Waste Act

Clifton Curtis,<sup>1</sup> Thomas E Novotny,<sup>2</sup> Kelley Lee,<sup>3</sup> Mike Freiberg,<sup>4</sup> Ian McLaughlin<sup>5</sup>

► Additional material is published online only. To view please visit the journal online (<http://dx.doi.org/10.1136/tobaccocontrol-2015-052737>).

<sup>1</sup>Cigarette Butt Pollution Project, Washington, USA

<sup>2</sup>Graduate School of Public Health, San Diego State University, San Diego, California, USA

<sup>3</sup>Faculty of Health Sciences, Simon Fraser University, Burnaby, British Columbia, Canada

<sup>4</sup>Public Health Law Center, William Mitchell College of Law, St. Paul, Minnesota, USA

<sup>5</sup>ChangeLab Solutions, Oakland, California, USA

## Correspondence to

Clifton Curtis, JD, Policy Director, Cigarette Butt Pollution Project, 3409 Quebec St NW, Washington, DC 20016; [ccurtis@cigwaste.org](mailto:ccurtis@cigwaste.org)

Received 4 October 2015

Accepted 9 January 2016

Published Online First

1 March 2016

## ABSTRACT

Cigarette butts and other postconsumer products from tobacco use are the most common waste elements picked up worldwide each year during environmental cleanups. Under the environmental principle of Extended Producer Responsibility, tobacco product manufacturers may be held responsible for collection, transport, processing and safe disposal of tobacco product waste (TPW). Legislation has been applied to other toxic and hazardous postconsumer waste products such as paints, pesticide containers and unused pharmaceuticals, to reduce, prevent and mitigate their environmental impacts. Additional product stewardship (PS) requirements may be necessary for other stakeholders and beneficiaries of tobacco product sales and use, especially suppliers, retailers and consumers, in order to ensure effective TPW reduction. This report describes how a Model Tobacco Waste Act may be adopted by national and subnational jurisdictions to address the environmental impacts of TPW. Such a law will also reduce tobacco use and its health consequences by raising attention to the environmental hazards of TPW, increasing the price of tobacco products, and reducing the number of tobacco product retailers.

## INTRODUCTION

While the environmental impacts of tobacco product waste (TPW) are less known than the health effects of tobacco use, the former are cause for public concern and possible regulation through legislative action. Cigarette butts are the most commonly discarded waste product in the world, and almost 6.3 trillion cigarettes were consumed globally in 2012. Observational studies and self-reports by smokers suggest that from one to two-thirds of the butts from smoked cigarettes are tossed by smokers into the surrounding environment, buried in landfills, or dumped into storm drains.<sup>1</sup> These may now be considered a non-point source of toxic, hazardous waste and thus subject to regulatory control.<sup>2</sup>

There are numerous environmental concerns regarding the production and use of tobacco products throughout their lifecycle. Tobacco leaf growing and processing involves heavy pesticide and petroleum-based fertiliser use, land degradation and deforestation.<sup>3</sup> Additional waste concerns arise from tobacco manufacturing, packaging, distribution and combustion. These concerns include the production of greenhouse gases (CO<sub>2</sub> and methane) released by manufacturing, transport and smoking of tobacco products; environmental toxins found in secondhand smoke; and newly described toxic residuals known as thirdhand smoke that are

found in homes and other enclosed environments where smoking has occurred.<sup>4</sup>

A *Tobacco Control* Supplement published in 2011 summarised multiple concerns regarding the environmental impact of TPW, and presented policy options to prevent, reduce and mitigate these impacts. As a brief review of this special supplement, there are 7000 chemicals contained in cigarettes, and many of them, such as ethyl phenol, heavy metals and nicotine, are themselves toxic. At least 50 are known human carcinogens; others have been found to be toxic to marine and freshwater organisms<sup>5</sup> and poisonous to humans and animals.<sup>6</sup> Aquatic systems, such as shorelines and waterways, may be the most vulnerable environments, as the majority of land-based litter ultimately is deposited into them. In addition, there are externalised costs borne by communities and local/state governments due to cleanup of TPW.<sup>7</sup> The vast majority of manufactured cigarettes sold today include filters that are usually made of cellulose acetate, a non-biodegradable plastic. While ultraviolet rays may eventually break filters into smaller pieces, the source material never disappears.<sup>1</sup> Persisting for up to 10 years, they are the major environmental concern regarding TPW because they are a visible community nuisance and they leach out toxic chemicals. According to the ‘broken windows’ theory around public nuisances, researchers have found that if people see one norm or rule being violated (such as graffiti or illegal parking), they are more likely to violate others—such as butt littering.<sup>8</sup>

Although filtered cigarettes have been marketed by the tobacco industry for decades with the implication that they are ‘safer’, their main effects have been to reduce the machine-measured yields of tar and nicotine, to discourage smokers from quitting, and to make it easier for young people to become addicted. However, the 2014 US Surgeon General’s *Report on the Health Consequences of Smoking* found that there is no benefit from product designs, such as the cellulose acetate filter, in reducing the individual or population risks of smoking.<sup>9</sup> In fact, risks for the more aggressive type of lung cancer (adenocarcinoma) have increased since introduction of filtered cigarettes. Regardless of their health risk to smokers, filters pose a serious litter and toxic waste disposal challenge. The marketing of filtered cigarettes as ‘safer’ as well as the lack of recognition by smokers of the environmental impact of discarded filters represent ‘information asymmetry’ between the consumers and producers of tobacco products.<sup>10</sup> Correcting this asymmetry through regulation will likely lead to both reduced tobacco consumption and less environmental contamination by TPW. Although a



CrossMark

To cite: Curtis C, Novotny TE, Lee K, et al. *Tob Control* 2017;**26**:113–117.

proprietary effort to establish a cigarette butt recycling programme (supported by the tobacco industry) has been made,<sup>11</sup> that effort and other cleanup campaigns address a miniscule quantity of TPW. For example, the Ocean Conservancy reports that approximately 52 million cigarettes have been picked up globally in 27 years of cleanups.<sup>12</sup> With trillions dumped each year, these downstream solutions will never be measurably effective in reducing TPW in the environment. It is also unlikely that there are safe options for reusing or recycling the toxic, hazardous components of TPW. Instead, the focus of managing postconsumer TPW should be directed towards reducing production, changing the product design, preventing littering, conducting cleanups as monitoring rather than abatement programmes, and developing safe disposal technologies for TPW.

On the basis of experience involving the pesticide, paint and pharmaceutical industries, it can be argued that the tobacco industry is responsible for numerous environmental problems throughout the tobacco product life cycle.<sup>4</sup> However, the industry has firmly held that 'the responsibility of cigarette waste belongs to the smoker',<sup>13</sup> although, as described elsewhere, industry efforts to persuade smokers to take on that responsibility have not been successful.<sup>14</sup> It has also been found that smokers were defensive about discarding their tobacco butts and thus not very receptive to antilittering efforts.<sup>11</sup> In fact, littering behaviour studies have found a littering rate of 17% overall, but for cigarette butt littering, this was 65%.<sup>15</sup>

With a goal of shifting responsibility for TPW to the smoker, the industry's response to the butt waste problem has been to encourage cleanup efforts through corporate social responsibility partnerships with environmental groups, the use of hand-held ashtrays for smokers, and the placement of butt waste disposal receptacles in public places. Although tobacco industry-sponsored environmental groups claim correlation between reduced butt waste and placement of receptacles,<sup>16</sup> careful evaluation of these efforts has not been done. Moreover, these approaches should be recognised as downstream solutions to an upstream waste problem; they put the blame for TPW onto end users rather than to the manufacturers of a product that generates toxic waste once used. This is a 'blame the victim' response, not a source-based approach to waste reduction and prevention. The industry's long-standing efforts to avoid responsibility have also included attempts to develop biodegradable filters. However, it was concluded that biodegradable filters would likely encourage even more littering and, in fact, would not be marketable.<sup>17</sup>

From a tobacco control perspective, a variety of initiatives can help prevent, reduce and mitigate the environmental impacts of TPW. These measures include banning smoking in outdoor, indoor and workplace areas; applying additional litter fees on tobacco products to pay for cleanup and anti-TPW programmes; and levying fines for littering that specifically include TPW. While not yet operational, other potential initiatives include banning the sale of single-use, disposable filters; litigation for damages associated with TPW environmental impacts; product labelling regarding TPW disposal as hazardous waste; and enactment of laws that make tobacco producers and sellers responsible for cleaning up and safely disposing of TPW.<sup>1</sup>

This *Special Communication* explores that last policy approach, which is based on the environmental principle of Extended Producer Responsibility (EPR). We have developed a *Model Tobacco Waste Act* which may be adapted at the national or subnational level to implement such an approach. First we discuss EPR and product stewardship (PS) principles that are the

foundation for such an Act. Next, we present the core provisions in the Model Act and discuss relevant potential barriers to implementation, limitations on efficacy and implications for tobacco control outcomes. The *Model Tobacco Waste Act* is presented in the online supplementary file to this paper.

## ENVIRONMENTAL PRINCIPLES UNDERLYING THE MODEL TOBACCO WASTE ACT

EPR is a policy principle that promotes environmental protection by extending the responsibilities of *the producer* across the product's entire life cycle.<sup>18</sup> As set out by Lindhqvist,<sup>19</sup> EPR addresses three core tenets:

1. Internalise the environmental cost of products into their retail price.
2. Shift the economic burden of managing toxicity and other environmental harm associated with postconsumer waste from local governments and taxpayers, to producers.
3. Provide incentives to producers to incorporate environmental considerations into the design of their products.

For the effective application of those tenets, Lindhqvist includes four specific categories of producer responsibility:

1. Liability: The responsibility for proved environmental damages caused by the product in question; the extent of liability is determined by legislation and may embrace different parts of the product life cycle, including usage and final disposal.
2. Economic: The producer covers part or all of the expenses for the collection, recycling, or final disposal of the products manufactured; these expenses could be paid for directly by the producer or through a special fee collected by sellers.
3. Physical: Manufacturer is involved in the physical management of the product and its environmental impacts throughout its life cycle.
4. Informative: Producer must supply information on the environmental risks of the products manufactured.

Complementing EPR-based interventions, the PS principle requires that, throughout the product lifecycle, all stakeholders who participate in growing, designing, producing, distributing, selling and using products share various responsibilities to reduce the negative environmental impacts at the end of product life.<sup>16</sup> Among these responsibilities, government agencies, citizen groups, 'green' business enterprises, or academic researchers might conduct informational activities, publish op-eds, conduct scientific research, or advocate about a given product's environmental hazards. Postconsumer waste may involve hazardous materials, and therefore, sellers of these products must inform consumers about proper disposal. PS also underlies voluntary cleanup efforts for postconsumer waste products.

Over the past two to three decades there has been some confusion regarding the roles of EPR and PS. As presented above, EPR focuses on the tobacco producer as the party mainly responsible for prevention and mitigation of TPW. PS provides for complementary responsibilities among all stakeholders, while holding the producer mainly responsible for the four categories of producer responsibility described above. Thus, the two principles may work in consort to address the environmental impacts of TPW.

Regarding TPW, EPR and PS focus on product design as well as take-back, recycling and final disposal of postconsumer waste. TPW-related EPR and PS interventions could include:

1. Mandating corporate take-back programmes for TPW, both as individual and collective activities of tobacco companies;

2. Shifting product disposal management responsibilities away from local communities and taxpayers to producers, distributors and consumers of tobacco products;
3. Enabling cost recovery schemes to fund EPR programme management, implementation and compliance through enforcement;
4. Collecting TPW from beaches, parks, campuses or neighbourhoods as a way of raising awareness about tobacco use and the impact of TPW;
5. Changing the product such that it creates less waste at the end of life. This could include eliminating sales of the cellulose acetate filter.<sup>1</sup>

With regard to tobacco control, the application of EPR/PS principles to TPW legislation may also create important public health outcomes by: (1) further denormalising tobacco use and increasing anti-industry sentiments; (2) increasing the cost of tobacco products; (3) enacting new tobacco product regulations to make the product less marketable; (4) strengthening existing anti-litter and outdoor smoking prohibitions and (5) forging new alliances with environmental advocacy, tobacco control and regulatory groups. With these issues in mind, it is highly likely that a substantial reduction in tobacco use will result from the implementation of EPR/PS-based legislation on TPW. It is also likely that tobacco product retailers might consider the difficulties in participating in a take-back programme for TPW untenable for their continued tobacco business model. Finally, increasing public attention to TPW and how the tobacco industry is responsible for this waste may have beneficial impacts among smokers. This is essentially an anti-industry strategy that may serve to reinforce intentions to quit as part of social normative changes based on environmental concerns.<sup>20</sup>

#### CORE PROVISIONS OF THE MODEL TOBACCO WASTE ACT AND BARRIERS TO IMPLEMENTATION

The Product Stewardship Institute (PSI) is a US-based non-profit organisation (<http://www.productstewardship.us/>) that works with a variety of governmental, private sector and non-profit partners to implement some of the 89 EPR/PS-based state laws currently operative in 33 states. These laws address 12 different waste products including: appliances with refrigerants, switches, batteries, carpets, cell phones, electronics, fluorescent lighting, mattresses, mercury thermostats, paint, pesticide containers and pharmaceuticals. The *Model Tobacco Waste Act* (see online supplementary file) is based on the well-established principles underlying such laws in the USA and Europe. For example, the 'Framework Principles for (PS) Policy' was developed in 2008–2009 by five US state stewardship councils and British Columbia.<sup>21</sup> In 2012, the 'PS and EPR Definitions and Principles' were adopted by the Product Policy Institute, the PSI and the California Product Stewardship Council. They were then endorsed in 2013 by a diverse mix of businesses, stewardship organisations, academia, governments, government councils, non-profit organisations and consulting groups.<sup>22</sup>

The *Model Tobacco Waste Act's* core provisions draw heavily from the 2009/2013 Oregon PaintCare law, which established the first US paint stewardship programme in 2010.<sup>23</sup> It requires paint manufacturers to finance and operate a system for retrieving, transporting and processing leftover paint, which, like TPW, contains toxic substances. All programme activities are funded by the paint industry, and the responsible entity (*PaintCare Incorporated*) is managed directly by the industry. Additional features involve accountability to government for: plan approvals and amendments, goals and performance standards, education and outreach programmes, annual reports, annual

stakeholder meetings, and privacy considerations. While these and other features may be readily transferable to a TPW EPR/PS programme, the major difference between the two products is that leftover paint is significantly less toxic and far more amenable to recycling than cigarette butts. In 2012, for example, over 70% of all leftover latex paint collected by *PaintCare Incorporated* was used to make recycled-content paint.<sup>24</sup>

Enforcement of an EPR/PS-based TPW regime may be challenging, given what is known about the smokers' lack of adherence to existing litter laws. To address enforcement (section 14 'Enforcement and Penalties', see online supplementary file), we reviewed section 7 of the model *Cigarette Fire Safety Standard and Firefighter Protection Act*.<sup>25</sup> The Coalition for Fire-Safe Cigarettes drafted this model law based on fire prevention regulations developed by the New York State Office of Fire Prevention and Control. After 3 years of deliberation and with input from the public and affected parties, the State of New York State passed the first 'fire-safe cigarette' law in the USA in 2004. Today, all US states and Canadian provinces have adopted laws requiring that cigarettes sold in these jurisdictions have reduced combustibility. The first five types of enforcement approaches in that Act have been adapted for inclusion in the *Model Tobacco Waste Act*, and they are applicable to tobacco producers (broadly defined), retailers and consumers. They provide for court actions for injunctive relief or to recover any costs or damages suffered by the (State) because of a violation of the Act, including enforcement costs related to the specific violation and for attorney's fees.

A potential barrier to passing EPR/PS-based TPW legislation is the fear of pre-emption of subnational actions by national governments. This fear has not been realised in practice to date. In 2009, the US Congress enacted the *Family Smoking Prevention and Tobacco Control Act* (TCA), which provided the US Food and Drug Administration (FDA) with the authority to regulate tobacco products for the benefit of public health. Tobacco product standards, including new product marketing, additives, labelling, and manufacturing standards are solely the FDA's responsibility. However, state and local authorities were expressly allowed to adopt tobacco control laws that deal with distribution, possession, sale, advertising, promotion and fire safety. In an analysis of possible national pre-emption of local TPW regulation, Freiberg<sup>26</sup> found that a state or local law making tobacco producers responsible for cleaning up and properly disposing of TPW would not be pre-empted by FDA regulatory jurisdiction. Nonetheless, specific antipre-emption language may be included in state or local laws.

Finally, with the dramatic increase in the use of e-cigarettes, specific language may be needed to cover the chemicals, batteries and detritus produced as waste by this new but largely unregulated consumer product. The small size of disposable e-cigarettes facilitate their becoming e-waste, and this waste has been shown to contain lead as well as nicotine (if not fully consumed).<sup>27</sup> Additional research is needed to identify potential toxicants, fire risks and difficult-to-recycle materials used in making the product.<sup>28</sup>

#### FINAL COMMENTS

Given the numerous toxic chemicals found in tobacco products and TPW and the ubiquity of TPW in the environment, a strong case can be made that product alterations as well as effective prevention, clean up and safe disposal efforts are badly needed to address the TPW problem. In this context, there is much to learn from environmental policies for other toxic waste products, such as obsolete pesticides and their containers, medical



waste, and unused paints. Disposal of such substances into municipal landfills or incineration is generally recognised as unsafe. Applying these models to TPW, safely managed take-back programmes, including collection services, transportation and closed, monitored regional TPW disposal sites are needed. These and other related services should be paid for by tobacco producers according to EPR and PS principles.

While EPR is put forward as a legislative approach, it asserts that the manufacturer would be strictly liable for TPW. Several legal theories pertaining to liability are addressed in detail in a *Tulane Environmental Law Journal* article that explores several potential litigation-related causes of actions that could be applicable to TPW.<sup>29</sup> Public nuisance may be the strongest approach, although product liability and state hazardous waste laws could also successfully hold cigarette manufacturers liable for TPW.

Raising awareness about the environmental consequences of tobacco use and the responsibility of the tobacco industry for these consequences will require media messaging and actions by governments in order to succeed. These actions may reinforce global approaches to environmental protection, including interventions to slow climate change, and they may mobilise new partnerships between tobacco control and environmental advocates.

The *Model Tobacco Waste Act* presented in the online supplementary file to this report is a starting point from which national, subnational and local governments can begin to address the substantial and growing environmental concerns regarding tobacco products worldwide. These programmes will raise the cost of tobacco use, make it more difficult for retailers to participate in the tobacco product market, denormalise and formally recognise that tobacco use is not only deadly to humans, but hazardous to the environment as well.

### What this paper adds

This Special Communications provides a novel approach to tobacco control through the environmental principle of Extended Producer Responsibility. It describes a Tobacco Waste Act to prevent, reduce and mitigate tobacco product waste. This Act will internalise the burden of tobacco waste management to the producer and consumer, thereby increasing costs of smoking, further denormalising tobacco use as offensive to the environment, and possibly reducing retail accessibility of tobacco products.

**Acknowledgements** The authors wish to thank Heather Lewis of ChangeLab Solutions, Oakland, California, for her review of drafts of the Model Tobacco Waste Act. The authors wish to thank the Truth Initiative (Washington, DC), for their kind assistance in producing the video abstract for this article.

**Contributors** CC and TEN conceived of this article and the Model Tobacco Waste Act (see online supplementary file); CC composed first draft of the submitted article and the initial draft of Model Tobacco Waste Act, and TEN substantially edited the initial article draft and finalised the submitted article. KL provided substantial editing to the draft manuscript and Model Tobacco Waste Act. IMCL and MF contributed to development of the Model Tobacco Waste Act and to editing of the final article submission.

**Funding** This work was supported by the US National Cancer Institute of the US National Institutes of Health under award No. 2R01CA091021-10A1 and by the University of California Office of the President's Tobacco-related Disease Research Program under award No. 21XT-0030.

**Competing interests** None declared.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data sharing statement** We would like to include our Model Legislation as a online supplementary file.

**Open Access** This is an Open Access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>

### REFERENCES

- Novotny TE, Slaughter E. Tobacco product waste: an environmental approach to reduce tobacco consumption. *Curr Envir Health Rep* 2014;1:208–16.
- Novotny TE, Lum K, Smith E, et al. Cigarettes butts and the case for an environmental policy on hazardous cigarette waste. *Internat J Environ Res Public Health* 2009;6:1691–705.
- Lecours N, Almeida GEG, Abdallah JJ, et al. Environmental health impacts of tobacco farming: a review of the literature. *Tob Control* 2012;21:191–6.
- Novotny TE, Bialous SA, Burt L, et al. The environmental and health impacts of tobacco agriculture, cigarette manufacture and consumption. *Bull World Health Organ* 2015;93:877–80.
- Slaughter E, Gersberg R, Watanabe K, et al. Toxicity of cigarette butts, and their chemical components, to marine and freshwater fish. *Tob Control* 2011;20:i25–9.
- Novotny TE, Hardin SN, Hovda LR, et al. Tobacco and cigarette butt consumption in humans and animals. *Tob Control* 2011;20(Suppl 1):i17–20.
- Schneider JE, Peterson A, Kiss N, et al. Tobacco litter costs and public policy: a framework and methodology for considering the use of fees to offset abatement costs. *Tob Control* 2011;20(Suppl 1):i33–8.
- Keizer K, Lindenberg S, Steg L. The spreading of disorder. *Science* 2008;322:1681–5.
- U.S. Department of Health and Human Services. *The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General*. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014.
- Kenkel D, Chen L. Consumer information and tobacco use. In: Jha P, Chaloupka FJ, eds. *Tobacco control in developing countries*. Oxford: Oxford University Press, 1999:177–214.
- Szaky T. Cutting a Deal with Big Tobacco. *New York Times*, April 30, 2012 (accessed 31 Jan 2014). [http://boss.blogs.nytimes.com/2012/04/30/cutting-our-first-deal-with-big-obacco/?\\_php=true&\\_type=blogs&\\_r=0](http://boss.blogs.nytimes.com/2012/04/30/cutting-our-first-deal-with-big-obacco/?_php=true&_type=blogs&_r=0).
- Ocean Conservancy. *Tracking Trash: 25 Years of Action for the Ocean. 2011 International Coastal Cleanup 25th Anniversary Report* (accessed 28 Sep 2015). [http://act.oceanconservancy.org/pdf/Marine\\_Debris\\_2011\\_Report\\_OC.pdf](http://act.oceanconservancy.org/pdf/Marine_Debris_2011_Report_OC.pdf).
- Smith EA, McDaniel PA. Covering their butts: responses to the cigarette butt litter problem. *Tob Control* 2011;20:100–6.
- Smith EA, Novotny TE. Whose butt is it? Tobacco industry research about smokers and cigarette butt waste. *Tob Control* 2011;20(Suppl 1):i2–9.
- Schultz PW, Bator RJ, Large LB, et al. Littering in context: personal and environmental predictors of littering behavior. *Environ Behavior* 2013;45:35–59.
- MidAtlantic Solid Waste Consultants. *The 2009 National Visible Litter Survey and Litter Cost Study*. Keep America Beautiful, Inc. (accessed 14 Sep 2015). <http://preventioncigarettelitter.org/files/downloads/researchfindings.pdf>
- Deutsch LJ. *Cigarette Butt Degradability Task Force. Final Report* (accessed 8 Nov 2007). <http://legacy.library.ucsf.edu/tid/qtg33a00>
- Curtis C, Collins S, Cunningham S, et al. Extended producer responsibility and product stewardship for tobacco product waste. *Int J Waste Resources* 2014;4:157.
- Lindhqvist T. *Extended producer responsibility in cleaner production—policy principle to promote environmental improvements of product systems*. Doctoral Dissertation, The International Institute for Industrial Environmental Economics, Lund University, May 2000 (accessed 1 Sep 2015). <http://lup.lub.lu.se/luur/download?func=downloadFile&recordId=19692&fileId=1002025>
- Zhang X, Cowling DW, Tang Hao Z. The impact of social norm change strategies on smokers' quitting behaviours. *Tob Control* 2010;19(Suppl 1):i51–5.
- California Product Stewardship Council, Northwest Product Stewardship Council, Texas Product Stewardship Council, New York Association for Solid Waste Management, Vermont Product Stewardship Council, and British Columbia Product Stewardship Council. *Framework Principles for Product Stewardship Policy*. 2008 (accessed 1 Sep 2015). [http://productstewardship.net/PDFs/Joint\\_PS\\_Framework\\_Principles.pdf](http://productstewardship.net/PDFs/Joint_PS_Framework_Principles.pdf)
- Product Policy Institute, Product Stewardship Institute, and California Product Stewardship Council. *Product Stewardship and Extended Producer Responsibility: Definitions and Principles—Reducing Economic, Environmental, Health, and Safety Impacts from Consumer Products* (accessed 1 Sep 2015). [http://calpsc.org/mobius/cpsc-content/uploads/2015/02/UPSTREAM-PSI-CPSC\\_PS-EPR-Principles\\_FINALwEndorsers.pdf](http://calpsc.org/mobius/cpsc-content/uploads/2015/02/UPSTREAM-PSI-CPSC_PS-EPR-Principles_FINALwEndorsers.pdf)

- 23 Oregon Paintcare Program. *Oregon paintcare program update for local government*. December 2009 (accessed 28 Sep 2015). <http://www.deq.state.or.us/lq/sw/prodstewardship/OregonPaintCareUpdateLocalGovts.pdf>
- 24 Product Stewardship Institute. *Oregon Paint Stewardship Program Evaluation—Final Report to American Coatings Association and Metro Oregon*. 13 March 2013 (accessed 1 Sep 2015). <http://www.paintcare.org/wp-content/uploads/docs/or-report-psi-evaluation-2013.pdf>
- 25 Coalition for Fire-Safe Cigarettes. *The Cigarette Fire Safety Standard and Firefighter Protection Act* (accessed 28 Sep 2015). <http://www.nfpa.org/safety-information/for-consumers/causes/smoking/coalition-for-fire-safe-cigarettes/model-legislation>
- 26 Freiberg M. (Don't) See more butts: preemption and local regulation of cigarette litter. *Hamline Law Rev* 2014;37:205–28.
- 27 Krause MJ, Townsend TG. Hazardous waste status of discarded electronic cigarettes. *Waste Manag* 2015;39:57–62.
- 28 Chang H. Research gaps related to the environmental impacts of electronic cigarettes. *Tob Control* 2014;23(Suppl 2):ii54–8.
- 29 Witkowski J. Holding cigarette butt manufacturers and smokers liable for toxic butts: potential litigation-related causes of action for environmental injuries/harm and waste cleanup. *Tulane Environ Law J* 2014; 28:1–36.