

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Prevalence and Changes of Low-Value Care at Acute Care Hospitals: A Multi-Center Observational Study in Japan
AUTHORS	Miyawaki, Atsushi; Ikesu, Ryo; Tokuda, Yasuharu; Goto, Rei; Kobayashi, Yasuki; Sano, Kazuaki; Tsugawa, Yusuke

VERSION 1 – REVIEW

REVIEWER	Tim Badgery-Parker Macquarie University
REVIEW RETURNED	13-Apr-2022

GENERAL COMMENTS	<p>This is a well-conducted and well-written study of the prevalence and trends in low-value care in Japan. The method and presentation closely follows previous work from the US and Australia, and adds some additional analyses on factors associated with providing low-value care.</p> <p>It is difficult to know how valid the comparisons in Supplementary Figure 3 are, given differences in indicator definitions, and even denominator (as noted for the Schwartz results). The authors mention a reanalysis, but no details are given to assess exactly what was done to make the different results comparable.</p> <p>In the introduction (p 7 line 33) the authors mention work from North America and a single study from Australia. There is also a study from Austria (Sprenger, doi 10.1093/eurpub/ckw080), and I think some work from The Netherlands (although only measuring a few interventions). Furthermore, an Australian study also looked at low-value care in private insurance data (Chalmers, doi 10.1136/bmjopen-2018-024142).</p> <p>I would say private hospitals do play a substantial role in the Australian health system (p 24 line 10). It has often been speculated that low-value care may be higher in private hospitals in Australia than in the public systems.</p>
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REVIEWER	Yuejen Zhao Health Gains Planning, Department of Health
REVIEW RETURNED	17-Apr-2022

GENERAL COMMENTS	<p>Review report Title: Prevalence and Changes of Low-Value Care at Acute Care Hospitals in Japan Journal: BMJ Open Manuscript ID: bmjopen-2022-063171</p>
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	<p>This paper described the volume and trend of low-value care in Japanese acute hospitals. This is an important issue for improving efficiencies in health care services. This paper is well written. Data and analysis appear appropriate. The results are interesting. This paper will contribute to the existing literature. The following points may be helpful for the authors to improve this paper:</p> <ul style="list-style-type: none"> • Readers who are unfamiliar with Japanese health care system may benefit from a brief description of the payment and health insurance systems in Japan.(p6) • Have the authors undertaken data quality assessments including accuracy and completeness? How reliable are the claims data?(p8) • It is unclear how the authors distinguish principle and secondary diagnoses in defining low-value-care.(p8) • It is unclear how the authors costed low-value-care when multiple procedures were delivered within a single admission.(p9) • How did you measure sensitivity and specificity in your study.(p10) • Explain why low-value-care increased with Charlson scores.(p17) Is this plausible? • Why do you think 5% low-value-care is high? What is the basis for this conclusion?(p22) • It is unclear what is the general trend of the low-value-care in total in Japanese acute hospitals.(p23)
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VERSION 1 – AUTHOR RESPONSE

Comments by Reviewer 1 (Dr. Tim Badgery-Parker):

1. *This is a well-conducted and well-written study of the prevalence and trends in low-value care in Japan. The method and presentation closely follows previous work from the US and Australia, and adds some additional analyses on factors associated with providing low-value care.*

Thank you for your positive comment on our manuscript.

2. *It is difficult to know how valid the comparisons in Supplementary Figure 3 are, given differences in indicator definitions, and even denominator (as noted for the Schwartz results). The authors mention a reanalysis, but no details are given to assess exactly what was done to make the different results comparable.*

Thank you for bringing this to our attention. This post-hoc analyses simply compared the prevalence of low-value services by using the method similar to the main analyses but focusing on the same age categories as prior studies. The objective of these comparisons was to explore differences in the scale of low-value care by country. Having said that, we agree with the reviewer’s concern about the comparability of these findings, and to avoid any confusions, we have decided to remove the post-hoc analyses related to Supplementary Figure 3.

3. *In the introduction (p 7 line 33) the authors mention work from North America and a single study from Australia. There is also a study from Austria (Sprenger, doi 10.1093/eurpub/ckw080), and I think some work from The Netherlands (although only measuring a few interventions). Furthermore, an Australian study also looked at low-value care in private insurance data (Chalmers, doi 10.1136/bmjopen-2018-024142).*

Thank you for sharing the information on relevant literature. These have been cited in the introduction section of our revised manuscript (page 6, paragraph 2).

“Outside of North America, studies have been conducted in Australia [11–13] and Austria [14], but these studies focused only on inpatient services provided in hospitals. There is another study from the Netherlands [15], but this study evaluated only three diagnostic services.”

4. I would say private hospitals do play a substantial role in the Australian health system (p 24 line 10). It has often been speculated that low-value care may be higher in private hospitals in Australia than in the public systems.

Thank you for sharing the information on Australian healthcare system. To address this issue, we have removed the relevant statement regarding the description of the role played by private hospitals in Australian healthcare system in our revised manuscript. Furthermore, the role of private hospitals is a topic for further research in Japan as well as in Australia, and we have included such discussions in the paper (page 23, paragraph 2).

“Do to the lack of data, other provider-level characteristics including hospital ownership, location, and teaching status, were not assessed in the current study. Further studies are needed to evaluate structural hospital characteristics associated with the provision of low-value care. For example, private hospitals, which account for approximately 80% of total hospitals in Japan [66], may have stronger incentives to provide profitable health services, including low-value services.”

Comments by Reviewer 2 (Dr. Yuejen Zhao):

1. This paper described the volume and trend of low-value care in Japanese acute hospitals. This is an important issue for improving efficiencies in health care services. This paper is well written. Data and analysis appear appropriate. The results are interesting. This paper will contribute to the existing literature. The following points may be helpful for the authors to improve this paper:

We appreciate a positive review of our manuscript.

2. Readers who are unfamiliar with Japanese health care system may benefit from a brief description of the payment and health insurance systems in Japan.(p6)

This is an excellent point. As suggested, we have added a description of the payment and health insurance system in Japan as follows (page 7, paragraph 3).

“Setting

We first briefly describe the health insurance and payment system in Japan. Japan has achieved universal health coverage in 1961 [18]. Japanese residents are legally obligated to purchase one of the health insurance programs that consist of the employment-based health insurance, residence-based health insurance (for non-elderly self-employed and unemployed

people), or age-based health insurance program (for individuals aged 75 years or older). The scope of benefits covered by these health insurance programs is standardized among insurers by the government, including inpatient and outpatient care, dental care, physical rehabilitation, home health care, and prescriptions. Regardless of the healthcare services provided, the coinsurance rate is the same for all insurers (e.g., adults younger than 70 years pay 30% without deductibles, and including a catastrophic coverage provision [19]). The payment method by which insurers pay acute care hospitals differs between outpatient and inpatient care. Outpatient care is reimbursed under the fee-for-service (FFS) system. Among the costs of inpatient care, hospital fees (bed charges) are paid by the insurers under the per-diem reimbursement (a fixed amount per inpatient day, according to diagnosis categories, under a mechanism known as Diagnosis Procedure Combination [DPC]), although the costs of expensive surgeries and therapeutic or diagnostic procedures are exempted and paid through the FFS system.”

3. Have the authors undertaken data quality assessments including accuracy and completeness? How reliable are the claims data?(p8)

We used the database created by Medical Data Vision (MDV) Co, Ltd to conduct this research. MDV have conducted the quality assessments. To clarify this point, we added a description on the details of how they controlled the quality of database in the Appendix of our revised manuscript. Furthermore, as for the completeness and accuracy of the MDV claims data, a study using physician medical record review as the gold standard in two hospitals participating in the MDV database reported that MDV claims data were able to identify cases of malignant tumors and severe infections with good positive predictive value and sensitivity.

(Supplementary Method 1 in the Appendix)

“The MDV claims database used in this study was collected in two steps. First, all the electronic claims data accumulated in target acute care hospitals are sent to the MDV after de-identification. Since electronic claims data are recorded for billing purposes in Japanese hospitals, all patients treated at a given hospital are included in the data. Then, they are imported into the database by data managers. Quality assessments of the data accuracy are performed as follows:

(a) Systematic errors during data registration at the hospital (e.g., errors due to changes in the in-hospital system) are checked and corrected after confirmation with the hospital.

(b) All claims data, including inpatient, outpatient, and prescription claims, are automatically investigated for abnormal values by comparing those to the previous month, the same month of the previous year. When an abnormal value is found, the data manager confirms it with the target hospital and request the hospital to resubmit the data if there is an error in the submitted data.

(c) Diagnosis and drug names are standardized into the International Classification of Diseases, Tenth Revision (ICD-10), and the Anatomical Therapeutic Chemical code using the master files. For disease names that have not been coded (freely described disease names), a uniquely developed matching dictionary between disease names and ICD-10 codes is applied and coded.

As for the completeness and accuracy of the MDV claims data, a study using physician medical record review as the gold standard in two hospitals participating in the MDV database reported that MDV claims data were able to identify cases of malignant tumors and severe infections with good positive predictive value and sensitivity.¹”

1. Nishikawa A, Yoshinaga E, Nakamura M, et al. Validation study of algorithms to identify malignant tumors and serious infections in a Japanese administrative healthcare database. *Annals of Clinical Epidemiology* 2022;4:20–31. doi:10.37737/ace.22004

4. *It is unclear how the authors distinguish principle and secondary diagnoses in defining low-value-care.(p8)*

We apologize if this was unclear in our original submission. We did not distinguish between principal and secondary diagnoses when using ICD-10 diagnosis codes because the flag of principal diagnosis in Japanese claims data is known to be unreliable (sometimes a certain disease is designated as the principal diagnosis even though it is not actually the principal diagnosis). We added this information in the Method section (page 10, paragraph 3).

“We did not distinguish between principal and secondary diagnoses when using *ICD-10* diagnosis codes because the flag of principal diagnosis in Japanese claims data is unreliable.”

5. *It is unclear how the authors costed low-value-care when multiple procedures were delivered within a single admission.(p9)*

When multiple low-value services were performed in a single hospitalization, we added up the costs of those services; when two low-value surgeries were performed, we counted the cost of the two surgeries. It should be noted here that we only included the cost of services identified as low value when an inpatient received low-value care, not all the costs of the hospitalization (e.g., when an inpatient received a low value surgery, we only included the cost of the surgery, not all the costs of the hospitalization associated with that surgery). This is because it is difficult to completely distinguish which services are associated with the low-value service in interest and which are not. This method of calculation may lead to an underestimation of the cost of low-value care, but we took this approach in order to be conservative. We added the following sentence in the Method section (page 12 paragraph 1).

“When multiple low-value services were performed in a single hospitalization, we added up the costs of those services.”

6. *How did you measure sensitivity and specificity in your study.(p10)*

As the reviewer might be aware, we were not actually calculating sensitivity and specificity, since the gold standard for low-value care was not available for this study. Rather, this expression implies that if such a gold standard had been available, the narrower definition would have shown lower sensitivity and higher specificity than the broader definition.

We have made that clear in the main text (page 10, paragraph 3).

“...we specified two versions of each measure: a broader definition and a narrower definition. First, we created the broader definition to include all low-value care at the risk of misclassifying appropriate care. By adding some criteria to this broader definition, we next created the narrower definition to minimize the misclassification of appropriate care instead of overlooking some low-value care. Although the gold standard for low-value care was not available in this study, if such a gold standard had been available, the narrower definition would have shown lower sensitivity and higher specificity than the broader definition.”

7. *Explain why low-value-care increased with Charlson scores.(p17) Is this plausible?*

Overall, the low-value care use increased as Charlson’s score increased, as indicated by the reviewer. However, we would like to note that when focusing on individual services (Table 3), the association with Charlson’s score was inconsistent across services. This finding was in line with a study conducted in Canada (McAlister et al., 2017). We suspect that the overall results may be driven by the estimates for the most common low-value services, such as antibiotics use for common cold and serum T3 level testing. For example, in the case of antibiotics for the common cold, physicians may be more defensive to patients who have more complications (given the age and gender are the same) and, as a result, may be more likely to prescribe unnecessary antibiotics. We highlighted these points in the text (page 23, paragraph 2).

“Patient characteristics such as age, gender, and Charlson’s score were associated with the risk of receiving low-value care. For example, in the case of antibiotics for the common cold, physicians may be more defensive to patients who have more complications and, as a result, may be more likely to prescribe unnecessary antibiotics. Akin to a previous study in Canada, however, the associations with age and Charlson’s score was inconsistent across services.”

8. *Why do you think 5% low-value-care is high? What is the basis for this conclusion?(p22)*

Thank you for pointing this out. We found 16,863 (narrower definition)–25,815 (broader definition) patients (4.9%–7.5%) out of 345,564 patients treated in the 242 hospitals received at least one low-value service. Given the facts that our analytic sample was 5% sample, and that

our analytic hospitals accounted for 11% of all discharges from acute care hospitals in Japan, simple extrapolation indicates that more than 3 million ($16,863 \times 20 \times 100 / 11$) patients experienced low-value care across all Japanese acute care hospitals in a given year. We believe this figure is considered large, given we only focused on 33 low-value services. We added this discussion in the main text (page 21, paragraph 1).

“Using large-scale hospital claims data, we found that patients seeking care in Japan commonly received low-value care, with one in 20 patients (16,863/345,564) using at least one low-value service in FY2019, even when applying narrower definitions of only 33 low-value services. Given the facts that our analytic sample was a 5% sample, and that our analytic hospitals accounted for approximately 11% of all discharges from acute care hospitals in Japan, simple extrapolation indicates that more than 3 million patients experienced low-value care across all Japanese acute care hospitals in a given year.”

9. It is unclear what is the general trend of the low-value-care in total in Japanese acute hospitals.(p23)

This is an important suggestion. We analyzed overall trends of low-value care (31 continuously measurable low-value services) in Japanese acute care hospitals. We found no evidence of clearly decreasing trend in total during 2015–2019. We added the results in the main text.

(Abstract)

“Overall, there was no clear trend in the prevalence of low-value services between 2015 and 2019.”

(page 18, paragraph 1)

“Overall, there was no clear trend in the prevalence of low-value services between 2015 and 2019. The total number of low-value episodes per 1,000 patients decreased slightly when using the narrower definition (annual average percentage change, -2.0%; 95% confidence interval [CI], -3.4% to -0.6%; $P = 0.02$) (Figure 1 and Supplementary Table 4). However, there was no clear trend when using the broad definition (annual average percentage change, +0.6%; 95% CI, -1.6% to +2.8%; $P = 0.45$).”

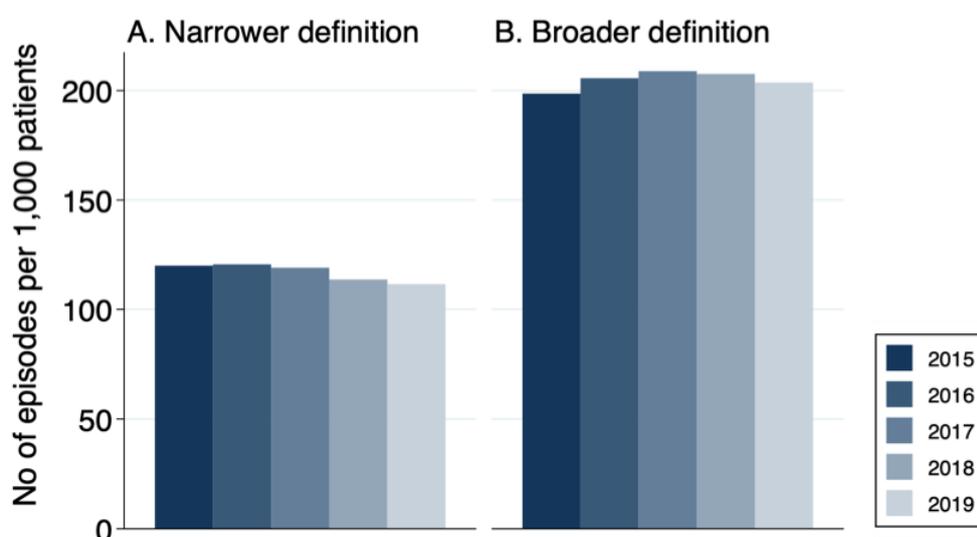
(page 22, paragraph 1)

“As a whole, there was no evidence of a clear decline in the prevalence of low-value services in Japanese acute care hospitals between 2015 and 2019, despite the increasing awareness of low-value care and its associated harms in Japan [53,54]. This is similar to the findings in the US, which showed that low-value care use remained similar or declined only slightly over time even after the Choosing Wisely campaign [55–57], although the measurement methods, timing, and target population were different.”

(page 25, paragraph 2)

“The overall trend in low-value care use remained similar or declined only slightly over time, despite increasing awareness of waste of health care spending in Japan.”

Figure 1. Total number of low-value episodes per 1,000 patients: fiscal year 2015 to 2019.



Among the 33 identified low-value services, we evaluated the aggregated number of 31 low-value services that were measurable throughout the period, except for bone mineral testing (measurable from FY2017) and breast MRI (measurable from FY2016).

VERSION 2 – REVIEW

REVIEWER	Tim Badgery-Parker Macquarie University
REVIEW RETURNED	08-Aug-2022
GENERAL COMMENTS	This looks good. No further concerns.
REVIEWER	Yuejen Zhao Health Gains Planning, Department of Health
REVIEW RETURNED	17-Jul-2022
GENERAL COMMENTS	Thanks