The Leading Cause of Death in Children Changes with Age: Congenital Malformations at Age 0 and Ages 1–4, Malignant Neoplasms at 5–9, and Suicide at 10–14 — the Switch from 1–4 to 5–9 Happens Because the Death Rate from Congenital Malformations Falls from 3.3 to 0.9 per 100,000 (0.273 Times) While Malignant Neoplasms Stay Nearly Flat from 1.5 to 1.8. The Most Common Type of Unintentional Injury Also Changes, from Suffocation at Ages 0 and 1–4 to Traffic Accidents at 5–9 and Drowning at 10–14 [M111]

Switching of ranks = differences in the age shape of rates by cause ── What separates them is whether a cause's rate falls, stays flat, or rises with age

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Abstract

Using the Ministry of Health, Labour and Welfare's Vital Statistics (2024, final figures, Volume 1, Table 5.17, deaths, death rates, and shares by rank of cause and age; Table 5.31, deaths from unintentional injuries by cause and age), this paper looked at how the ranking of causes of death in children changes with age. No new mathematical theorem and no new law are claimed. Only numbers of 10 or more are shown.

First, **in 2024 the leading cause of death was congenital malformations, deformations and chromosomal abnormalities (hereafter "congenital malformations") at age 0 (398 deaths) and ages 1–4 (105), malignant neoplasms at ages 5–9 (81), and suicide at ages 10–14 (132) and 15–19 (627)** (Section 4).

Second, this is the core of the paper. **The leading cause switches from ages 1–4 to 5–9 because the death rate from congenital malformations falls from 3.3 to 0.9 per 100,000 (0.273 times), while malignant neoplasms stay nearly flat, from 1.5 to 1.8 (1.200 times).** The switch happens not because the leading cause increased, but because another cause fell (Section 5).

Third, **the leading cause switches from ages 5–9 to 10–14 because suicide is not in ranks 1–10 at 5–9 and has a death rate of 2.6 at 10–14. Malignant neoplasms went from 1.8 to 1.9** (Section 5).

Fourth, **unintentional injuries ranked second at ages 1–4, 5–9, and 15–19, and third at 10–14** (Section 5).

Fifth, **the most common type of unintentional injury was suffocation at age 0 (45 of the 51 injury deaths), suffocation at ages 1–4 (19; traffic accidents 15), traffic accidents at 5–9 (20; drowning 12), and drowning at 10–14 (24), changing with age. Other types were under 10 deaths at every age** (Section 6).

Sixth, what separates them is **whether a cause's rate falls, stays flat, or rises with age**. When you hear that "the leading cause of death in children is X," check which age the ranking is for.

Scope note: **This paper claims no new mathematical theorem and no new law** — the ranking and number of deaths by cause and age are in public tables, and this paper only took ratios of rates and rearranged the rankings. **This paper is a structural interpretation of the shape of numbers in public aggregate data; it is not medical advice, not a diagnosis, and not a treatment recommendation. The author is not a physician. Decisions about individual health should be discussed with a physician or a medical institution. This is a preprint that has not been peer reviewed. This paper was written with families who have lost a child in mind. Cells with 1–9 deaths are not shown as numbers in the text, tables, or figures. Ways to prevent accidents or diseases, and evaluations of medical care or administration, are not discussed. Nothing here blames the children who died or their families.** Suicide deaths are included as aggregate counts, but their methods, circumstances, and reasons are not discussed. Causes follow the table's "classification items used for the ranking of causes of death," and causes with equal counts share a rank. The death rate at age 0 is per 100,000 births, a different denominator from the other ages (per 100,000 population). Only the single year 2024 was examined. **About the data**: the Vital Statistics (Ministry of Health, Labour and Welfare) were taken from e-Stat and used under the Government of Japan Standard Terms of Use (Version 2.0); the ratios of rates and rearranged rankings in this paper were processed from them. What this paper adds: **showing the switching of children's causes of death with age as differences in the age shape of rates by cause (falling, flat, or rising)**.

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1. Notation and question

- **Rank of cause of death**: the ranking by number of deaths at each age, using the table's "classification items used for the ranking of causes of death" (Table 5.17). Causes with equal counts share a rank.
- **Death rate**: per 100,000 population (per 100,000 births at age 0 only). **Share**: the percentage of deaths at that age.

- **Congenital malformations**: congenital malformations, deformations and chromosomal abnormalities. **Malignant neoplasms**: malignant neoplasms (tumors).
- **Under 10**: cells with 1–9 deaths. Their numbers are not shown.

Question: How does the leading cause of death in children change with age? Does it switch because a cause rises, or because a cause falls?

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2. Preview and design

Written honestly: the design was decided after looking at the tables.

	Content
Tables	Vital Statistics 2024, Volume 1, Table 5.17 (ranking of causes by age) and Table 5.31 (types of unintentional injury by age)
Noticed in the preview	The leading cause splits into three: ages 0–4, 5–9, and 10 and over
Noticed in the preview (2)	Lining up the rate of the same cause by age, some causes fall (congenital malformations), some stay nearly flat (malignant neoplasms), and some rise (suicide)
Noticed in the preview (3)	Counts by type of unintentional injury are under 10 in many cells at children's ages
Comparison	Ranks 1–5 at each age, the age shape of rates by cause, and types of unintentional injury (cells of 10 or more only)

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3. Data and checks

Calculation 3.1 The 2 retrieved files were fixed by SHA-256, and the following were checked.

- The total block of Table 5.17 has age 0, 1–4, 5–9, 10–14, and 15–19, with ranks 1 to 10. At all five children's ages, the number of deaths decreases from rank 1.
- The table's notes say the ranking is by number of deaths, causes with equal counts are listed at the same rank, shares take deaths at that age as 100, and the death rate at age 0 is per 100,000 births.
- In Table 5.31, the sum of the 14 major categories of unintentional injury equals the total at each age ("-" is 0).
- The totals of unintentional injury in Table 5.31 (age 0: 51; 1–4: 49; 5–9: 46; 10–14: 51) agree with the counts of unintentional injury in Table 5.17 at all four ages.

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4. Ranking of causes by age

Calculation 4.1 Ranks 1–3 at each age (2024; deaths, with death rate in parentheses)

Age	Rank 1	Rank 2	Rank 3
0	Congenital malformations 398 (58.0)	Perinatal respiratory disorders 234 (34.1)	Sudden infant death syndrome 55 (8.0)
1–4	Congenital malformations 105 (3.3)	Unintentional injuries 49 (1.6)	Malignant neoplasms 47 (1.5)
5–9	Malignant neoplasms 81 (1.8)	Unintentional injuries 46 (1.0)	Congenital malformations 40 (0.9)
10–14	Suicide 132 (2.6)	Malignant neoplasms 95 (1.9)	Unintentional injuries 51 (1.0)
15–19	Suicide 627 (11.8)	Unintentional injuries 167 (3.1)	Malignant neoplasms 120 (2.3)

Observation 4.2: **The leading cause was congenital malformations at age 0 and 1–4, malignant neoplasms at 5–9, and suicide at 10–14 and 15–19.** The rate at age 0 is per 100,000 births, a different denominator from the other ages. At age 0, rank 4 was shared by hemorrhagic disorders of fetus and newborn and unintentional injuries, both with 51 deaths.

Observation 4.3: By share, the leading cause accounted for 31.4% of deaths at age 0, 20.2% at 1–4, 23.2% at 5–9, 25.7% at 10–14, and 48.8% at 15–19.

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5. The core — the age shape of rates by cause

Calculation 5.1 Death rate by cause (per 100,000 population; rank in parentheses; "—" where not in ranks 1–10)

Cause	1–4	5–9	10–14	15–19
Congenital malformations	3.3 (1)	0.9 (3)	0.7 (4)	0.7 (5)
Malignant neoplasms	1.5 (3)	1.8 (1)	1.9 (2)	2.3 (3)
Unintentional injuries	1.6 (2)	1.0 (2)	1.0 (3)	3.1 (2)
Suicide	—	—	2.6 (1)	11.8 (1)

Observation 5.2: **From ages 1–4 to 5–9, the rate for congenital malformations fell from 3.3 to 0.9 (0.273 times), while malignant neoplasms stayed nearly flat, from 1.5 to 1.8 (1.200 times). The leading cause switched not because malignant neoplasms increased, but because congenital malformations fell.**

Observation 5.3: **From ages 5–9 to 10–14, suicide was not in ranks 1–10 at 5–9 and had a rate of 2.6 at 10–14. Malignant neoplasms went from 1.8 to 1.9. Here the switch came from a rising cause appearing.**

Observation 5.4: **Unintentional injuries ranked second at 1–4, 5–9, and 15–19, and third at 10–14, staying near the top at every age.** The rate fell from 1.6 at 1–4 to 1.0 at 5–14, and was 3.1 at 15–19.

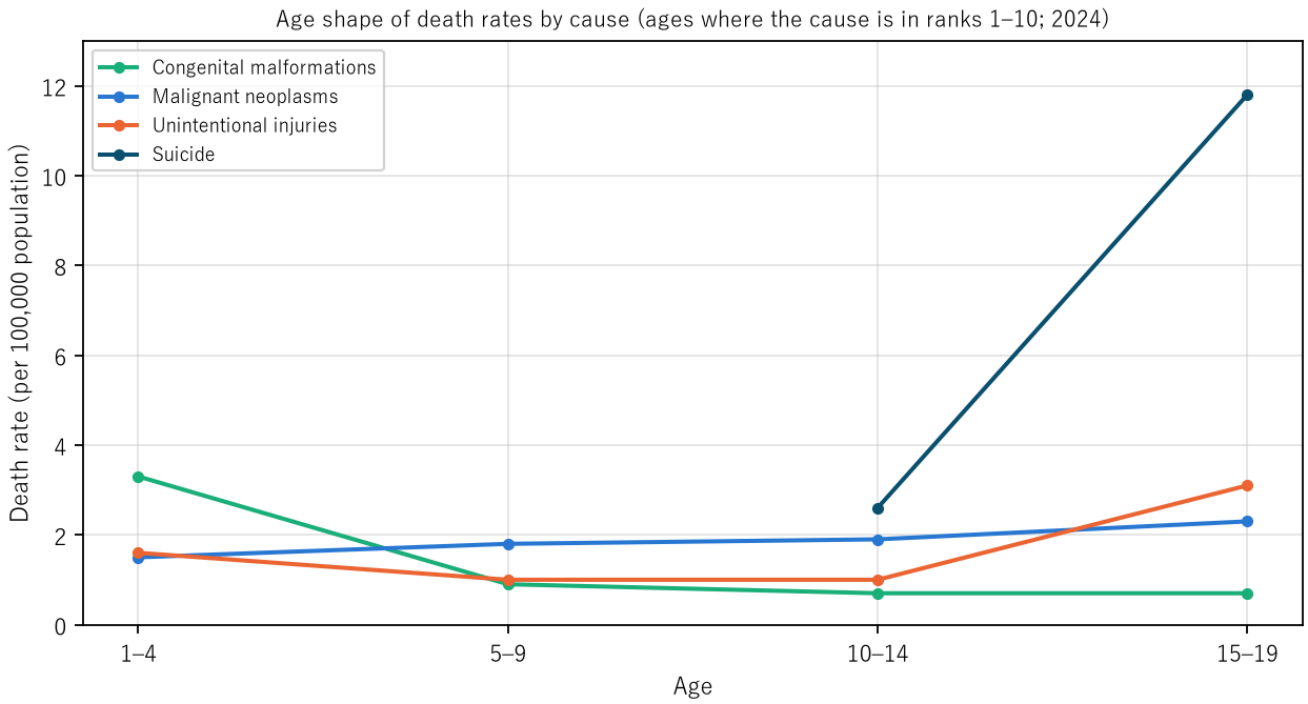


Figure 1: Death rate by cause (per 100,000 population; 2024). No point is drawn at ages where the cause is not in ranks 1–10 (this is not zero).

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6. Types of unintentional injury

Calculation 6.1 Types of unintentional injury (Table 5.31; cells with 10 or more deaths only)

Age	Unintentional injuries	Types with 10 or more
0	51	Suffocation 45
1–4	49	Suffocation 19, traffic accidents 15
5–9	46	Traffic accidents 20, drowning 12
10–14	51	Drowning 24

Observation 6.2: **The most common type was suffocation (the table's "other accidental threats to breathing") at ages 0 and 1–4, traffic accidents at 5–9, and drowning at 10–14, changing with age. Other types were under 10 deaths at every age (numbers not shown).**

7. Limitations

1. **With families who have lost a child in mind, cells with 1–9 deaths were not shown as numbers. Ways to prevent accidents or diseases and evaluations of medical care or administration are not discussed. The methods, circumstances, and reasons of suicide are not discussed.**
2. Only the single year 2024 was examined. Changes over the years were not.
3. The number of deaths from causes not in ranks 1–10 is not in the table, so "not in the top ranks" does not mean zero.
4. The rate at age 0 is per 100,000 births and cannot be compared with the per-100,000-population rates at other ages.
5. Splitting by sex would put many cells under 10, so only both sexes combined were examined.

Conclusion

The leading cause of death in children changes with age: congenital malformations at ages 0–4, malignant neoplasms at 5–9, and suicide at 10 and over. The switch from 1–4 to 5–9 happened because the rate for congenital malformations fell, and the switch from 5–9 to 10–14 happened because suicide appeared. The type of unintentional injury also changes with age: suffocation, traffic accidents, and drowning.

What separates them is one thing — whether a cause's rate falls, stays flat, or rises with age.

When you hear that "the leading cause of death in children is X," **check which age the ranking is for and how the rates of the other causes moved.**

Data and reproduction

Data	Vital Statistics 2024, final figures, Volume 1, deaths, Table 5.17: deaths, death rates (per 100,000 population), and shares by rank of cause, sex, and age (5-year groups); Table 5.31: deaths from unintentional injuries by cause (three-character basic classification) and age (specific groups) (Ministry of Health, Labour and Welfare, e-Stat) (retrieved 27 September 2026)
Terms of use	e-Stat follows the Government of Japan Standard Terms of Use (Version 2.0). The ratios of rates and rearranged rankings in this paper were processed from it and are not numbers produced by the government
Coverage	Japan; 2024; ages 0–19; both sexes combined
Verification	`検算/M111.py` (`--zu` also draws the figure). Every number in the text is taken from `検算/M111_output.txt`
Raw data	`data/` holds the retrieved files and `SOURCES.md` (URLs, retrieval date, SHA-256, terms of use, definitions and how the calculations were set up)
Figures	`図/M111_zu1` (png, svg, English version)

References

- Ministry of Health, Labour and Welfare. Vital Statistics 2024, final figures, Volume 1, deaths, Table 5.17: Deaths, death rates (per 100,000 population), and shares by rank of cause, sex, and age (5-year groups) and Table 5.31: Deaths from unintentional injuries by cause (three-character basic classification) and age (specific groups) (in Japanese). e-Stat (accessed 27 September 2026). https://www.e-stat.go.jp/