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Trends in the integration of medical corporation hospitals in Japan: a national wide longitudinal study between 2017 and 2021

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Abstract

Background Medical corporations, which are non-profit organizations that aim to operate hospitals, clinics, or long-term care facilities, account for more than half of all hospital beds and play a central role in the health care system in Japan. However, limited analysis of hospital integration has been performed. Examining the hospital integration trends of medical corporations can provide valuable insights for optimizing health care delivery and resource allocation in Japan. This study conducted a comprehensive analysis of trends in the hospital integration of medical corporations and market concentration in Japan using nationwide longitudinal data.

Methods This longitudinal study evaluated the hospital integration of medical corporations in Japan between 2017 and 2021 using medical corporation financial data provided by the Neostage Company. The target population was medical corporations that own hospitals in Japan. The primary outcomes were the horizontal and vertical integration of medical corporation hospitals. Horizontal integration was defined as the integration of two or more hospitals within the same corporation, while vertical integration was defined as the integration of a hospital with different types of health care facilities, such as clinics or long-term care facilities, within a single medical corporation. The Herfindahl–Hirschman Index (HHI) was calculated to measure hospital market concentration using hospital bed data for medical corporations in all prefectures.

Results The number of hospitals and hospital beds within medical corporations decreased from 5,670 to 848,174 in 2017 to 5,486 and 814,462 in 2021, respectively. Both horizontal and vertical integration among medical corporation facilities showed a gradual upward trend, increasing from 24.92% to 55.75% in 2017 to 26.92% and 59.42% in 2021, respectively. The mean (standard deviation [SD]) HHI increased slightly from 262.7 (178.6) in 2017 to 275.2 (187.9) in 2021, with rural areas being more concentrated than urban areas, although both remained unconcentrated.

Conclusions This longitudinal study revealed a gradual downward trend in the number of hospitals and hospital beds owned by medical corporations, while horizontal and vertical integration gradually progressed without any

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particular medical corporation dominating the market. These findings are expected to contribute to policymaking efforts aimed at providing optimal health care services in Japan.

Keywords Hospital integration, Horizontal integration, Vertical integration, Health care

Background

Medical corporations (“Iryohoujin” in Japanese) are non-profit organizations established under the Medical Care Act (“Iryou Hou” in Japanese) [1]. These entities are founded with private capital but operate as strictly non-profit organizations. Their primary purpose is to own and manage various healthcare facilities, including hospitals, clinics, and long-term care facilities [1]. Since its establishment in 1950, the number of medical corporations has grown, and they have played an important role in supporting Japan’s health care system. Japan achieved universal health coverage in 1961, a milestone that significantly reduced the financial burden of medical costs on the population and greatly improved access to hospital care [2]. This led to a surge in demand for medical services, outpacing supply. Consequently, the number of hospitals increased dramatically from 6,094 in 1960 to 9,608 in 1985, with the majority of this growth occurring within medical corporations [3]. However, the rapid expansion of hospital beds soon led to concerns about oversupply in many regions and rising medical expenditures. To address these issues, the Japanese government implemented several key policy changes. The first revision of the Medical Care Act in 1985 introduced restrictions on opening new hospital beds, which were implemented at the prefectural level in 1989 [4]. As a result, policies were established to calculate a standard number of hospital beds per prefecture, aiming to control the uneven distribution of hospital beds across regions. These regulatory measures have contributed to a gradual downward trend in the number of hospital beds nationwide, while simultaneously encouraging more efficient use of existing healthcare resources.

In 2022, medical corporations owned 5,658 hospitals (69.4% of the total) and 834,330 hospital beds (55.9% of the total) [3]. In contrast, national and public hospitals accounted for 18.6% of the total number of hospitals (3.9% national, 14.7% public) and 29.0% of the total number of hospital beds (8.3% national, 20.7% public), indicating that these three types of entities dominate the hospital landscape in Japan [3]. While the management of national and public hospitals is determined by government policy, the same authority does not work for medical corporations, which would need to be guided by policy. To contain health care costs and optimize resource allocation in the face of a declining birth rate and an aging population in Japan, adjustments to the entire health care system, including medical corporations, are crucial [5]. Therefore, understanding the

management trends within medical corporations is essential for policymaking.

Hospital integration has become an important strategy for hospital management to reduce costs and standardize care through horizontal integration between hospitals and vertical integration between hospitals and different levels of health care facilities [6]. In recent decades, both horizontal and vertical integration have accelerated rapidly in the United States [7–9], leading to the emergence of giant health care systems and “Integrated Delivery Networks” [10]. On the other hand, concerns have been raised about reduced competition due to market dominance by integrated health care hospitals [11]. In Japan, where the opening of new hospital beds is legally regulated by the first revision of the Medical Care Act in 1985 [1], integration becomes necessary for medical corporations to increase their scale and bed capacity. According to the Organization for Economic Co-operation and Development (OECD), Japan has one of the highest numbers of hospitals and hospital beds in the world [12], and reducing these numbers through integration is a major policy goal to promote health care cost reduction and optimal resource allocation [5].

To evaluate the effectiveness of past policies and develop the next policy to establish an optimal health care system in Japan, it is essential to understand current trends in the hospital integration of medical corporations. The Ministry of Health, Labour and Welfare (MHLW) reports aggregate data on hospitals by entity, which shows a decline in the number of hospitals and hospital beds owned by medical corporations after peaking in 2017. This could be due to a combination of factors: a simple reduction in the total number of hospitals and hospital beds and integration leading to aggregation. However, the Ministry’s publicly available data lack individual-level data for medical corporations, making it difficult to assess integration and market concentration. A previous nationwide study reported that horizontal integration accounted for 22.1% of hospitals and 28.1% of beds in 2011, with increases of 4.7% and 5.1%, respectively, over the 10-year period [13]. Another study showed that 23.1% of medical corporation hospitals were integrated with long-term care facilities in 1996 [14]. These previous studies conducted up to the 2010s demonstrated a steady progression of both horizontal and vertical integrations among medical corporations from the 1990s to the early 2010s. The Japanese healthcare landscape has undergone significant changes since these studies were conducted, including the Long-Term Care

Insurance System in 2000 [15], the Community-based Integrated Care System around 2010 [16], and the revisions to medical and nursing fees in 2018 [17, 18]. These policy changes have likely influenced the strategies and operations of medical corporations. However, no comprehensive analysis of medical corporation hospital integration has been conducted since the early 2010s, leaving a significant gap in our understanding of recent trends.

The present study aimed to analyze horizontal and vertical integration among medical corporation hospitals using individual hospital-level data. By examining the most recent five-year period, we tried to understand recent trends and make predictions about future integration. We also measured the market concentration of medical corporation hospitals and observed competition among them.

Methods

Study design

This longitudinal study examined trends in the integration of hospitals owned by medical corporations in Japan. Given that this study solely utilized medical corporation data, it was exempt from institutional review board approval and participant consent requirements, in accordance with the Ethical Guidelines for Medical and Health Research Involving Human Subjects that belongs to the MHLW in Japan. This study adhered to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guidelines [19].

Setting

This study was conducted in Japan and focused on the landscape of medical corporation hospitals between 2017 and 2021.

Data source

The data for this study were derived from Medical Corporate Financial Data provided by The Neostage Company, a company that supports the collection and analysis of corporate information and data processing [20]. Under the Medical Care Act, medical corporations are required to submit annual financial statements and details of the owned facilities to each prefectural government [1], and the reports are compiled annually into a database by The Neostage Company. This database covers 95% of all medical corporations in Japan and provides comprehensive information on various characteristics of medical corporations, including facility types (hospital/clinic/long-term care facility/other), board of directors and executive officers, geographic address, number of beds, and financial statements, including balance sheets and profit and loss statements. The database does not contain information except for medical corporations, such as national, public,

or individual hospitals. We collected data from this database for five years, from 2017 to 2021.

Study population

The target population of the study was medical corporations operating hospitals in Japan. According to the Medical Care Act, a medical corporation is a non-profit association or foundation that incorporates the relevant facility that aims to establish a hospital, clinic, or long-term care facility [1]. The types of facilities owned by medical corporations were classified into four categories according to the Medical Care Act [1] and Long-Term Care Insurance Act [21] as follows:

- Hospital: a place where physicians provide health care, with inpatient facilities for 20 or more patients.
- Clinic: a place where physicians provide health care, with no inpatient facilities or with inpatient facilities for 19 or fewer patients.
- Long-term care facility: a place that provides medical care, including nursing and medical supervision and assistance with activities of daily living, for elderly persons in need of care, with a resident physician required on staff.
- Other: a place that does not fall into any of the three categories above but provides services related to health and social welfare. Examples include community-based residential services, short-term stay service facilities, day care service centers and in-home service providers.

Of the medical corporations, we narrowed the target population to medical corporations that own hospitals and examined how they own hospitals, clinics, long-term care facilities, and others within their corporations.

Outcome measures and definitions

The following variables were extracted from the database: the name of the medical corporation, the classification of the facility (including hospitals, clinics, long-term care facilities, and others), the name of the facility, the geographic address of the facility, and the number of hospital beds. According to the OECD definition, hospital beds are all available beds, including psychiatric and special beds, but excluding operating tables, stretchers, closed beds, temporary beds or beds in long-term care facilities [22]. Horizontal integration was defined as the integration of two or more hospitals under a single medical corporation, while maintaining their individual operational structures (Fig. 1) [10]. Vertical integration, on the other hand, was defined as the integration of a hospital with different types of health care facilities, including clinics, long-term care facilities, or others, under a single medical corporation (Fig. 1) [10]. We assessed the integration

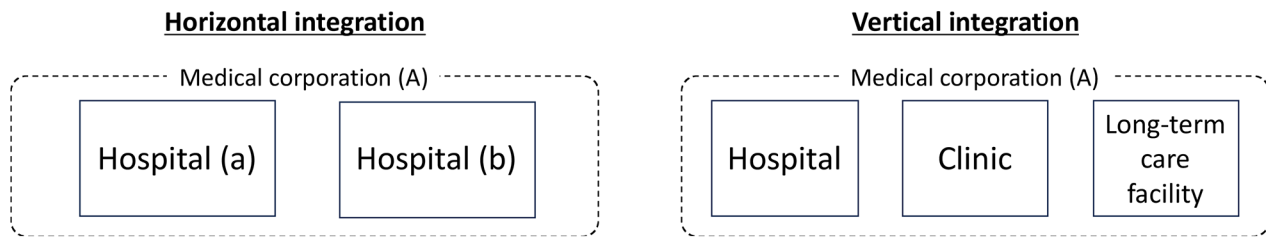


Fig. 1 Schema of horizontal and vertical integration

Table 1 Characteristics of medical corporation with hospital

	Year									
	2017		2018		2019		2020		2021	
	No.	%	No.	%	No.	%	No.	%	No.	%
Total medical corporation	4791		4748		4692		4623		4545	
Total facility	10,138		10,142		10,220		10,374		10,250	
Hospital	5670	55.93	5658	55.79	5634	55.13	5569	53.68	5486	53.52
Clinic	2368	23.36	2355	23.22	2394	23.42	2500	24.10	2401	23.42
Long-term care facility	2011	19.84	2031	20.03	2007	19.64	2012	19.39	1972	19.24
Other	89	0.88	98	0.97	185	1.81	293	2.82	391	3.81
Hospital beds	848,174		850,572		840,904		828,400		814,462	

status of each medical corporation annually over the five-year study period.

Statistical analysis

We described the integration of hospitals within medical corporations each year over the period from 2017 to 2021 using numerical counts and percentages (%). We categorized medical corporation hospitals into horizontal and vertical integration groups and analyzed trends in the number of hospitals and hospital beds within each integration type annually. In addition, the Herfindahl–Hirschman Index (HHI) [23] was calculated to measure hospital market concentration using hospital bed data for medical corporations in all prefectures, such as Tokyo and Hokkaido. We calculated the HHI at the prefecture level because new hospital openings and bed restrictions are determined at the prefecture level by the Medical Care Act and prefectural governments play a significant role in healthcare planning and resource allocation in Japan [1]. This variable is the sum of the squared market share of each medical corporation in each prefecture multiplied by 10,000. According to the guidelines, markets were classified as highly concentrated if their HHI exceeded 2500, moderately concentrated if their HHI fell between 1500 and 2500, unconcentrated if their HHI fell between 100 and 1500, and highly competitive if their HHI was below 100 [24]. An increase in the HHI of less than 100 points is also classified as a small change in concentration [24]. All analyses were conducted between December 2023 and March 2024 using R (version 4.3.1; R Foundation for Statistical Computing, Vienna, Austria).

Results

Medical corporation trends

Supplementary Fig. 1 shows the study flow diagram. The total number of medical corporations included in hospitals was 4,791 in 2017, 4,748 in 2018, 4,692 in 2019, 4,623 in 2020 and 4,545 in 2021. Table 1 shows the owned facilities and hospital beds of medical corporations with hospitals. Both the number of hospitals and the number of hospital beds owned by medical corporations exhibited a downward trend from 5,670 to 848,174 in 2017 to 5,486 and 814,462 in 2021, respectively.

Horizontal and vertical integration of medical corporation hospitals

Table 2 illustrates the trends in horizontal integration of hospitals within medical corporations from 2017 to 2021. In 2017, 4,257 medical corporations operated without horizontal integration, while 534 engaged in horizontal integration (as shown in the top column of Table 2). Among these 534 corporations, 389 owned two hospitals, and 82 owned three hospitals. While the absolute number of medical corporations with non-horizontal integrations decreased from 4,257 in 2017 to 4,009 in 2021, their proportion remained relatively constant at approximately 88% throughout the five-year period. Among horizontal integrations, medical corporations comprising two hospitals constituted the dominant group. Notably, corporations with more than ten hospitals remained scarce, representing less than 0.2% of the total. The proportion of hospitals and hospital beds covered by horizontal integrations increased steadily from 24.92% to 31.55% in

Table 2 Horizontal integration in medical corporation hospitals

	Year									
	2017		2018		2019		2020		2021	
	Number of medical corporations									
	n = 4791		n = 4748		n = 4692		n = 4623		n = 4545	
	No.	%	No.	%	No.	%	No.	%	No.	%
Medical corporation without horizontal integration										
Stand-alone hospital	4257	88.85	4202	88.50	4145	88.34	4084	88.34	4009	88.21
Medical corporation with horizontal integration	534	11.15	546	11.50	547	11.66	539	11.66	536	11.79
Number of owned hospitals										
2	389	8.12	398	8.38	393	8.38	386	8.35	381	8.38
3	82	1.71	80	1.68	85	1.81	80	1.73	84	1.85
4	31	0.65	33	0.70	33	0.70	36	0.78	35	0.77
5	11	0.23	12	0.25	8	0.17	9	0.19	10	0.22
6	6	0.13	7	0.15	11	0.23	9	0.19	5	0.11
7	2	0.04	3	0.06	4	0.09	6	0.13	8	0.18
8	5	0.10	6	0.13	4	0.09	3	0.06	3	0.07
9	4	0.08	3	0.06	3	0.06	4	0.09	4	0.09
12					1	0.02	1	0.02	1	0.02
14	1	0.02			1	0.02				
15	1	0.02	2	0.04	2	0.04	3	0.06	3	0.07
19	1	0.02	1	0.02						
20					1	0.02				
23							1	0.02	1	0.02
36	1	0.02								
41			1	0.02						
47					1	0.02			1	0.02
48							1	0.02		
	Number of hospitals									
	n = 5670		n = 5658		n = 5634		n = 5569		n = 5486	
	No.	%	No.	%	No.	%	No.	%	No.	%
Medical corporation without horizontal integration	4257	75.08	4202	74.27	4145	73.57	4084	73.33	4009	73.08
Medical corporation with horizontal integration	1413	24.92	1456	25.73	1489	26.43	1485	26.67	1477	26.92
	Number of hospital beds									
	n = 848,174		n = 850,572		n = 840,904		n = 828,400		n = 814,462	
	No.	%	No.	%	No.	%	No.	%	No.	%
Medical corporation without horizontal integration	580,536	68.45	575,286	67.64	564,216	67.10	551,909	66.62	539,617	66.25
Medical corporation with horizontal integration	267,638	31.55	275,286	32.36	276,688	32.90	276,491	33.38	274,845	33.75

2017 to 26.92% and 33.75% in 2021, respectively (in the middle and bottom column of Table 2).

Table 3 demonstrates the trends in vertical integration. In 2017, 2,509 medical corporations operated without vertical integration, while 2,282 implemented vertical integration (as indicated in the top column of Table 3). Of these 2,282 corporations, 763 integrated hospitals with clinics, and 859 combined hospitals with long-term care facilities. The proportion of medical corporations without vertical integrations declined from 52.37% in 2017 to 48.98% in 2021. Looking at the types of vertical

integration, the most common configurations were combinations of hospitals and long-term care facilities, hospitals and clinics, and a trifecta of hospitals, clinics, and long-term care facilities. Similar to horizontal integration, the share of hospitals and hospital beds within vertically integrated entities showed a gradual upward trend from 55.75% to 60.79% in 2017 to 59.42% and 63.76% in 2021, respectively (in the middle and bottom column of Table 3).

Table 3 Vertical integration in medical corporation hospitals

	Year														
	2017			2018			2019			2020			2021		
	Number of medical corporations														
	n = 4791			n = 4748			n = 4692			n = 4623			n = 4545		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Medical corporation without vertical integration															
Stand-alone hospital	2509	52.37	2470	52.02	2398	51.11	2293	49.60	2226	48.98					
Medical corporation with vertical integration	2282	47.63	2278	47.98	2294	48.89	2330	50.4	2319	51.02					
Hospital/Clinic	763	15.93	747	15.73	758	16.16	740	16.01	711	15.64					
Hospital/Long-term care health facility	859	17.93	862	18.16	806	17.18	772	16.70	735	16.17					
Hospital/Other	26	0.54	29	0.61	56	1.19	107	2.31	143	3.15					
Hospital/Clinic/Long-term care health facility	602	12.57	603	12.70	581	12.38	555	12.01	532	11.71					
Hospital/Clinic/Other	7	0.15	11	0.23	22	0.47	33	0.71	43	0.95					
Hospital/Long-term care health facility/Other	15	0.31	20	0.42	55	1.17	75	1.62	98	2.16					
Hospital/Clinic/Long-term care health facility/Other	10	0.21	6	0.13	16	0.34	48	1.04	57	1.25					
Number of hospitals															
n = 5670			n = 5658		n = 5634		n = 5569		n = 5486						
No.			No.		No.		No.		No.						
%			%		%		%		%						
2509	44.25	2470	43.66	2398	42.56	2293	41.17	2226	40.58						
3161	55.75	3188	56.34	3236	57.44	3276	58.83	3260	59.42						
Number of hospital beds															
n = 848,174			n = 850,572		n = 840,904		n = 828,400		n = 814,462						
No.			No.		No.		No.		No.						
%			%		%		%		%						
332,541	39.21	329,580	38.75	315,021	37.46	302,038	36.46	295,121	36.24						
515,633	60.79	520,992	61.25	525,883	62.54	526,362	63.54	519,341	63.76						

Hospital market concentration

Figure 2 and Supplementary Table 1 show the trend of hospital market concentration in medical corporations between 2017 and 2021, by prefecture. The mean (standard deviation [SD]) HHI increased slightly from 262.7 (178.6) in 2017 to 275.2 (187.9) in 2021 (Supplementary Table 1). Regional areas such as Tottori, Shimane, Ishikawa, and Yamagata had higher HHIs (dark red in Fig. 2) than did urban areas such as Tokyo, Fukuoka, Osaka, and Saitama (light red in Fig. 2). The HHIs in all regions remained below 1,000, indicating moderate market concentration according to the HHI thresholds (unconcentrated; 100 to 1500). Only Yamagata showed an increase in HHI above 100 from 2017 to 2021, and the average change in HHI across all regions during this period was 12.5 (27.2).

Discussion

Principal findings

This study provides a comprehensive analysis of the five-year trends in the integration of medical corporation hospitals in Japan based on a nationwide dataset. While the number of hospitals and hospital beds owned by medical corporations has declined, both horizontal and vertical integration have increased slightly as a percentage of the total. The horizontal integration rates remain relatively modest, with the majority of medical corporations operating only one or two hospitals. In contrast, vertical integration accounts for approximately half of the total, indicating a more pronounced presence. While hospital market competition within medical corporations

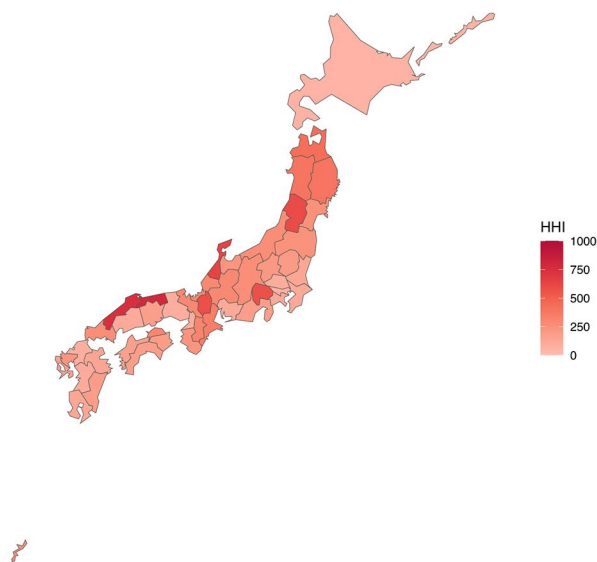
is somewhat more concentrated in rural areas than in urban areas, the overall level of concentration is not significant.

Comparison with other studies

Previous studies on the integration of medical corporation hospitals in Japan are very limited. According to a comprehensive national survey of medical corporations, 17.4% of the total 5,533 hospitals and 23.6% of the total 811,961 hospital beds in medical corporations were horizontally integrated in 2002, which increased to 22.1% of the total 5,712 hospitals and 28.7% of the total 851,918 hospital beds in 2011 [13]. Although the databases were different, our study showed that 26.92% of the total 5,486 hospitals and 33.75% of the total 814,462 hospital beds in 2021, suggesting that horizontal integration has progressed very slowly but steadily over these 20 years. On the other hand, regarding vertical integration, a national survey of prefectures, hospitals, and long-term care facilities by telephone and letters in 1996 reported that 23.1% of the total 4,367 medical corporation hospitals were integrated with long-term care facilities [14]. Although the databases and definitions were different, our study showed the total integration including hospitals and long-term care facilities 31.3% of all 4,545 corporations in 2021 (Table 3), suggesting that the type of vertical integration has been increasing from about 20–30% for 25 years.

Assuming that health care systems are different, we compared the trends in health care systems in the U.S. with the results of the present study. The United States

2017



2021

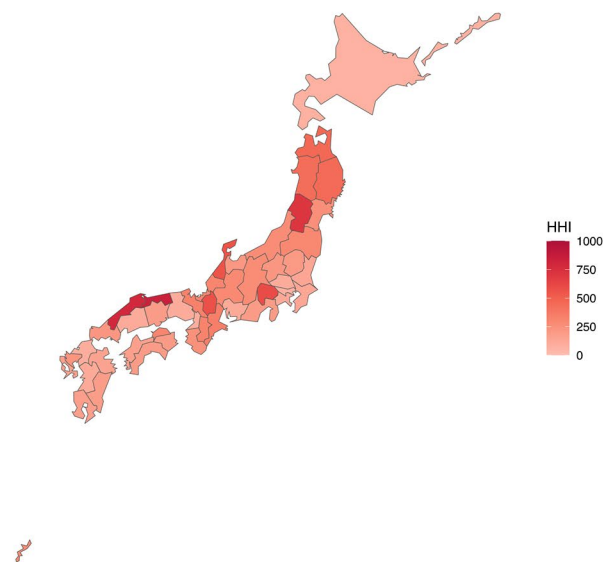


Fig. 2 Hospital concentration in medical corporations across Japan between 2017 and 2021. Abbreviation: HHI, Herfindahl-Hirschman Index

stands out as having the most extensive reports on trends in health care systems. Over the past few decades, health care in the United States has undergone rapid integration [7, 8], with vertical integration reportedly outpacing horizontal integration in recent years [9]. The extent of integration is substantial, with nearly half of the hospital referral regions in the United States reported to be in a highly concentrated state, with HHI values exceeding 2,500 in 2011, indicating highly concentrated conditions [7]. Comparing the level of integration of the health care system in the U.S. with our study, both horizontal and vertical integration have developed very slowly in Japan, and the HHI is less than 1000 in all regions, indicating a much lower level of integration than in the U.S. When comparing integration trends internationally, it's crucial to consider how vertical integration is defined in each context, particularly regarding which facility types are included. This study, similar to previous comparisons between the United States and England [25], demonstrates that the differences between healthcare systems can be so substantial that direct comparisons may not yield meaningful insights for policymaking in either country. Instead, these comparisons serve to highlight the extent to which healthcare systems are shaped by country-specific factors. Moving forward, discussions on healthcare integration should focus on the unique aspects of its system, including the role of medical corporations, regulatory frameworks, and cultural factors that influence healthcare delivery and management. This approach will likely yield more relevant and actionable insights for policymakers and healthcare leaders in each country.

Mechanisms and implications

Based on the findings of this analysis, it is evident that Japan's health care system stabilized four decades after the initial revision of the Medical Care Act in 1985, which imposed restrictions on hospital beds [1]. While the total number of hospitals and hospital beds has gradually declined, there has been steady progress in horizontal and vertical integration. This trend toward integration, especially vertical integration, can be largely attributed to changes in the delivery system for medical and long-term care services for elderly people due to population aging and low birth rates, as well as to policy implementation. The 1985 amendment to the Medical Care Act prohibited the establishment of new hospital beds [1], compelling medical corporations to pursue horizontal integration as the only means of expanding their scale. Subsequently, the revision of the Health and Medical Service Act for the Aged (now Retitled Act on Assurance of Medical Care for Elderly People) in 1986 led to the establishment of geriatric health care facilities [26], and the Ten-Year Strategy to Promote Health Care and Welfare for the

Elderly (the so-called "Gold Plan") policy of the 1990s promoted the establishment of welfare facilities [27], marking the beginning of vertical integration unique to Japan. With the introduction of the Long-Term Care Insurance System in 2000, the integration of medical and nursing care services began, leading to the development of vertical integration involving hospitals and long-term care facilities [15]. In approximately 2010, the Community-based Integrated Care System, which aimed at providing "housing, medical care, nursing care, prevention, and life support" at the regional level, was introduced, further promoting vertical integration [16]. Moreover, the 2018 revisions to medical and nursing fees provided incentives for collaboration between medical and nursing services, further encouraging vertical integration [17, 18]. These developments are believed to have led to the distinctive patterns of horizontal and vertical integration observed in Japan.

As the aging population and low birth rate are expected to continue, gradual progress in the integration of medical corporation hospitals is expected in the future. These findings can serve as a valuable reference point for policymakers when considering desirable health care delivery systems for medical corporations in the future. If further integration is deemed beneficial, a re-evaluation of existing policies and the implementation of new initiatives may be warranted.

Strengths and limitations of the study

This study has several notable strengths. First, this study used a comprehensive database of Japanese medical corporations to conduct a thorough analysis of recent trends, indicating for the first time that such research has been disseminated in English. This facilitates the global dissemination of trends within Japan's health care system, enables comparative analysis with health care systems in other countries, and promotes seamless academic communication with researchers and policymakers worldwide. Second, the study used individual-level data from medical corporations to analyze health care services at the corporate level. The existing data from the MHLW are aggregated data that only show trends in the number of hospitals and hospital beds for medical corporations as a whole. By analyzing at the level of medical corporations, horizontal and vertical integration among medical corporations can be identified, allowing for microlevel trend analysis.

This study has several limitations. First, although our data have a coverage rate of approximately 95%, they do not include all medical corporations for analysis. However, since the trend in the number of hospitals and beds is almost consistent with the publicly available data from the MHLW, the dataset is considered sufficient for conducting broad trend analyses. Second, since the data are

not derived from public sources, the reliability of the data is not guaranteed due to possible cases of missing data or errors. Nevertheless, because the data have been used by universities and financial institutions [20], despite their limitations, they are currently the most relevant data for analyzing medical corporations in Japan. Third, although the analysis is conducted at the level of individual medical corporations, it does not extend to larger groups of medical corporations. For example, although the top two companies, “Iryohojin Tokushukai” and “Iryohojin Okinawa Tokusyukai,” are different medical corporations, they both belong to the same conglomerate. For a more detailed examination of interfirm cooperation in the health care sector, future research may require analysis at a broader conglomerate level. Fourth, the HHI calculated in this study solely examines the concentration among medical corporations, not including national and public hospitals. As a result, it does not capture the entire hospital market in Japan. Although this measure may not strictly represent the overall market concentration, the interpretation that it reflects a certain level of concentration within the market occupied by medical corporations, which account for approximately 55% of the market share and have remained relatively stable over the past five years, can be considered valid. Fifth, this study did not evaluate the potential impact of integration on outcomes such as quality of care or improvements in health care costs. To fully assess the advantages and disadvantages of integration, an analysis of the associated changes in relevant outcomes is needed. In this regard, future research plans include incorporating quality of care and financial performance data into the existing database for further analysis.

Conclusions

In this longitudinal study to examine trends in hospitals owned by medical corporations in Japan, we have observed a gradual downward trend in the number of hospitals and hospital beds, while horizontal and vertical integration is gradually progressing without any particular medical corporation occupying the market. These results are expected to contribute to policymaking for providing optimal health care services.

Abbreviations

HHI	Herfindahl–Hirschman Index
MHLW	Ministry of Health, Labour and Welfare
OECD	Organisation for Economic Co-operation and Development
STROBE	Strengthening the Reporting of Observational Studies in Epidemiology

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12913-024-11463-5>.

Supplementary Material 1

Acknowledgements

We would like to thank the Institute for Health Economics and Policy for its support in the research grant and the National Institute for Public Health for its support in article publishing.

Author contributions

SF and RG conceived and designed the experiments. SF designed the analytical strategy and analyzed the data. SF prepared the draft manuscript. SF coordinated the whole experiment and was responsible for the overall content as the guarantor. All authors edited and reviewed the manuscript and approved the final version of the manuscript.

Funding

We would thank the Institute for Health Economics and Policy for the support in the research grant and the National Institute for Public Health for their support in language editing fees and article publishing charges.

Data availability

Data are available to appropriate academic parties upon reasonable request to the corresponding author.

Declarations

Ethics approval and consent to participate

Given that this study solely utilized medical corporation data, it was exempt from institutional review board approval and participant consent requirements, in accordance with the Ethical Guidelines for Medical and Health Research Involving Human Subjects that belongs to the Ministry of Health, Labour and Welfare (MHLW) in Japan.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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Received: 9 May 2024 / Accepted: 20 August 2024

Published online: 29 August 2024

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