PUBLIC HEALTH COMMUNICATION CENTRE AOTEAROA

Disposable vapes: An emerging environmental health threat

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Anup Bhetuwal, Chris Bullen

Summary

Waste from single-use disposable vaping devices is emerging as an environmental and public health threat globally and in Aotearoa New Zealand (NZ). Daily vaping in NZ now exceeds smoking—11% of adults reported daily use — and disposable devices dominate sales. Each spent vape contains a sealed lithium-ion battery, toxic metals, nicotine residues, and persistent plastics, creating fire hazards and leaching pollutants into soil and water. Globally, an estimated 844 million devices reach landfills each year. Field audits and research in NZ, albeit limited, confirm rising levels of vape litter, with most devices found broken, unrecyclable, and potentially hazardous.

NZ lacks a dedicated system to manage this complex waste. NZ's upcoming ban on single-use vapes, effective 17 June 2025, focuses solely on youth protection, leaving the environmental burden unresolved. In contrast, international models, like the EU's Waste Electrical and Electronic Equipment (WEEE) directive and the UK's broader ban, show that producer responsibility and strong recycling systems are pivotal. Without similar measures in NZ, vape waste will erode environmental kaitiakitanga and could undermine the health gains people achieve when using vapes to stop smoking.

This Briefing reviews the composition and environmental hazards of disposable vape waste in Aotearoa New Zealand (NZ), summarises emerging evidence of related human health risks, and outlines regulatory and practical measures to curb its impact. It aims to guide policymakers, industry stakeholders, and the public in managing vape waste sustainably while advancing Smokefree goals.[1]

Prevalence translates directly into waste

While cigarette smoking in NZ has declined year-on-year until recently, vaping has surged. According to the 2023/24 NZ Health Survey, 11% of adults reported vaping daily,[2] with especially high uptake among Rangatahi, many of whom have never smoked.[2,3] Although unlikely to help reduce smoking prevalence to 5% or below by the end of 2025,[4] vapes remain integral to NZ's tobacco-control strategy as an effective smoking cessation tool.[5,6] and they were a key component of denicotinisation strategy in the now-historic Smokefree Aotearoa 2025 Action Plan and Act that followed.[7]

However, beyond their role in tobacco harm, the proliferation of disposable single-use vapes, introduced to the market in 2019, has created a parallel concern: a growing volume of poorly managed vape waste. These end-of-life products fall outside the capacity of conventional litter management systems, which were not designed to handle such complex e-waste, thereby imposing environmental burden.

Understanding vape waste

Vape waste comprises lithium-ion batteries, e-liquid (vaping liquid) residues, electronic circuits, heating coils, and plastic components. Although less prevalent than cigarette butts, they pose greater environmental risks. Unlike cigarette filters, which release microplastics and toxic chemicals,[8] vapes include e-waste components that are unit-for-unit more hazardous and materially complex.

The risks include:

- **Battery fires**: Damaged lithium-ion batteries can ignite fires in refuse trucks, landfills, and recycling facilities due to thermal runaway.[9,10]
- **Heavy-metal leaching**: Batteries and coils may leach lead, nickel, and other metals into soil and water.[11]
- **Toxic chemicals**: Residual nicotine, classified by the US Environmental Protection Agency as acute hazardous waste, can leach into the environment.[12] E-liquids may also contain trace arsenic, chromium, mercury, and other hazardous chemicals, posing further risks when mishandled or ingested.[12]
- **Microplastics**: Plastic casings fragment over time, contributing to long-term pollution in terrestrial and aquatic environments.

Many of these substances are carcinogenic, bioaccumulative, and/or environmentally persistent.[12] At the same time, the loss of recoverable minerals like lithium represents depletion of strategic minerals.

Field evidence and global trends

Evidence is accumulating that vape products are contributing to NZ's litter stream. The 2022 National Litter Audit recorded 94 discarded vapes and 67 empty refill containers, about one vape waste every 2000m^2.[13] A 2023, Auckland Council kerbside audit found 132 devices in just 575 refuse bins, roughly one device for every four bins inspected.[14] Although the numbers are modest, reported incidents indicate that vape devices containing lithium batteries may have contributed to fires in waste collection vehicles.

Recent fieldwork, as part of the University of Auckland-led research into vape waste in Auckland's Central Business District likewise found devices that were broken, disposable models with sealed batteries, rarely intact, and potentially leaking toxic substances around roadside gardens, gutters, and hospitality precincts.

These observations reflect global patterns. The United Kingdom (UK) discards approximately 5 million disposable vapes each week, containing enough lithium to power 5,000 electric vehicles. Globally, an estimated 844 million devices may end up in landfills annually.[15] As volumes rise, NZ waste infrastructure lacks the systems and safeguards needed to safely manage this emerging stream of small-format e-waste placing workers, infrastructure and the wider environment at avoidable risk of fire and contamination.

Lessons from overseas

Several international jurisdictions, including the EU, UK (Waste Electrical and Electronic Equipment [WEEE) regulation), Canada, Australia, and the US, have adopted models that combine mandatory producer responsibility with widely accessible take-back points (see Appendix). By contrast, NZ relies on a single retailer-led initiative, VapeCycle, with limited reach.

From 1 June 2025, the UK will ban single-use vapes on both youth-protection and environmental grounds. NZ's single-use vape ban, effective 17 June 2025, focuses primarily on reducing youth vaping, leaving the environmental burden largely unaddressed.[16,17] These contrasting approaches highlight the opportunity for NZ to strengthen its regulatory response that would better align with international practice and satisfy obligations under the Environment Act, which requires the protection of ecosystems, environmental kaitiakitanga, resource conservation, and the safeguarding of future generations.[18]

Pathways to sustainable solutions

To address the growing vape waste problem in NZ, we recommend the following actions:

1. **Mandate responsible disposal** of unsold stock to prevent improper disposal of excess inventory.
2. **Introduce WEEE-style regulations** for all vape products, with enforceable obligations for retailers, waste contractors, and consumers, backed by audits and penalties.
3. **Implement extended producer responsibility** requiring manufacturers and importers to fund take-back programs and recycling infrastructure through legally binding mechanisms.
4. **Establish accessible take-back/drop-off points** through councils and retailers, supported by facilities equipped to process batteries and hazardous materials safely.
5. **Enhance data collection and oversight** of sales, returns, and recycling to inform policy and monitor compliance.
6. **Incentivise sustainable product design,** including rechargeable devices, reusable batteries, and recyclable materials.
7. **Launch public awareness campaigns** to highlight fire risks, environmental hazards, and proper disposal practices.

Together, these steps can align environmental protection with Smokefree ambitions.

Conclusion

Policymakers, local authorities, and vaping retailers have a shared responsibility to safeguard public health and uphold environmental kaitiakitanga. Strengthening regulations, expanding recycling access, and encouraging product innovation would ensure that vapes can support Smokefree goals without exacerbating NZ's growing vape waste problem.

What this Briefing adds

- Highlights the composition and environmental risks of disposable vape waste in NZ.
- Synthesises emerging field evidence showing vape waste is increasing and environmentally hazardous.
- Draws on international models, including the UK and EU, to show how frameworks such as WEEE and take-back schemes can inform local solutions.
- Offers regulatory, infrastructural, and behavioural solutions that address environmental burdens without compromising Smokefree progress.

Implications for policy and practice

NZ authorities can act now to address vape waste by adopting integrated measures that protect ecosystems, improve health outcomes, and meet existing legal obligations under the Environment Act:

- **Policy:** Introduce mandatory regulation (WEEE-style) and extended producer responsibility to address vape waste at its source.
- **Practice:** Establish national infrastructure for safe collection and recycling through coordinated council–retailer partnerships.
- **Surveillance:** Improve data collection on vape sales, returns, and recycling to inform regulation and monitor compliance.
- **Public Awareness:** Promote disposal education to reduce fire risks, environmental leaching, and improper handling of hazardous components.

Authors details

Dr Anup Bhetuwal, School of Population Health, The University of Auckland | Waipapa Taumata Rau

Professor Chris Bullen, School of Population Health, The University of Auckland | Waipapa Taumata Rau.

Appendix 1: International vape-waste management schemes and key lessons for Aotearoa

Jurisdiction	Regulatory mechanism	Key elements	Takeaway for NZ
EU	WEEE Directive	Statutory collection, recovery, and recycling targets for all e-waste, including vapes	Legal mandate

UK	WEEE + Distributor Take-back Scheme	Vape retailers must accept returns or offer alternative collection points	Shared producer–retailer responsibility ensures consumer convenience and high collection coverage
Québec (Canada)	Recycle Your Vapes (launch 2025)	Network of ≈ 200 public drop-off points dedicated to vaping devices and pods	Industry-funded infrastructure that can build a broad, dedicated return network for vape waste.
Australia	Council drop-off points + Return Unwanted Medicine pharmacy scheme	Councils set up drop-off locations; selected pharmacies take reusable-vape components; batteries are recycled separately	Multi-channel approach integrates existing hazardous-waste and medicine-return systems
United States	Local household hazardous-waste programmes	Counties run free collection days or depots for e-cigarettes and batteries, aimed at fire prevention	Decentralised but widespread provision highlights the importance of community-level access

EU: European Union; NZ: New Zealand; UK: United Kingdom; WEEE: Waste Electrical and Electronic Equipment

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