The Average Length of Stay for All Beds Fell from 54.6 Days in 1984 to 25.6 in 2024, but of the 7.77-Day Fall from 2005 to 2024 for All Beds Except Psychiatric, Changes in the Mix of Bed Types Account for 0.07 Days and Shortening Within the Same Types for the Remaining 7.71 — the Table Value for Long-Term Care Beds (117.4 Days in 2024) Uses a Different Formula with Transfers Between Beds in the Same Hospital in the Denominator, and Recounted with the Common Formula It Is 144.9 Days [M094]

Fall in average length of stay = part from the mix of bed types + part within the same type ── What separates them is whether flows shifted to other bed types or stays shortened within the same type

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Abstract

Using the trend tables of the Ministry of Health, Labour and Welfare's Hospital Report (inpatient days, new admissions, discharges, and average length of stay by bed type, 15 years from 1984 to 2024) and its glossary, this paper split the history of falling average length of stay into the part from the mix of bed types and the part within the same type. No new mathematical theorem and no new law are claimed.

First, average length of stay is given by "inpatient days ÷ the average of new admissions and discharges." This common formula reproduces the table values for all beds, general beds, tuberculosis beds, and infectious disease beds within 0.05 days in all 15 years. **Only long-term care beds are not reproduced: in all 11 years from 1996 to 2024 the common formula is at least 20 days longer than the table value.** The glossary says that long-term care beds use a different formula that adds to the

denominator "patients transferred from other bed types in the same medical institution" and "patients transferred to" them (Section 3).

Second, **the average length of stay for all beds fell from 54.6 days in 1984 to 25.6 in 2024 (0.469-fold), falling in 13 of the 14 transitions (it rose only from 2017 to 2020). General beds fell from 39.7 to 15.5 days (0.390-fold)** (Section 4).

Third, this is the core of the paper. **The average length of stay for all beds except psychiatric (common formula) fell by 7.77 days, from 28.05 in 2005 to 20.27 in 2024. Splitting it, the part from changes in the flow shares of bed types (mix part) is −0.07 days and the part from shortening within the same type (within part) is −7.71 days; nearly all of it is within.** Of the within part, general beds account for −4.13 days and long-term care beds for −3.55 (Section 5).

Fourth, **the table value for long-term care beds is 117.4 days in 2024 against 144.9 days by the common formula (the table value is 0.810 of it), and 172.8 against 241.9 days in 2005 (0.714). The share of transfers in the denominator implied by the table fell from 0.286 in 2005 to 0.190 in 2024.** Comparing general and long-term care beds by table values compares two values from different formulas (Section 6).

Fifth, the gap between all beds and all beds except psychiatric narrowed from 13.64 days in 1984 to 5.37 in 2024. This paper does not examine psychiatric beds separately and touches them only as this gap (Section 4).

Sixth, what separates them is **whether flows shifted to other bed types or stays shortened within the same type**. "Hospital stays have become shorter," for the fall since 2005, is almost entirely explained not by bed types replacing each other but by shortening within the same bed types.

Scope note: **This paper claims no new mathematical theorem and no new law** — inpatient days, admissions, discharges, and average length of stay are in public tables, and this paper only recomputed average length of stay with a common formula and split it into mix and within parts. **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. It does not judge whether stays are long or short, or evaluate the number of beds, the health care system, or policy.** Psychiatric beds are a field this series holds back, so they are not examined separately and are touched only as the gap from all beds. Why stays shortened within the same types cannot be separated with these tables. The split into mix and within parts is one choice, weighting by the average of the two years. The split starts in 2005 because the classification of long-term care and general beds was in transition until 2002 (2002 in the Japanese calendar is Heisei 14) (table notes). These are Hospital Report figures and do not include clinics. Prefectures and hospitals are not compared. **About the data**: the Hospital Report (Ministry of Health, Labour and Welfare) was taken from e-Stat and used under the Government of Japan Standard Terms of Use (Version 2.0); the average length of stay by the common formula and the split in this paper were processed from it. What this paper adds: **splitting the 2005–2024 fall in average length of stay for all beds except psychiatric into the mix of bed types and the within part and showing that nearly all of it is within, and confirming in numbers that the table value for long-term care beds uses a different formula and recounting it with the common formula.**

1. Notation and question

- **Common formula**: average length of stay = inpatient days ÷ (average of new admissions and discharges).

- **Flow share**: each bed type's (average of new admissions and discharges) ÷ their sum.
- **Mix part and within part**: average length of stay for all beds except psychiatric = Σ (flow share × average length of stay by type). The difference between two years is split into the part from changes in flow shares (mix) and the part from changes in average length of stay by type (within), weighting by the average of the two years. The two sum exactly to the difference.

Question: Did average length of stay become shorter because flows shifted to bed types with shorter stays, or because stays shortened within the same types?

Observation 1.1: M009 showed that "average length of stay" is the average of the flow of people discharged, which differs from the average of the people in hospital on a given day, and reproduced the Hospital Report's average length of stay from the common formula within 0.048 days. This paper applies the same formula by bed type and splits what is inside the fall.

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2. Preview and design

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

	Content
Tables	Hospital Report 2024, national volume, trend Tables 2 (inpatient days), 3 (new admissions), 4 (discharges), and 8 (average length of stay) (by bed type, 15 years from 1984 to 2024), and the glossary in the notes for users
Noticed in the preview	The common formula reproduced the table values for all beds, general, tuberculosis, and infectious disease beds, but missed widely for long-term care beds. I obtained the glossary and confirmed that long-term care beds use a different formula with transfers between beds in the denominator
Noticed in the preview (2)	The year labels for Heisei 5 (1993) and Reiwa 5 (2023) are both just "5." Years were assigned by row order
Noticed in the preview (3)	The stock plan also lined up the number of beds, but this paper covers only length of stay (the tables of bed numbers are not used)
Comparison	History of average length of stay (table values), all beds except psychiatric (common formula), the 2005–2024 mix and within parts, and the two formulas for long-term care beds

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3. Data and checks

Calculation 3.1 The 5 retrieved files were fixed by SHA-256, and the following were checked.

- Tables 2, 3, 4, and 8 have the same 15 year rows (1984–2024) and bed-type columns.
- The largest difference over 15 years between the common formula and the table's average length of stay is 0.048 for all beds, 0.043 for general, 0.049 for tuberculosis, and 0.049 days for infectious disease beds (the table is rounded to 0.1 day).
- For long-term care beds, common formula − table value runs from 72.4 days in 1996 to 27.5 in 2024, at least 20 days in all 11 years. The glossary gives, under "for long-term care beds, the following formula," a formula whose denominator adds patients transferred from and to other bed types in the same medical institution. The check first failed because I miscounted the years with table values as 10 (there are 11).

4. History of average length of stay

Calculation 4.1 Average length of stay (table values, days)

Year	All beds	General beds	Long-term care beds	All beds except psychiatric (common formula)
1984	54.6	39.7		40.98
1996	43.7	32.8	152.6	33.89
2005	35.7	19.8	172.8	28.05
2014	29.9	16.8	164.6	23.45
2020	28.3	16.5	135.5	22.13
2024	25.6	15.5	117.4	20.27

Observation 4.2: **The average length of stay for all beds fell from 54.6 days in 1984 to 25.6 in 2024 (0.469-fold), falling in 13 of the 14 transitions. It rose only from 2017 to 2020 (28.2 → 28.3 days). General beds fell from 39.7 to 15.5 days (0.390-fold).** The gap between all beds and all beds except psychiatric is 13.64 days in 1984, 7.68 in 2005, and 5.37 in 2024.

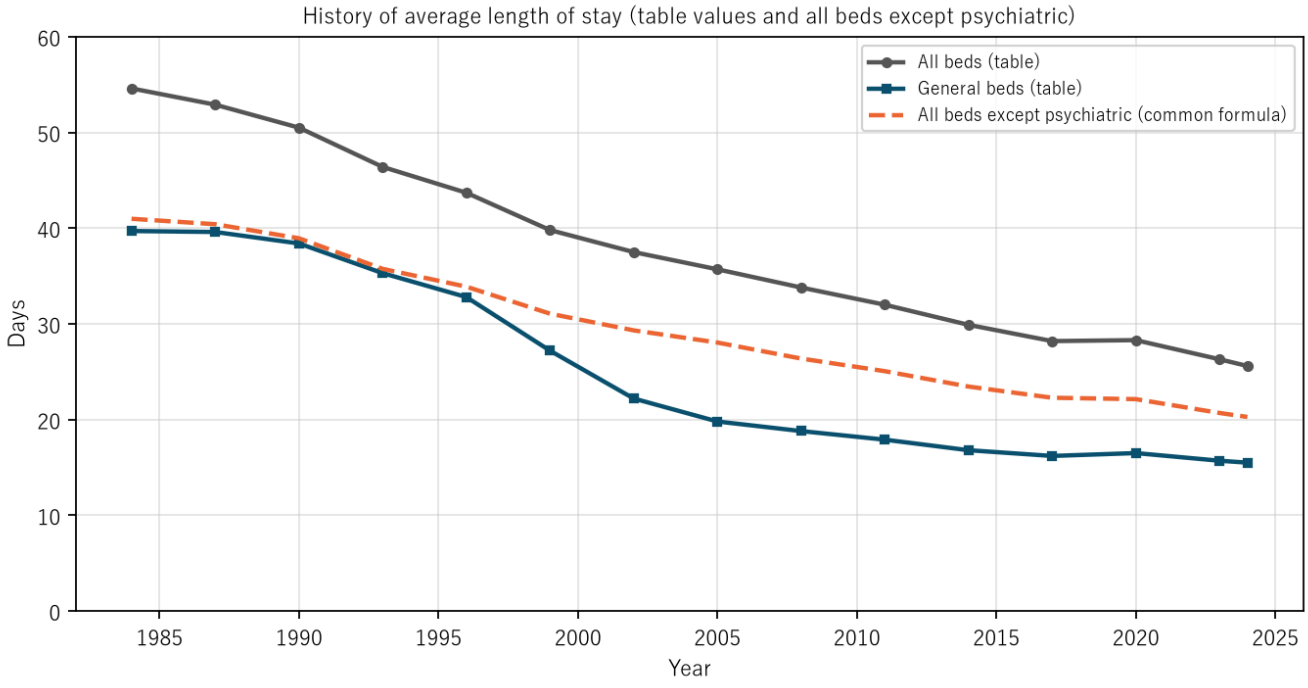


Figure 1: History of average length of stay. Grey is all beds (table), navy general beds (table), and the orange dashed line all beds except psychiatric (common formula).

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5. The core — mix part and within part

Calculation 5.1 All beds except psychiatric (2005 → 2024)

Bed type	Flow share 2005	Flow share 2024	ALOS 2005 (common formula)	ALOS 2024 (common formula)	Within part (days)
General	0.9613	0.9623	19.8	15.5	-4.13
Long-term care	0.0366	0.0366	241.9	144.9	-3.55
Tuberculosis	0.0020	0.0004	71.9	49.4	
Infectious disease	0.0001	0.0006	9.8	9.2	

Observation 5.2: **The average length of stay for all beds except psychiatric fell by 7.77 days, from 28.05 to 20.27. The mix part is −0.07 days and the within part −7.71 days; nearly all of it is shortening within the same types.** Flow shares hardly moved: general beds 0.9613 → 0.9623, long-term care beds 0.0366 → 0.0366. Of the within part, general beds account for −4.13 days, long-term care beds for −3.55, and tuberculosis and infectious disease beds together for −0.03. Applying 2005 stays to 2024 flow shares gives 27.97 days; applying 2024 stays to 2005 flow shares gives 20.33.

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6. The two formulas for long-term care beds

Calculation 6.1 Average length of stay for long-term care beds

Year	Common formula (days)	Table value (days)	Table ÷ common	Transfer share of the denominator implied by the table
2005	241.9	172.8	0.714	0.286
2014	219.1	164.6	0.751	0.249
2024	144.9	117.4	0.810	0.190

Observation 6.2: **The table value for long-term care beds puts transfers from and to other bed types within the same hospital into the denominator, so it comes out shorter than the common formula: 117.4 days against 144.9 in 2024, and 172.8 against 241.9 in 2005. The transfer share of the denominator implied by the table fell from 0.286 to 0.190.** Dividing the 2024 general-bed value of 15.5 days by the long-term care value gives 0.1320 with table values but 0.1070 with the common formula. Comparing table values compares two values from different formulas.

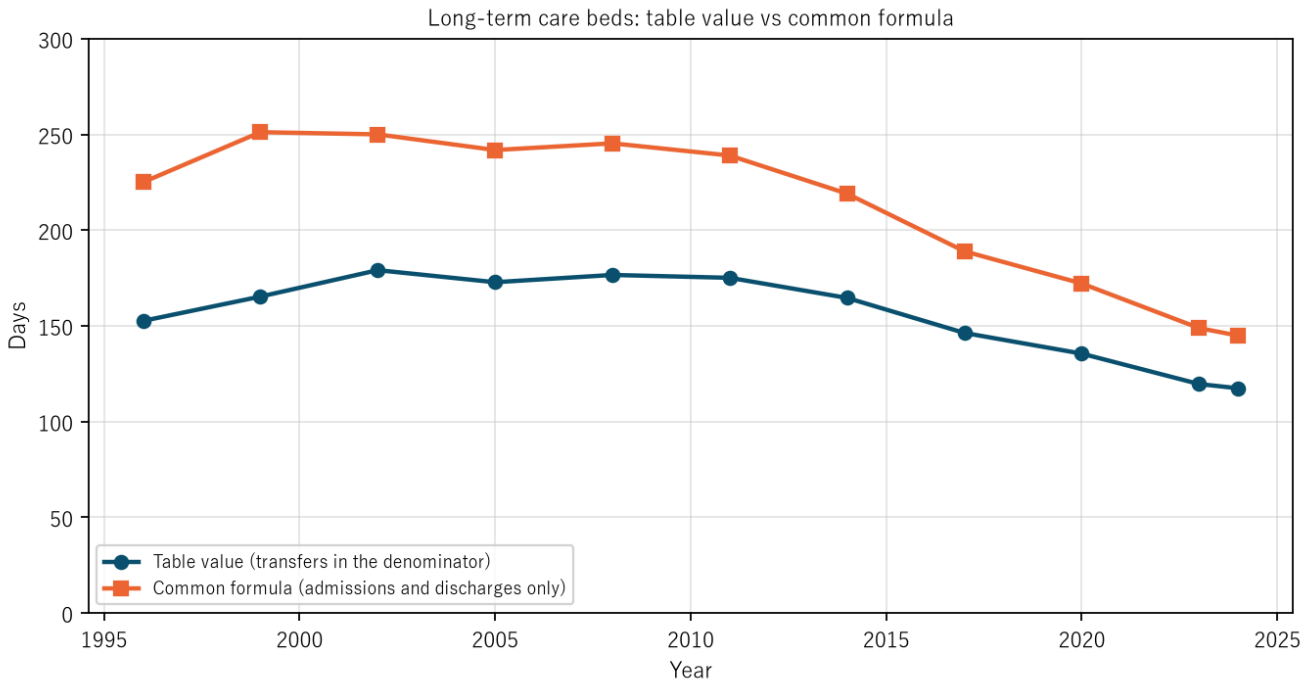


Figure 2: Average length of stay for long-term care beds. Navy is the table value (transfers in the denominator); orange is the common formula (admissions and discharges only).

7. Limitations

1. **Why stays shortened within the same types cannot be separated with these tables.**
2. The split into mix and within parts is one choice, weighting by the average of the two years. The composition within each bed type (hospital type, patient age, etc.) is not examined.
3. The split starts in 2005 because the classification of long-term care and general beds was in transition until 2002; no split running through from 1984 is made.
4. Psychiatric beds are a held-back field and are touched only as a gap, not examined separately. The tables of bed numbers are not used.
5. The paper does not judge whether stays are long or short, or evaluate the number of beds, the health care system, or policy.

Conclusion

The average length of stay for all beds fell from 54.6 days in 1984 to 25.6 in 2024. Splitting the 7.77-day fall from 2005 to 2024 for all beds except psychiatric, the mix of bed types accounted for −0.07 days and shortening within the same types for −7.71. The table value for long-term care beds uses a different formula with transfers between beds in the denominator; recounted with the common formula, 2024 was 144.9 days rather than 117.4.

What separates them is one thing — whether flows shifted to other bed types or stays shortened within the same type.

When you hear "hospital stays have become shorter," **check together whether it is about bed types replacing each other or stays shortening within the same type — and which formula the table value comes from.**

Data and reproduction

Data	Hospital Report 2024, national volume, trend Tables 2, 3, 4, and 8, and the glossary in the notes for users (Ministry of Health, Labour and Welfare, e-Stat) (retrieved 26 September 2026)
Terms of use	e-Stat follows the Government of Japan Standard Terms of Use (Version 2.0). The average length of stay by the common formula and the split in this paper were processed from it and are not numbers produced by the government
Coverage	Japan, hospitals, 15 years from 1984 to 2024, bed types (general, long-term care, tuberculosis, infectious disease; psychiatric only as a gap)
Verification	`検算/M094.py` (`--zu` also draws the figures). Every number in the text is taken from `検算/M094_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/M094_zu1`, `図/M094_zu2` (png, svg, English versions)

References

- Ministry of Health, Labour and Welfare. Hospital Report 2024, national volume, trend Tables 2, 3, 4, and 8, and glossary in the notes for users (in Japanese). e-Stat (accessed 26 September 2026). https://www.e-stat.go.jp/
- Yamagishi, Y. (2026). "Average Length of Stay" Is the Average of the People Who Are Discharged [M009]. Zenodo. https://doi.org/10.5281/zenodo.22965052