

# Hazardous substances-related deaths reported to the coroner in New Zealand

This factsheet presents information on deaths due to hazardous substances in Aotearoa New Zealand from 2007–21. The data comes from the National Coronial Information System (NCIS) and includes deaths where the coronial investigation was completed. Data from 2019–21 may be incomplete due to open investigations.



Motor vehicle exhaust and other carbon monoxide sources caused half '37' of all unintentional hazardous substances deaths from 2007–21.



Toluene was the third most common substance causing unintentional deaths from 2016–21 but was less common prior to this.



Following restricted access to butane in 2013, there has been a marked decline in unintentional deaths from huffing among teenagers and individuals under the age of 30.



Carbon monoxide, predominantly from motor vehicle exhaust, caused seven times as many intentional deaths as all other hazardous substances combined from 2007–21.

## Hazardous substances deaths are an important public health problem

Each year people in New Zealand die from hazardous substance exposures. This report covers reported New Zealand cases from the NCIS from 2007–21. It includes substances covered under the HSNO Act 1996 and Health Act 1956. Unintentional deaths are the primary focus as deliberate misuse is not a meaningful measure or indicator of the effectiveness of the HSNO Act regime (Environmental Protection Authority 2016).

Medicines in finished dose form, alcohol when classified as a food item, chemical toxins associated with food, and radioactive materials are covered by different legislation. Carbon monoxide, a byproduct of incomplete combustion, is also outside the legislation. However, these deaths have been included to indicate the size of the problem.

A hazardous substance is any substance that has any of the following properties:		A hazardous substance does NOT include:	
 Explosive	 Toxic	 Medicine in finished dose form	 Alcohol when classified as a food item
 Oxidises	 Flammable	 Chemical toxins associated with food (poisoning)	 Radioactive materials
 Corrosive		 Manufactured items (eg, button batteries)	

## Unintentional hazardous substances coronial deaths

### Carbon monoxide and toluene are the main substances causing unintentional deaths

There were 73 unintentional deaths caused by hazardous substances 2007–21, an average of five per year. Due to the nature of coronial investigations, it is likely that some cases in recent years are ongoing. As a result, discussion of deaths over time is limited.

Roughly half, 37 unintentional deaths, related to carbon monoxide from motor vehicle exhaust (19 deaths) or other sources (18 deaths), with no notable fluctuations between years. In comparison, toluene has become equally common since 2016, with an average of one death per year. Prior to 2016, toluene deaths were less common. Huffing deaths are discussed separately below, as these could be considered “recreational exposures”.

Table 1 Unintentional hazardous substance deaths, top 10 substances, 2007–21

Hazardous substance	Deaths
Motor vehicle exhaust (carbon monoxide)	19
Other sources of carbon monoxide	18
Toluene	9
Hydrogen sulphide	5
Methanol	<5
Ethylene Glycol	<5
Disinfectant/cleaning agent	<5
Herbicide	<5
Petrol/Diesel	<5
Unspecified fuel/solvent	<5
<b>Total</b>	<b>73</b>

**Note:** Total includes deaths related to hazardous substances not listed in the top 10.

**Source:** National Coronial Information System (2023)

Some key notes about these unintentional deaths from 2007–21 include:

- **Males** make up 80+% of deaths consistently across years

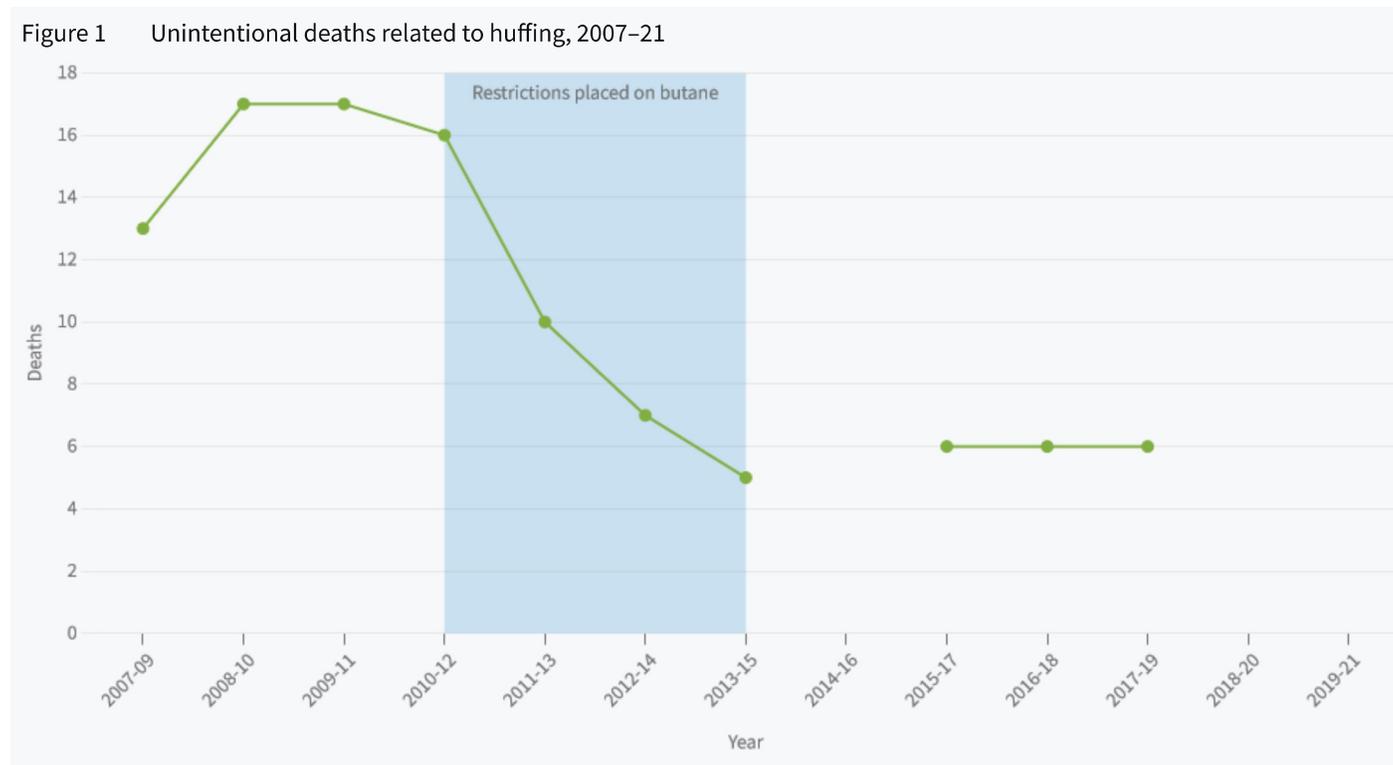
- Males make up 80% of deaths consistently across years.
- Māori crude death rates (18 deaths, 1.6 per million) and European/Other rates (48 deaths, 1.1 per million) are similar.
- Māori are most commonly affected by toluene.
- Age groups over 15 years made up over 95% of deaths.

### Huffing-related deaths have gradually declined since the early 2010s

There were 40 unintentional deaths related to huffing from 2007–21. The majority, 31 deaths, relate to butane inhalation. Deaths dropped from an average of five per year from 2007–11, to one per year from 2014–2021 (Figure 1). This may have been influenced by restrictions, with huffing attracting media and political attention in the early 2010's (Office of the Chief Coroner of New Zealand 2012). Some deaths may still be under investigation. Despite restrictions, butane was the cause of all nine deaths between 2014 and 2021.

This decline in deaths predominantly affected the following groups:

- Individuals under the age of 30 accounted for most deaths before and after.
- Māori were more heavily affected prior to restrictions.
- Males accounted for most deaths both before and after restrictions.



Note: 2014-16, 2018-20 and 2019-21 have been suppressed due to counts being less than 5.  
Butane restrictions remain in place through to 2021, the highlighted region is when restrictions were introduced.

Source: National Coronial Information System (2023)

## Intentional hazardous substances coronial deaths

### Carbon Monoxide is the primary cause of intentional hazardous substance deaths

Carbon monoxide exposure is overwhelmingly the most common hazardous substance causing death intentionally. There were 508 deaths from motor vehicle exhaust and 53 deaths from other sources from 2007–21. These individuals were predominantly:

- Males with >80% of deaths per year.
- European/Other (495 deaths, 11.1 per million), Māori (34 deaths, 3.1 per million), Pacifica (9 deaths, 2.0 per million) and Asian (18 deaths, 2.0 per million) peoples.

- All 15+ year age groups, with crude death rates ranging from 4.1–13.0 per million.

Table 2 presents the most common hazardous substances involved in intentional deaths. Aside from carbon monoxide, 80 individuals died from other hazardous substances. These individuals had similar demographic breakdowns to carbon monoxide discussed above. Of note, ethylene glycol deaths were similar for females (6 deaths) and males (8 deaths).

Table 2 Intentional hazardous deaths, 10 most common substances, 2007–21

Hazardous substance	Deaths
Motor vehicle exhaust (carbon monoxide)	508
Other sources of carbon monoxide	53
LPG gas, natural gas, methane gas, propane gas, butane gas	14
Ethylene glycol	14
Herbicide	13
Cyanide	11
Hydrogen sulphide	5
Paraquat	<5
Insecticide	<5
Organophosphate	<5
<b>Total</b>	<b>641</b>

**Note:** Total includes deaths related to hazardous substances not listed in the top 10.

**Source:** National Coronial Information System (2023)



## Dashboard - Hazardous substances



### Data for this indicator

The data presented in this factsheet were extracted from the National Coronial Information System (NCIS) on 19 July 2023. The organisation source of the data is the Victorian Department of Justice and Community Safety.

The dataset extracted contained every hazardous substances-related death reported to the New Zealand coroner from the 1 July 2007 to 31 December 2021. This factsheet reports on deaths due to exposures to chemicals or other non-pharmaceutical substances, and where the coronial investigation had concluded, and the case was closed on the NCIS.

Crude rates presented in this factsheet do not take into account varying age distributions when comparing between populations.

Geolocated data is not available for New Zealand coronial cases. As a result, deprivation and rurality have not been reported. All counts less than five have been suppressed as per NCIS confidentiality requirements.

For descriptive information about the data, see the [Metadata Sheet](#).

### References

Environmental Protection Authority. 2016. *Monitoring the Effectiveness of the Hazardous Substances and New Organisms Act 1996*. URL: <https://epa.govt.nz/assets/RecordsAPI/fd4d1267c7/Monitoring-the-effectiveness-of-the-HSNO-Act-2016.pdf> (accessed August 2023).

Office of the Chief Coroner of New Zealand. 2012. *Case Study from Recommendations Recap: volatile substance abuse-Butane-based substances from issue 2*. URL: <https://www.drugfoundation.org.nz/assets/uploads/2012-uploads/Chief-Coroners-Report-Butane-Case-Study.pdf> (accessed August 2023).

**Other related topics include:**[Hazardous substances-related deaths registered in New Zealand](#)[Unintentional hazardous substances-related hospitalisations](#)[Hazardous substances notifications](#)[Unintentional hazardous substances exposures in children \(0–14 years\)](#)**Disclaimer**

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**Author**

To get in touch with the author [✉ ehinz@massey.ac.nz](mailto:ehinz@massey.ac.nz)

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