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Environmental Health Intelligence New Zealand
Rapu Mātauranga Hauora mo te Taiao – Aotearoa

Related indicators

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Occupational lead absorption notifications

This factsheet presents data on occupational lead absorption notifications in people aged 15 years and older, entered into the Hazardous Substances Disease and Injury Reporting Tool from 2014–2021.

In 2020–2021, occupational lead notification rates for Pacific Peoples (11.0 per 100,000) were over four times greater than any other ethnic group while also having the highest median blood lead levels.

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Compared to 2019, occupational lead notification rates in more deprived areas, quintiles 3–5, halved in 2020, while less deprived regions were unchanged.

From 2014–2021, painters were consistently the most notified career group for occupational lead notifications.

In 2021, 38 males and one female, exposed to lead occupationally, exceeded the Biological Exposure Index of 0.97 µmol/L.

In 2020 and 2021, occupational lead notifications contained a high amount of missing data.

Lead absorption investigation guidelines

Although no safe level of exposure to lead has been found, the blood lead levels required to be notified in New Zealand are lead absorption equal to or in excess of 0.24 µmol/L. The notifiable threshold was reduced from 0.48 µmol/L to 0.24 µmol/L on 9 April 2021. At and above this level, public health intervention and investigation of sources/pathways is dependent on the blood lead level of individuals as set by the Ministry of Health (2021) and WorkSafe (2022):

Lead level	Guidelines
0.24–0.48 µmol/L	Investigate, particularly pregnant women.
0.48–0.71 µmol/L	Investigate all cases. ≥0.48 µmol/L is the workplace suspension level for females of reproductive capacity and those pregnant or breastfeeding.
0.72–0.95 µmol/L	Investigate all cases. Notify children to their general practitioner.
0.96–2.16 µmol/L	Cases will be referred to WorkSafe who investigate further.
≥2.17 µmol/L	Cases will be referred to WorkSafe who investigate further.

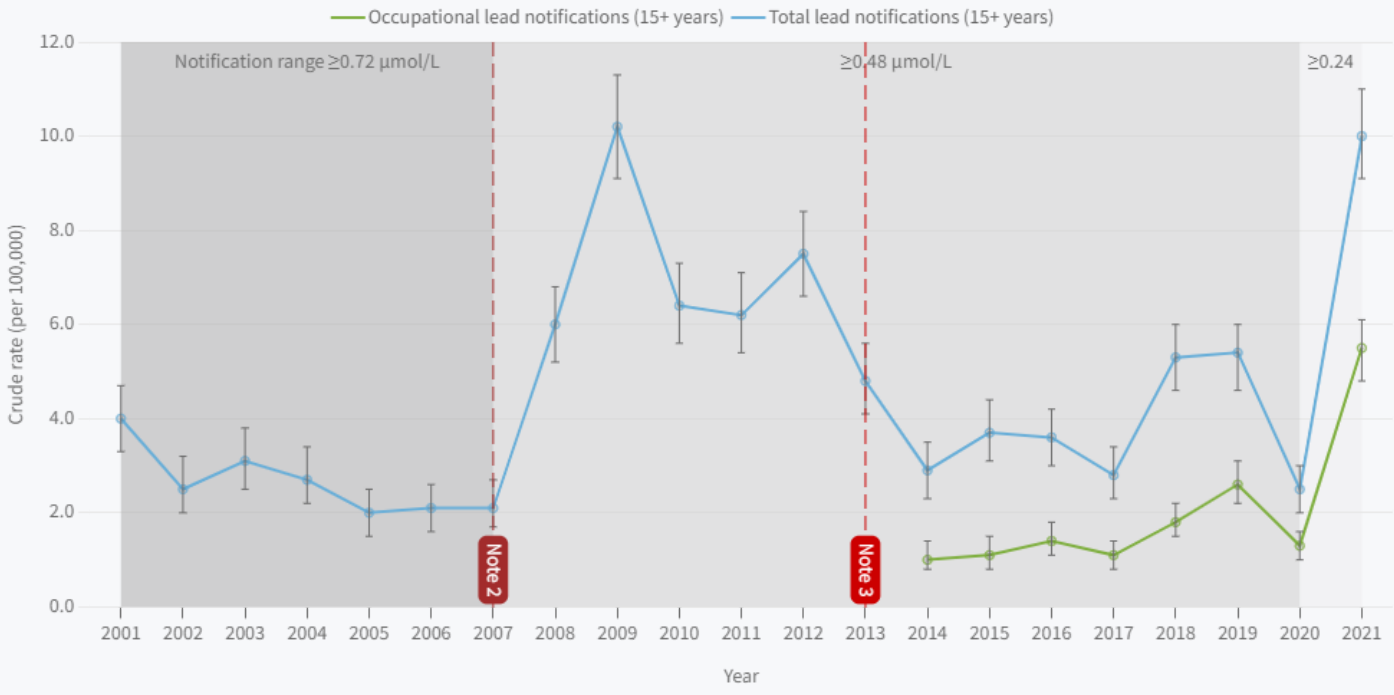
This factsheet presents occupational lead absorption notifications based on the blood lead notification thresholds. Notifications included here relate to all individuals with notifiable blood lead levels potentially exposed in the workplace, as determined by the Public Health Service. It is often not possible to be certain of the exposure source and, as a result, its determination is left to the investigator's discretion and knowledge of individual cases. For information on the health risks of lead absorption, visit the EHINZ website

Occupational lead notification rate increases in 2021 due to threshold change

Both occupational and total national lead notification rates for adults, 15+ years, increased by roughly double the rates seen in 2019, after a decline in 2020 (Figure 1). It is assumed the drop in 2020 is due to COVID-19 restrictions impacting occupational lead surveillance programmes around New Zealand, similar to screening programmes for health issues such as cancer and acute coronary syndrome (Chanz et al 2020, Gurney et al 2021).

The increase in rates in 2021 is primarily due to the lowering of the non-occupational notification level from 0.48 to 0.24 µmol/L on 9 April 2021 and consequently a lowering of the threshold for all direct laboratory notifications of lead. Of 280 occupational lead notifications in 2021, 129 were in the 0.24–0.47 µmol/L range. The notification rate involving the previous notification range, ≥0.48 µmol/L, was similar in 2021 (2.9 per 100,000) compared to the rate in 2019 (2.6 per 100,000).

Figure 1 Occupational lead (15+ years) and total lead (15+ years) notification rates, 2001–2021



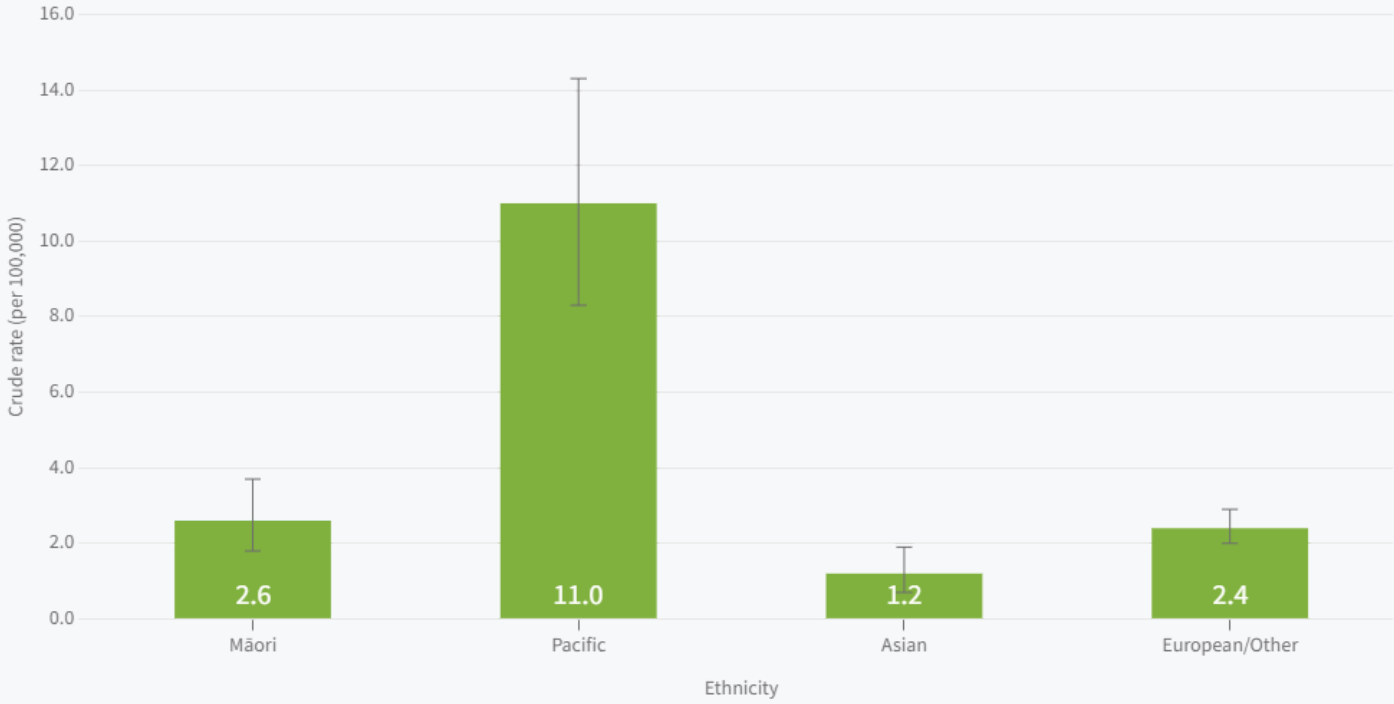
Note 1: 95% confidence intervals have been presented as error bars. See Metadata for more information on how to interpret this graph.
Note 2: In 2007 direct laboratory notifications were introduced across New Zealand.
Note 3: Over the course of 2013, HSDIRT was introduced to districts (formerly district health boards) across New Zealand.

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) 2022.

Notification rate for Pacific Peoples four times higher than any other ethnic groups

In 2020–2021, the occupational lead notification rate among Pacific Peoples (11.0 per 100,000) was over four times greater than either Māori (2.6 per 100,000) or European/Other (2.4 per 100,000) (Figure 2).

Figure 2 Occupational lead notification rates for adults (15+), by ethnicity, 2020–2021



Note: 95% confidence intervals have been presented as error bars. See Metadata for more information on how to interpret this graph.

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) 2022.

In addition to the notification rate, Pacific Peoples also had a higher median blood lead level compared to other ethnic groups (Table 1).

Table 1 Median blood lead level, interquartile range, and number of occupational lead notifications by ethnicity, 2020–2021

Ethnicity	Median (µmol /L, interquartile range)	Notifications
Pacific	0.68 (0.48-0.98)	56
European/Other	0.58 (0.33-0.81)	126
Asian	0.56 (0.43-0.70)	16
Māori	0.52 (0.33-0.81)	31

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) 2022.

Of the 345 occupational lead notifications recorded in 2020/21, roughly a third, 116 notifications, did not have ethnicity recorded. Despite this, this trend of Pacific Peoples having a higher median blood lead level is reflected in previous years where demographic data are more complete.

Notifications in more deprived areas declined in 2020 before increasing in 2021

In 2020, occupational lead notifications in more deprived areas, quintiles 3–5, decreased by over 50%, while less deprived areas, quintiles 1 and 2, remained unchanged (Table 2). Notifications increased again in 2021, especially in more deprived areas. It is likely that this decline is the result of COVID-19 lockdowns and restrictions on work, however the decline being exclusively in more deprived areas is notable.

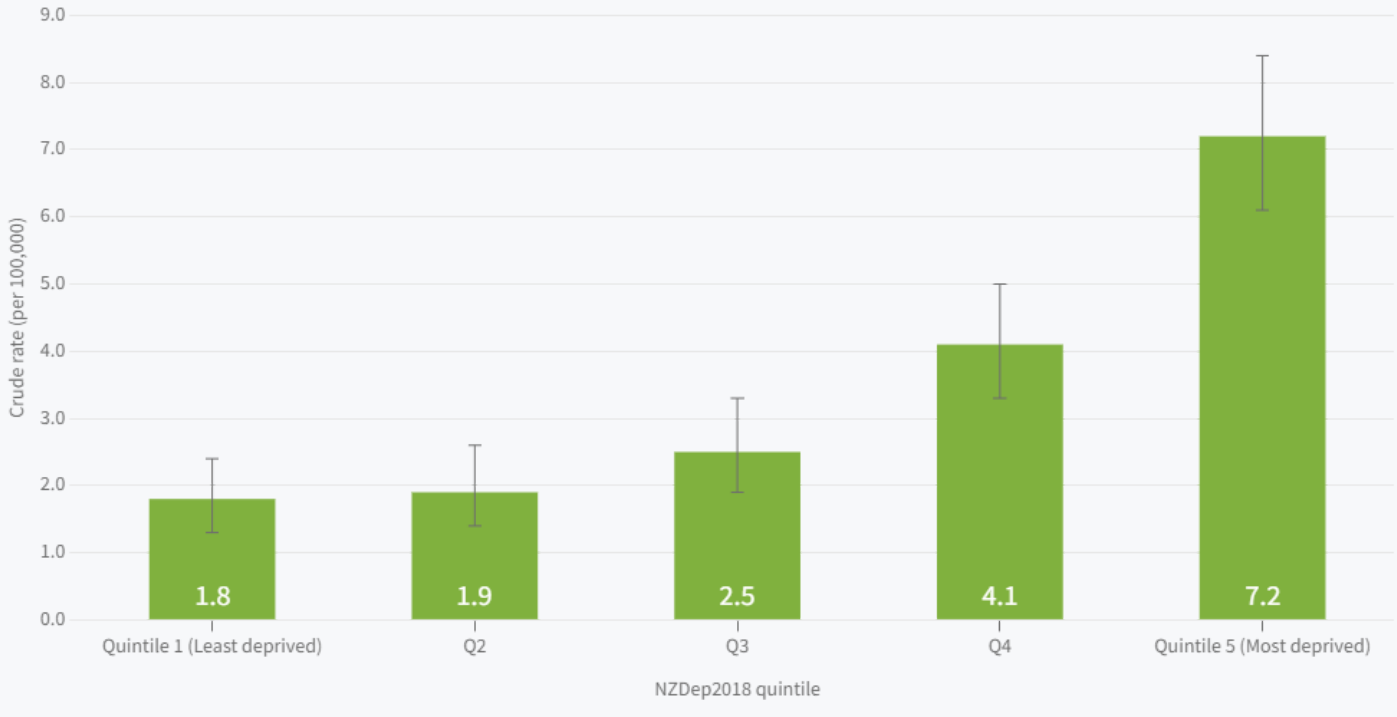
Table 2 Occupational lead notification counts, by NZDep18 quintiles, 2019–2021

NZDep 2018	2019	2020	2021
Quintile 1	10	14	15
Quintile 2	6	7	30
Quintile 3	17	7	34
Quintile 4	28	14	53
Quintile 5	67	18	79

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) 2022.

Despite the irregular drop in 2020, notification rates over the past three years, 2019–2021, have been highest in more deprived areas, quintiles 4 and 5 (Figure 3).

Figure 3 Occupational lead notification rates for adults (15+), by NZDep18 quintiles, 2019–2021



Note: 95% confidence intervals have been presented as error bars. See Metadata for more information on how to interpret this graph.

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) 2022.

Painters are consistently the most notified occupational group

Since 2014, painters have consistently been the most commonly notified occupational group for high blood lead levels. Other occupational groups featuring each year include smelting/metal, construction (non-painters), and metal recycling. Table 3 presents the four most commonly notified occupational groups from 2017–2021.

Table 3 Number of occupational lead notifications, by occupational group, 2017–2021

Rank	2017	2018	2019	2020	2021
1	Painter (30)*	Painter (44)*	Painter (50)*	Painter (24)*	Painter (90)*
2	Unknown (5)	Unknown (22)	Unknown (48)	Unknown (10)	Smelting/Metal working (88)
3	Automotive repair (3)	Smelting/Metal working (8)	Smelting/Metal working (11)	Smelting/Metal working (7)	Unknown (32)
4	Artist (3)**	Construction (4)**	Construction (5)**	Metal recycling (6)	Metal recycling (20)
Total* **	**51**	**89**	**130**	**65**	**280**

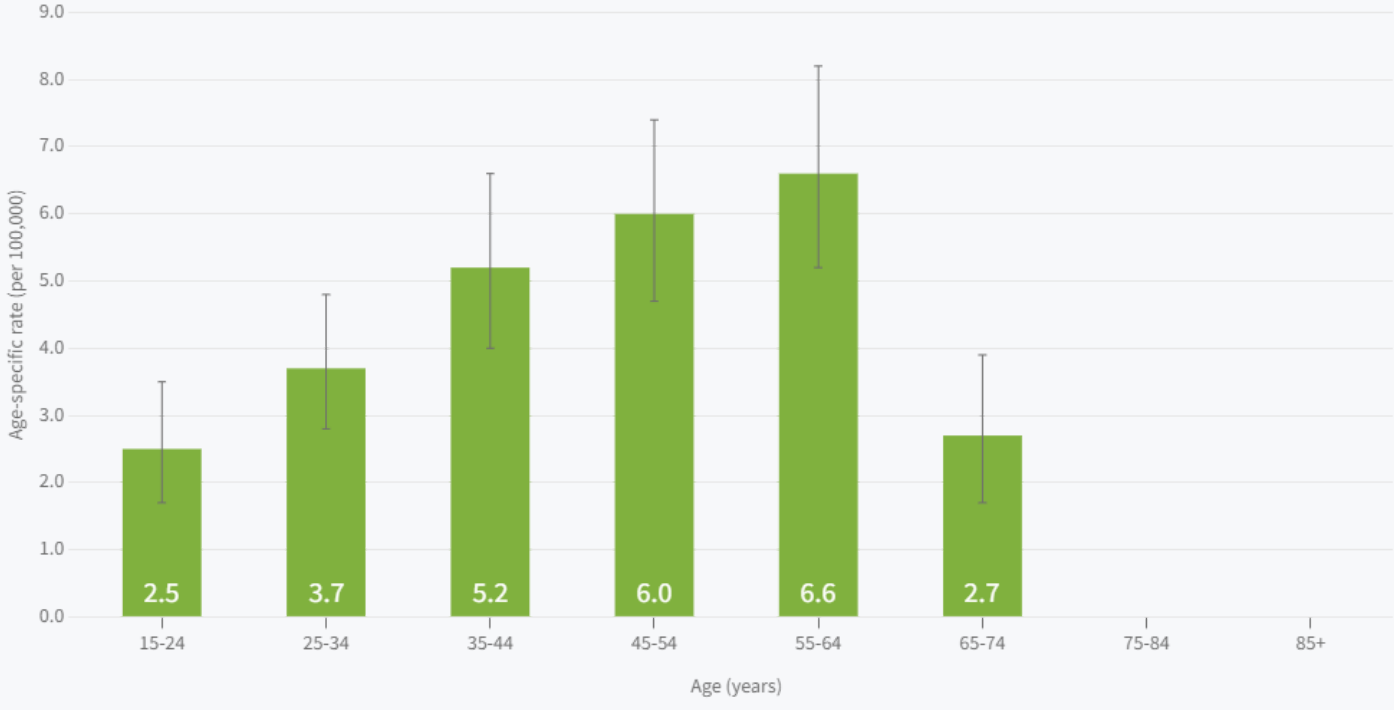
Note 1: *Includes housing, artistic, and other types of painters
Note 2: **Category does not include painters
Note 3: ***Total includes career groups not presented here.

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) 2022.

Occupational lead notification rates are high in older working-age men

From 2020–2021, notification rates increased with age until the average retirement age of 65 years, where rates dropped significantly (Figure 4). This is likely due to fewer people in the 65+ year age groups working, resulting in fewer people being tested and exposed to lead in the workplace. Median lead levels are similar for all ages. This trend has been consistent since data became available from HSDIRT in 2014.

Figure 4 Occupational lead notification rates for adults (15+), by age, 2020–2021



Note 1: Denominator values for rates use total population values. This includes individuals who are not working which may impact rates for 15–24 years, school-age individuals, and 65+ years.
Note 2: 95% confidence intervals have been presented as error bars.
Note 3: Missing rates have been suppressed as it is an unreliable estimate based on small numbers. See Metadata for more information on how to interpret this graph.

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) 2022.

Since 2014, males have consistently made up over 95% of occupational lead notifications where sex is recorded. Table 4 outlines the number of cases in 2021 only, which exceeded specific thresholds set by WorkSafe as outlined in "background information" above.

Table 4 Occupational lead thresholds set by WorkSafe exceeded, by sex, 2021

Lead level	Male	Female	Actions Recommended
≥0.48 µmol/L	143	2	Suspension level for females of reproductive age or pregnant or breastfeeding individuals.
≥0.97 µmol/L	38	1	Exceeding Biological Exposure Index
≥1.45 µmol/L	11	1	Suspension level for all males and females not of reproductive age.

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) 2022.

Data Issues in 2020 and 2021

Over the past two years, 2020–2021, occupational lead notifications have been missing key data partly due to the public health services focus on the COVID-19 pandemic (Table 5). Most cases missing occupational data had low blood lead levels, 0.24–0.71 µmol/L, and were likely considered a lower priority. Missing demographic data, especially ethnicity and address, may affect the above results.

Table 5 Occupational lead notifications missing key data, 2020–2021

Public Health Services	Sex	Ethnicity	DOB (for age)	Address (for NZDep)	Occupation	Total cases by PHS
Auckland Regional Public Health Service	0	11	0	4	20	110
Community and Public Health	14	83	1	65	4	84
Regional Public Health	0	1	0	2	10	60
Hawke's Bay Public Health	0	8	0	1	1	19
Waikato Public Health	1	1	0	1	1	16
Taranaki Public Health	0	0	0	0	2	13
MidCentral Public Health	0	1	0	0	1	12
Toi Te Ora - Public Health	0	1	0	1	2	12
Public Health South	0	4	0	0	1	10
Ngā Tai Ora, Public Health Northland	0	5	0	0	0	6
Nelson-Marlborough Public Health Service	0	0	0	0	0	3
Hauora Tairāwhiti	0	0	0	0	0	0
Total	**15**	**115**	**1**	**74**	**42**	**345**

Source: Hazardous Substances Disease and Injury Reporting Tool (HSDIRT) 2022.

Data for this indicator

This indicator reports HSDIRT occupational lead absorption notifications from 2014 to 2021. The data were extracted from the HSDIRT system on 8 March 2022. Updates or additions made to HSDIRT after this date are not reflected in this factsheet. For additional information, see the metadata link below.

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

Age-standardised rates presented in this factsheet take into account varying age distributions when comparing between populations.

All 95% confidence intervals have been presented as error bars on graphs. Unless otherwise stated, all differences mentioned in the text between the two values are statistically significant at the 5% level or less.

References

Chan Z, Stewart A, Kerr J, et al. 2020. The impact of a national COVID-19 lockdown on acute coronary syndrome hospitalisations in New Zealand (ANZACS-QI 55). *The Lancet Regional Health-Western Pacific*, 5, 100056. URL: https://www.sciencedirect.com/science/article/pii/S2666606520300560

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Ministry of Health. 2021. *The Environmental Case Management of Lead-exposed Persons.* Wellington: Ministry of Health. URL: https://www.health.govt.nz/publication/environmental-case-management-lead-exposed-persons (accessed 09 August 2022)

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Other related topics include:

Non-occupational lead absorption notifications

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Hazardous substances-related deaths registered in New Zealand

Unintentional hazardous substances-related hospitalisations

Unintentional hazardous substances exposures in children (0–14 years)

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Further information
For descriptive information about the data Metadata Sheet

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