

Element	Details
Name	Lead-based paint exposure in New Zealand dwellings.
Domain and topic	Hazardous substances: Non-occupational lead absorption notifications
Indicator definition and units	The number of non-occupational lead notifications entered into the HSDIRT reporting tool in New Zealand, where the blood lead level is greater than or equal to 0.48 µmol/l before 09/04/2021 and greater than or equal to 0.24 µmol/l from 09/04/2021 onwards, and the lead-based paint is the primary or one of the exposure sources.
Data source	<ul style="list-style-type: none"> The Hazardous Substances Disease and Injury Reporting Tool (HSDIRT); 2014–2024 https://www.ehinz.ac.nz/indicators/hazardous-substances/resources-for-health-professionals/ Quotable Value [QV]: NZ residential and lifestyle buildings, including assessment roll, category, and the decade they were built in. https://www.qv.co.nz/
Numerator	Number of non-occupational lead absorption notifications linked to residential or lifestyle dwellings where lead-based paint was identified as a primary or one of the exposure sources.
Denominator	Number of residential and lifestyle dwellings in New Zealand, by lead paint hazard category (QV).
Methodology	<p>1. Quotable Value (QV)</p> <p>i. Regional datasets Quotable Value (QV), the councils' registered valuation service provider, supplied District Valuation Roll (DVR) data for residential and lifestyle buildings, including construction age and valuation assessments. Data were extracted on 6 May 2024 and covered the period 2021–2023. Multiple regional datasets were merged and cleaned to form a single national building dataset. Administrative boundaries (Districts, National Public Health Services, Health Regions, Regional Councils, and Statistical Areas 2) were assigned using territorial authority identifiers in the DVR data. Where spatial allocation was required, building footprints were spatially matched to administrative boundaries using a spatial join with a “Largest Overlap” match type, ensuring that each building was assigned to the boundary with which it shared the greatest area.</p> <p>ii. Assigning hazard-level categories</p> <ul style="list-style-type: none"> A Lead paint hazard level category was assigned to all residential and lifestyle buildings with a known construction age. Buildings classified as “XXX Mixed/Remodelled” (75,556) and buildings with an unknown age (170,234) were excluded from this stage of analysis. <p>2. HSDIRT</p> <p>i. Data collection</p> <ul style="list-style-type: none"> Lead absorption is a notifiable condition in New Zealand when blood lead levels are 0.24 µmol/L or higher, effective from 9 April 2021. General practitioners or local Public Health Services (PHSs) report cases to the Hazardous Substances Disease and

	<p>Injury Reporting Tool (HSDIRT), administered by Environmental Health Intelligence New Zealand.</p> <ul style="list-style-type: none"> • Case status is assigned by PHSs following investigation, with records designated as “not a case” excluded. The notification date was approximated using the laboratory lead result date, where available. If unavailable, the PHS assessment date was used; if both were missing, the HSDIRT notification creation date was used. • Lead notifications were classified as non-occupational if the recorded Exposure Place was Public Place, Home, School, or Other, or if the Exposure Lead Source was recorded as Non-occupational. Notifications classified as unknown were not assigned to either occupational or non-occupational. • Repeat blood lead level tests occurring within 366 days were not treated as new notifications unless additional investigation or public health action had taken place. Records without a reported blood lead level were excluded from the analysis. • Notifications in HSDIRT represent index notification case and do not necessarily correspond to unique individuals; an individual may therefore have more than one notification over time. <p>ii. Exposure to lead-based paint HSDIRT notifications involving primary or secondary exposure to lead-based paint were extracted for analysis. Addresses were geocoded using the Esri World Geocoder, which returns point-address matches where possible. Quality assurance checks included review of:</p> <ul style="list-style-type: none"> • match status (Matched / Unmatched / Tied), • match score (≥ 85), • match type. <p>Where required, geocoding results were verified against Toitū Te Whenua Land Information New Zealand (LINZ) address data https://data.linz.govt.nz/layer/123113-nz-addresses/ and aerial imagery.</p> <p>iii. Assigning hazard-level categories The analysis focused on residential and lifestyle dwellings. Notifications associated with non-residential buildings (eg commercial, industrial, or rural properties) were identified and reviewed. Geocoded HSDIRT notifications were spatially matched with QV building data to determine dwelling age. The hazard-level category was assigned based on the historical use of lead-based paints in New Zealand, resulting in four categories: Pre-1940 – Very high hazard 1940–1959 – High hazard 1960–1979 – Medium hazard 1980 onwards – Low hazard Dwellings with an unknown age (9) were excluded from hazard-level calculations. Buildings coded as “XXX Mixed/Remodelled” (21) and No-data age (1) were manually reviewed and assigned a construction year using supporting information from PropertyValue records, HSDIRT notes, and visual assessment of aerial and street-level imagery. PropertyValue.co.nz (powered by CoreLogic) was particularly useful for identifying historical build dates and clarifying ambiguous age classifications.</p>
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	<p>https://www.propertyvalue.co.nz/ Counts of Mixed/Remodelled and unknown-age dwellings differ between the QV building stock dataset and the geocoded HSDIRT notification subset due to differences in scope and linkage.</p> <p>iv. Notification rates were calculated by the author using HSDIRT notification data and QV dwelling stock denominators, with the most recent available QV extraction used as a stable proxy for comparative hazard-level analysis across the notification period.</p> <p>3. Toitū Te Whenua Land Information New Zealand (LINZ)</p> <p>i. Rating Valuations Rules 2008 Under the Rating Valuations Rules 2008, property use is identified using a two-character code, with Lifestyle (Zone 2) and Residential (Zone 9) relevant to this study. A three-character code is required to indicate the decade in which the principal building was constructed. The DVR data attribute age_indicator references the LINZ building age code classification, as documented in the NZ Properties – Building Age data table. Age codes were decoded using the official LINZ reference table. References:</p> <ul style="list-style-type: none"> • Rating Valuations Rules 2008 (pp. 43 & 50) https://www.linz.govt.nz/sites/default/files/30300-Rating%2520Valuations%2520Rules%25202008-%2520version%2520date%25201%2520October%25202010%2520-%2520LINZS30300_0.pdf • NZ Properties – Building Age table https://data.linz.govt.nz/table/105617-nz-properties-building-age/ <p>ii. NZ Addresses The LINZ NZ Addresses dataset was used to verify and quality-check geocoded addresses from HSDIRT notifications. https://data.linz.govt.nz/layer/105689-nz-addresses/</p>
Time period and time scale	Annual data from 2014 to 2024. The HSDIRT was rolled out progressively to all districts throughout 2013; therefore, the 2013 data were incomplete. Consequently, notifications have been reported since 2014.
Population coverage	All people in New Zealand, regardless of age.
Spatial coverage	National, Public Health Services, NPHS Regions, Districts, Regional Council, Territorial Authority, SA2
Limitations of the indicator	<ul style="list-style-type: none"> • Lead absorption is difficult to detect based on symptoms alone, as many cases are asymptomatic and may not come to a doctor's attention. Some individuals may also not undergo blood lead testing. • HSDIRT data only includes notified cases and will underestimate the burden of diseases or injuries caused by exposure to hazardous substances. Also, a case will not be included in the analysis if the GP is unaware of the tool and does not use it to notify cases to the Public Health Service or if the laboratory does not directly notify the blood lead result to EpiSurv. • Some notifications assigned to low-hazard dwellings (buildings constructed after 1980) may reflect alternative exposure pathways such as historical site contamination or off-site exposure to lead-based paint.

- Spatial and address accuracy**
 The Quotable Value (QV) spatial and tabular datasets did not fully align in all cases. Minor inconsistencies were identified, including instances where address records were associated with incorrect or imprecise spatial coordinates. These issues are consistent with known limitations in large, multi-source administrative datasets and may result in small numbers of records being spatially misallocated.
- Building age classification constraints**
 Under the Rating Valuation Rules 2008 (p. 50), the `building_age_indicator` attribute is subject to several limitations:
 - The attribute refers only to the principal building on a rating unit where a single principal building exists.
 - Where multiple buildings are present on a rating unit, the age indicator may be null for secondary buildings.
 - Construction age is recorded by decade of construction, rather than a specific year, limiting temporal precision.
 As a result, parcels containing multiple buildings and/or multiple titles may have multiple District Valuation Roll (DVR) records associated with different age codes. In some cases, buildings on the same parcel were assigned different age classifications (e.g. a 1950 construction date classified as *High hazard* alongside a *Mixed/Remodelled* code). For mapping and analysis purposes, such parcels may therefore appear under a single aggregated age classification (e.g. *Mixed/Remodelled*), which can mask intra-parcel variation in building age and associated hazard level.

Limitations of the data source



- Implications for analysis**
 These limitations may lead to:
 - Minor spatial misclassification of a small number of records;
 - Reduced precision in assigning hazard levels where parcels contain multiple buildings of differing construction ages;

Metadata

	<ul style="list-style-type: none">- Conservative treatment of buildings classified as <i>Mixed/Remodelled</i> or with missing age information, which may under- or over-represent hazard categories in localised areas.- These issues were mitigated where possible through data cleaning, spatial validation, and targeted manual review; however, they should be considered when interpreting results, particularly at fine spatial scales.
Related indicators	Non-occupational lead absorption notifications
For more information	HSDIRT notification tool. https://www.ehinz.ac.nz/indicators/hazardous-substances/resources-for-health-professionals/ New Zealand dwellings, by lead-based paint hazard level map: https://arcg.is/0am4uT3 or an interactive app, Potential lead-based paint exposure in NZ dwellings .