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ORIGINAL ARTICLE

Reasons for encounters, diagnoses, and admission rate among emergency referrals at an urban primary care clinic in Japan: A retrospective cohort study

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Abstract

Background: Comprehensive understanding of emergency referrals (EmR), encompassing reasons for encounters (RFEs) and diagnoses, is crucial for primary care physicians (PCPs). Comparing EmR rates and subsequent admission rates can potentially enhance the quality of primary care for EmR practice. However, no study has evaluated RFEs among patients with EmRs. This study aimed to identify RFE/diagnosis in relation to subsequent admission among patients receiving EmR.

Methods: We conducted a retrospective cohort study at an urban family physician teaching clinic in Kawasaki City, Japan. Our cohort recruited consecutive EmR episodes with their medical records and admissions confirmed through response letters from receiving hospitals. Using the 2nd edition of the International Classification of Primary Care, we explored the frequency of RFEs and diagnoses, calculating EmR rates and admission rates as primary outcomes. Bivariate analyses were employed to compare admission and non-admission cases.

Results: The present study encompassed 162 EmR episodes out of 47,901 visits, yielding an EmR rate of 3.38/1000 visits. Among 153 completely followed episodes, 99 patients were emergently admitted, resulting in a 64.7% admission rate. The admission group exhibited significantly higher age and a greater prevalence of dementia. Descriptive analysis revealed fever and pneumonia as the most frequent RFE and diagnosis, respectively, with significant differences between admission and non-admission groups.

Conclusions: The present study reports EmR and admission rates following EmR, highlighting differences in patient characteristics, RFEs, and diagnoses. The findings offer insights to enhance PCPs' EmR practices and serve as a benchmark for the scope of EmR practice.

KEYWORDS
diagnosis, emergencies, episode of care, primary health care, referral and consultation, triage

1 | INTRODUCTION

Primary health care plays a vital role in healthcare systems.[1] One of its essential functions is to serve as an initial triage at a point of entry.[1] Primary care physicians (PCPs) should refer patients with emergency conditions such as stroke, myocardial infarction, and sepsis to advanced healthcare facilities promptly, to avoid undertreatment. It is crucial for PCPs to triage emergency patients, considering that in the United Kingdom (UK), 40%–70% of emergency admissions were referred from general practitioners (GPs).[2] Nevertheless, some studies have reported delayed diagnosis and referral in primary care settings.[3–5] Understanding the characteristics of patients who require emergency referrals (EmRs) enables PCPs to triage and refer those patients appropriately. Therefore, to avoid referral delays and undertreatment, the characteristics should be understood by PCPs.

Few studies have examined the EmR rate from PCPs and the characteristics of EmRs.[6] Although a qualitative study described GPs' decision making about referrals for emergency hospital admissions, the study did not provide information on the EmR rate, patient characteristics, and diagnoses leading to EmRs.[2] Reasons for encounters (RFEs) in primary care settings have been studied frequently,[7–9] however, to our knowledge, no study has evaluated RFEs among patients with EmRs.

Referral rates from PCPs to specialists are one of the critical quality indicators in primary care.[10] Although there is no "correct" referral rate,[10] providing comparisons could be meaningful as a starting point for quality improvement in primary care practices. Similarly, given that the EmR rate is recognized as an indicator of the functioning of the health care service system in the UK,[11] it can also serve as a quality indicator in primary care practices. EmRs necessitate greater appropriateness than elective referrals, as EmRs can impose additional burdens on specialist services and potentially result in prolonged wait times for patients in need of urgent care. Although a prior study has reported that the referral rate was an inadequate indicator of referral appropriateness,[12] EmRs resulting in hospital admissions can be deemed appropriate, as hospital specialists recognized the immediate need for hospital admission subsequent to the referral. In fact, the need for inpatient care after the referral has been utilized to measure its appropriateness in recent research.[13] Therefore, combining EmR rates with hospital admission rates subsequent to EmRs may enable the comparison of the quality of care for EmRs among primary care practices.

To help PCPs to refer patients with emergency conditions promptly, it is crucial to understand the characteristics, RFEs, and diagnoses of EmRs. In addition, the EmR rate and admission rate following EmR can serve as valuable indicators of quality in primary care, enabling meaningful comparisons. Therefore, this study aimed to identify RFEs/diagnoses in relation to subsequent admission among the patients receiving EmR; moreover, it described the incidences of EmR and admission following EmR.

2 | METHODS

2.1 | Design and setting

This was a retrospective cohort study conducted at a family physician teaching clinic located in an urban area within the greater Tokyo region (Kawasaki City), Japan. The population of Kawasaki City was approximately 1.5 million in 2017, with 20.1% of the population aged ≥65 years, which is lower than the national average of 27.7% in 2017. Within a 5-km radius of the clinic in the city, there are four secondary care hospitals and one tertiary care university hospital.

The clinic operates from 9:00 a.m. to 5:00 p.m., with extended hours until 8:00 p.m. on one weekday; however, it does not provide out-of-hours (OOH) medical services. The clinic's medical staff consists of physicians, nurses, medical assistants, clinical laboratory technologists, and radiologic technologists. Family physicians and family medicine residents provide primary care, while part-time specialists, including two internists, one orthopaedist, two gynecologists, and one breast surgeon, also provide specialist care at the clinic. As the clinic is part of a family medicine residency program, one to three family medicine residents are in training during the 3-year period at the clinic. Although PCPs have seen patients of all ages, genders, and health conditions, the patient population is biased toward the elderly, with 67.9% of patients being aged ≥60 years and only 2.4% being <15 years old during the period of April 1, 2016 to March 31, 2017.

Regarding diagnostic tests performed at the clinic, same-day results were available for X-rays, electrocardiograms (ECGs), urinalyses, rapid antigen detection tests (group A streptococcus, adenovirus, and influenza), urine beta human chorionic gonadotropin, blood glucose, and troponin *T* tests. However, same-day results were not available for ultrasounds, Holter ECGs, and most blood tests. As the clinic lacks computerized tomography (CT) or magnetic resonance imaging (MRI) facilities, these tests were performed for patients at other medical institutions. In addition, the clinic did not stock suture materials; therefore, patients requiring suturing were referred by PCPs, despite their possessing necessary suturing skills. Prior to all EmRs, the staff obtained approval of acceptance from the receiving hospitals via telephone, and subsequently directed the patients to designated departments, such as the emergency department (ED) or specialist outpatient department, within those hospitals.

2.2 | Participants

In this study, an EmR was defined as a referral from a primary care clinic to an advanced care hospital on the same day as the patient's visit to the primary care clinic. Since it was difficult to define patients requiring EmR, we included all patients who underwent EmRs by PCPs and considered patients admitted after EmRs as those requiring EmR. All EmR episodes from April 1, 2016 to March 31, 2018, were evaluated. Information on response letters from receiving

hospitals was extracted from the electronic medical records of the clinics through March 31, 2019.

This cohort study comprised episodes of patients' visits with EmRs. To focus the triage function at the clinic, we excluded episodes of EmRs among patients receiving home visit care. We included patients who; although did not undergo EmR at the initial visit, had EmR during follow-up due to continuous symptoms. The cohort was followed up retrospectively from the time of EmRs until the reception of response letters from the receiving hospitals. For cases where the receiving hospitals did not send response letters to the clinic, follow-up ended on March 31, 2019. When the same patient was referred more than once for EmR, each EmR was considered as one episode of visit.

2.3 | Measurements

The first author retrospectively reviewed patient data and response letters in the clinic's electronic medical records. The measurements included age (years), sex (female/male), Charlson Comorbidity Index (CCI) score,[14] smoking status (never, former, or current), subsequent hospital admission (existent/non-existent), RFE, and diagnosis. Hospital admission was defined as the presence of a description of hospital admission in the response letter from the receiving hospital. In cases where there were no response letters or no description of hospital admission in the letters, admission was defined as the presence of a description of hospital admission in the clinic's electronic medical records (such as a description of the patient's mention or a phone call from the receiving hospital clerk). The following situations were deemed as hospital admission: death immediately after the patient arrival at the hospital and patients who refused to adhere to the hospital specialists' admission decision. RFEs and diagnoses in all patients were coded by the first author using the International Classification of Primary Care, second edition (ICPC-2), an accepted and reliable mode of classifying RFEs in primary health care.[15] In addition, the numbers of RFE and diagnosis by each of the ICPC-2 chapters were counted as continuous variables. We adopted diagnoses written in response letters as the diagnoses of EmRs. If multiple diagnoses were written in the letters, we adopted all of them to avoid bias. The inclusion of symptom diagnoses was not excluded as code. Additionally, in cases where no response letter was received, the diagnosis was categorized as "unknown."

2.4 | Statistical analysis

The following analyses were conducted to compare the admission and the non-admission groups. Continuous variables were compared using the Student's *t*-test for parametric data or the Wilcoxon rank-sum test for non-parametric data. Categorical and binary variables were compared using the Fisher's exact test. The Wilcoxon rank-sum test was also used to compare ordinal variables. The Cochran–Armitage test[16,17] for trend across ordered groups was specifically employed to examine the association between CCI scores and the admission, which in this case was whether the admission rate increased or decreased with the CCI score increased. Given the exploratory nature of this research, we did not perform sample size estimation. Furthermore, we opted for a complete case analysis. Details of missing values are shown in Table 1.

Statistical analyses were performed using Stata 15.0 (StataCorp. 2017, Stata Statistical Software: Release 15. College Station, TX, USA: StataCorp LLC) and 18.0 (StataCorp. 2023, Stata Statistical Software: Release 18.: StataCorp LLC). Two-tailed *p*-values of <0.05 were considered statistically significant.

2.5 | Ethical approval

This study was approved by the institution Research Ethics Committee (approval number: N/A). Although we did not obtain informed consent from individual patients, we displayed posters as opt-out in the clinic that provided possible subjects with information about the collection and use of their data for this study and guaranteed them opportunities for refusal and the protection of personal information.

3 | RESULTS

3.1 | Descriptive statistics

During the study period, there were 47,901 patient visits at the clinic excluding general health checks and immunizations. After screening, we enrolled 162 episodes of patients' visits with EmRs, which were all referred emergently by PCPs. No part-time specialists referred patients emergently. Only one patient was referred emergently thrice and two patients were referred emergently twice during the period. Of the 47,901 episodes, 162 were referred emergently (3.38/1000 visits: 95% confidence interval 2.88–3.94). Among the EmRs, 94.4% (153/162) were followed up completely, 64.7% (99/153) of whom were admitted emergently. We included six patients who refused admission and one patient who died in the ED of the receiving hospital as admission cases. Details of enrolment are shown in Figure 1. Among the EmRs, the patients were emergently referred to 13 hospitals, including three tertiary care hospitals and 10 secondary care hospitals, both inside and outside of the city. The proportion of the response letters from the receiving hospitals was 91.4% (148/162). Of the 14 episodes that did not have response letters, eight episodes were lost-to-follow-up, and the remaining six were informed of admission or non-admission from electronic medical records at the clinic. Furthermore, due to the absence of diagnostic information, the diagnosis for these 14 episodes without response letters was categorized as "unknown."

The age of patients among the EmRs was distributed between 0 and 98 years old, although approximately 70% of the patients with EmRs were aged ≥65 years. The median (range) numbers of RFE and

TABLE 1 Patient characteristics and comparison between admission and non-admission groups with emergency referrals.

Characteristics	Overall, $n=162$	Admission group, $n=99$	Non-admission group, $n=54$	p-value
Age, median (25th–75th percentile), years	72 (61–82)	77 (65–84)	72 (60–81)	0.012
<18, *n* (%)	11 (6.8)	4 (4.0)	7 (13.0)	
18–64, *n* (%)	38 (23.5)	20 (20.2)	13 (24.1)	
≥65, *n* (%)	113 (69.8)	75 (75.8)	34 (63.0)	
Female sex, *n* (%)	73 (45.1)	43 (43.4)	27 (50.0)	0.74
Smoking, *n* (%)				0.30
Never	53 (32.7)	33 (33.3)	14 (25.9)	
Former	32 (19.8)	17 (17.2)	15 (27.8)	
Current	17 (10.5)	11 (11.1)	5 (9.3)	
CCI score				0.58
Median (25th–75th percentile)	1 (0–2)	1 (0–2)	0 (0–1)	
0, *n* (%)	78 (48.1)	44 (44.4)	30 (55.6)	
1, *n* (%)	29 (17.9)	20 (20.2)	8 (14.8)	
≥2, *n* (%)	50 (30.9)	32 (32.3)	16 (29.6)	
CCI conditions, *n* (%)				
Myocardial infract	10 (6.2)	6 (6.1)	4 (7.3)	0.75
Congestive heart failure	6 (3.7)	5 (5.1)	1 (1.8)	0.42
Peripheral vascular disease	4 (2.5)	2 (2.0)	2 (3.6)	0.62
Cerebrovascular disease	17 (10.5)	12 (12.2)	5 (9.1)	0.60
Dementia	25 (15.4)	20 (20.4)	4 (7.3)	0.037
Chronic pulmonary disease	7 (4.3)	3 (3.1)	4 (7.3)	0.25
Connective tissue disease	4 (2.5)	3 (3.1)	1 (1.8)	1.00
Ulcer disease	11 (6.8)	6 (6.1)	4 (7.3)	0.75
Mild liver disease	10 (6.2)	6 (6.1)	3 (5.5)	1.00
Diabetes	14 (8.6)	8 (8.2)	5 (9.1)	1.00
Hemiplegia	5 (3.1)	3 (3.1)	2 (3.6)	1.00
Diabetes with end organ damage	16 (9.9)	9 (9.2)	6 (10.9)	0.78
Moderate or severe renal disease	1 (0.6)	0 (0)	1 (1.8)	0.36
Any tumor	10 (6.2)	8 (8.2)	2 (3.6)	0.33
Leukemia	0 (0)	0 (0)	0 (0)	N/A
Lymphoma	0 (0)	0 (0)	0 (0)	N/A
Moderate or severe liver disease	0 (0)	0 (0)	0 (0)	N/A
AIDS	0 (0)	0 (0)	0 (0)	N/A
Metastatic solid tumor	0 (0)	0 (0)	0 (0)	N/A
Number of the ICPC-2 codes, median (minimum-maximum)				
RFE	2 (1–4)	2 (1–4)	1 (1–4)	0.11
Diagnosis	1 (1–3)	1 (1–3)	1 (1–2)	0.20

Note: Data missing: Smoking = 61, Charlson Comorbidity Index = 5, Admission = 9, Diagnosis = 14. The CCI score was used in the Cochran-Armitage test for trend as the value itself.

Abbreviations: AIDS, acquired immunodeficiency syndrome; CCI, Charlson Comorbidity Index; ICPC-2, International Classification of Primary Care, Second edition; N/A, not applicable; RFE, reason for encounter.

diagnosis codes per patient were 2 (1–4) and 1 (1–3), respectively (Table 1). As shown in Tables S1 and S2, the visits with EmRs included 55 RFEs and 62 diagnoses. A comparison of admission and non-admission characteristics revealed that the age of patients admitted was significantly higher than that of non-admitted patients. Although the admission rate did not significantly increase as the CCI score increased, the proportion of dementia was significantly higher in admitted patients than in non-admitted patients. There was no significant difference in other characteristics between the two groups.

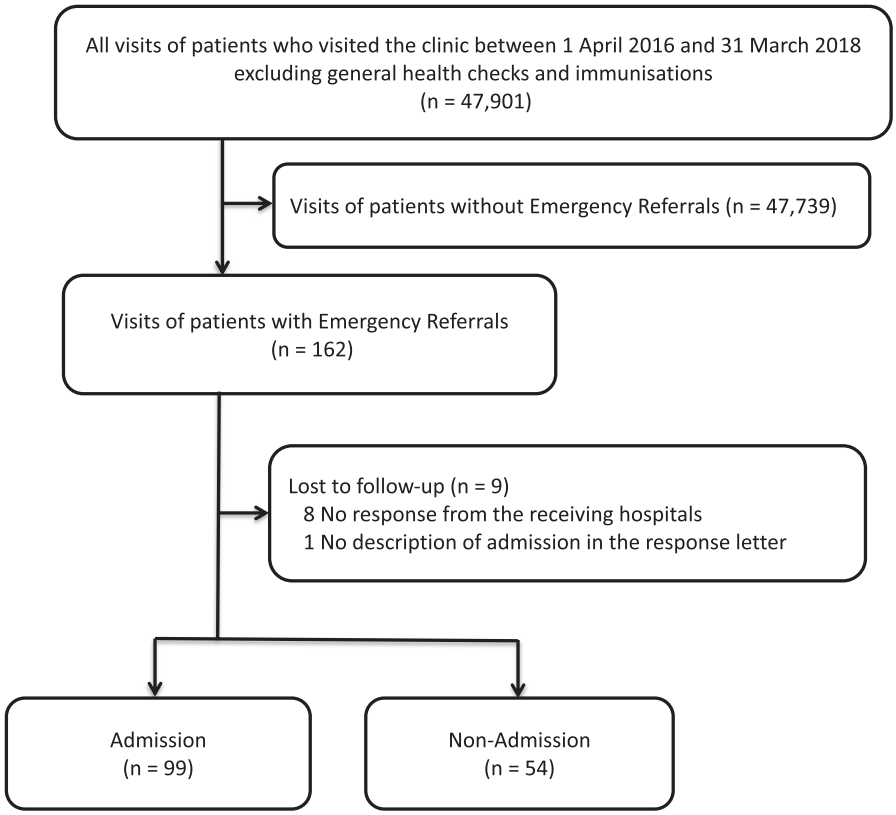

FIGURE 1 Patient flow chart. The selection of study participants was based on the criteria as indicated.

3.2 | Reasons for encounters and diagnoses among EmRs

Figure 2 illustrates the frequency of RFEs and diagnoses using the ICPC-2 chapters as categories. Figure 2A,C was based on the number of persons, whereas Figure 2B,D was based on the number of codes (e.g., if a patient had three codes of the same ICPC-2 chapter, we counted three codes in code-based counting and one person in person-based counting). Among the RFEs for admission, the most frequent ICPC-2 chapter was chapter A (general and unspecified), followed by chapter R (respiratory), (Figure 2A,B). For admission, chapter R (respiratory) was significantly more frequent, and chapter S (skin) was significantly less frequent than non-admission, both based on the number of persons and codes. However, chapter A (general and unspecified) was significantly more frequent in non-admission only based on the number of codes. Table 2 shows the top 10 RFEs for each group. Among admission, the most frequent RFE was fever (A03), followed by loss of appetite (T03), and cough (R05). The proportions of episodes of patients' visits with fever (A03) as RFE based on persons and codes were 35.4% and 17.9%, respectively. For admission, fever (A03) and cough (R05) were significantly more frequent, and abdominal pain localized other (D06) and laceration/cut (S18) were significantly less frequent.

Among the diagnoses of admission, the leading category was chapter R (respiratory), followed by chapter D (digestive), chapter K (cardiovascular), and chapter U (urological) categories (Figure 2C,D). A comparison of admission and non-admission revealed that chapter R (respiratory) for admission was significantly more frequent than that for non-admission, and chapter A (general and unspecified) for non-admission was significantly more frequent than that for admission group. Table 3 shows the top 10 diagnoses for each group. Among admission, the most frequent diagnosis was pneumonia (R81), followed by cholecystitis/cholelithiasis (D91), and appendicitis (D88). Pneumonia (R81) was significantly more frequent for admission, whereas no disease (A91) was significantly more frequent for non-admission. There was no significant difference in the other diagnoses between the two groups. Tables S1 and S2 provide further details on the frequency of RFEs and diagnoses.

4 | DISCUSSION

This study provides insights into the characteristics of EmR in primary care settings in Japan. The EmR rate was 3.38/1000 visits, with 64.7% of EmR cases resulting in hospital admissions. The study underscores the differences in patient characteristics, RFEs, and diagnoses between those admitted following EmR and those not admitted. Specifically, those in the admission group were significantly older, exhibited a higher prevalence of dementia, and showed an increased occurrence of RFEs from the ICPC-2 chapters A (general and unspecified) and R (respiratory) and a decreased occurrence of RFEs from the ICPC-2-chapter S (Skin). Furthermore, they had a higher frequency of diagnoses within chapter R (respiratory) and a lower frequency of diagnoses within chapter A (general and unspecified) compared with the non-admission group. Additionally, two RFEs, fever (A03) and cough (R05), were significantly more frequent among those in the admission group, as was pneumonia (R81).

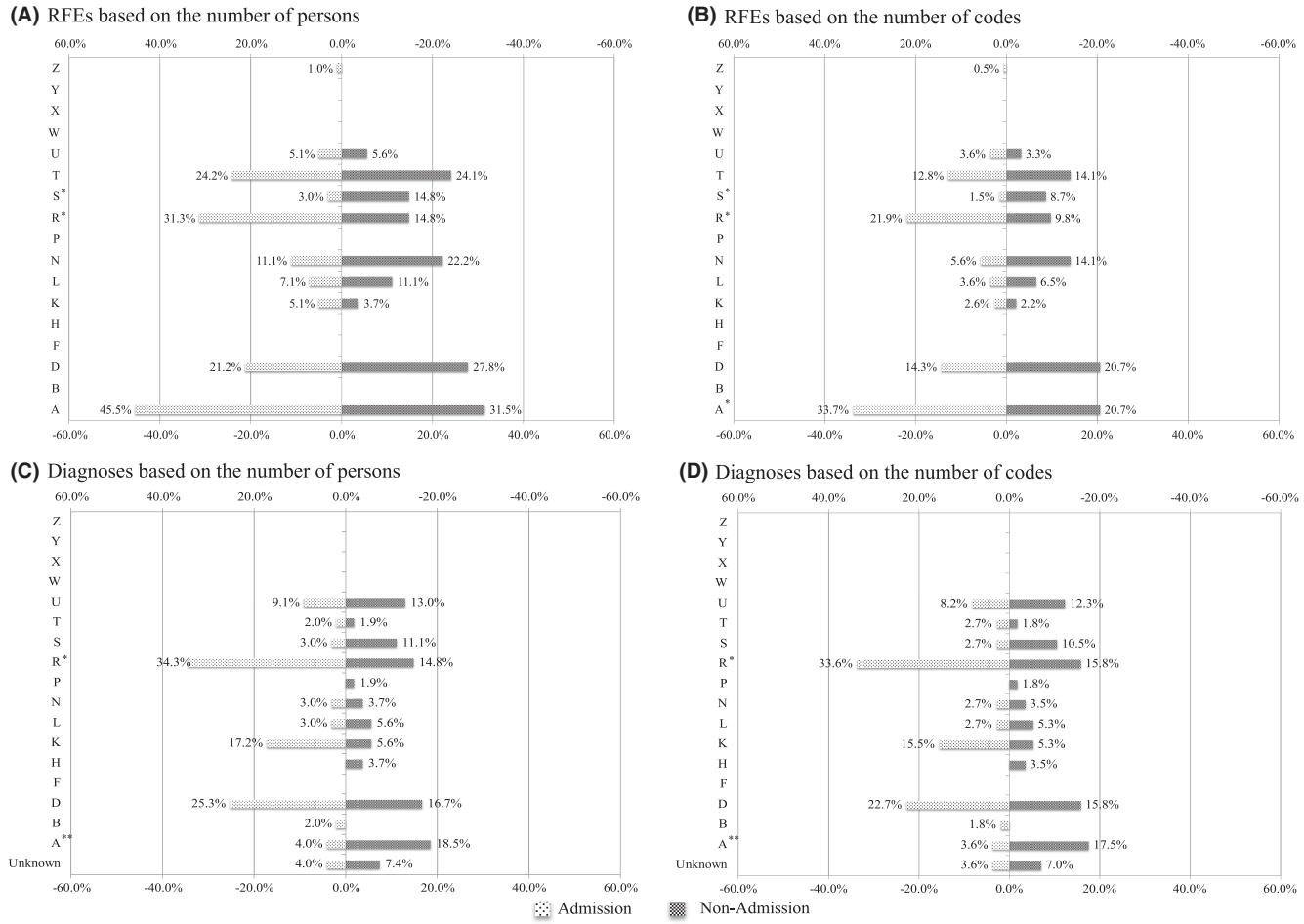

FIGURE 2 Frequency of reasons for encounters and diagnoses using the ICPC-2 chapters. This figure illustrates the frequency of reasons for encounters and diagnoses using the ICPC-2 chapters. Percentages in panels (A) and (C) are calculated based on the number of codes, while those in panels (B) and (D) are calculated based on the number of persons. The ICPC-2 chapters are as follows: A: General and Unspecified; B: Blood, Blood-Forming Organs, and Immune Mechanism; D: Digestive; F: Eye; H: Ear; K: Cardiovascular; L: Musculoskeletal; N: Neurological; P: Psychological; R: Respiratory; S: Skin; T: Endocrine/Metabolic and Nutritional; U: Urological; W: Pregnancy, Childbearing, Family Planning; X: Female Genital; Y: Male Genital; Z: Social Problems. ICPC-2, International Classification of Primary Care, Second edition; RFE, reasons for encounter. $^{*}p < 0.05$, $^{**}p < 0.01$.

4.1 | Comparison of EmR and admission rates across studies

Several studies on EmR rates have been reported from Japan and other countries. Comparison with a study in a Japanese rural area revealed that our EmR rate (3.38/1000 visits) was slightly higher than that of the study (2.04/ 1000 visits) although this study did not provide an admission rate following EmR.[18] In contrast, a retrospective cohort study on an isolated island in Okinawa reported substantially a higher EmR rate of 11.3/1000 visits including OOH referrals and an admission rate following EmR of 89.1%.[19] Similarly, a descriptive study in the Bahamas reported high estimated EmR rates ranging from 8.33 to 13.89/1000 patients across four isolated islands; moreover, this study emphasized the variability in rates even within a specific region.[20] A recent study in Scotland reported a referral rate from in-hours GP practices to acute medicine services of 2.26/100 patient-years and a hospital admission rate of 58.7%.[13] Unfortunately, the EmR rate in this Scottish study cannot be directly compared to our EmR rate due to the difference in denominator. Its admission rate was close to our admission rate of 64.7%. A study of GPs' OOH emergency referrals to hospitals in the UK indicated a higher referral rate of 43.9/1000 consultations.[21] However, a hospital admission rate of 66.0% was not so high compared to in-hours practice in the Scottish study.[21]

These variations in EmR and admission rates across different studies underscore the complexity of the findings. Disparities can be attributed to differences in healthcare systems, geographical conditions, clinical settings (in-hours vs. OOH services), and population characteristics. Moreover, the lack of standardized EmR definitions and inconsistent denominators further complicates direct comparisons. In fact, the Bahamas study revealed significant variations even within the same facility due to an unclear EmR definition.[20] Addressing these challenges emphasizes the need for standardized EmR definitions, consistent data collection methods, and further research to enable meaningful comparisons across different studies.

TABLE 2 Top 10 Reasons for encounters among admission and non-admission groups with emergency referrals using the ICPC-2.

Admission group ($n = 99$)						Non-admission group ($n = 54$)					
Rank	ICPC-2 code	Label	*n*	Proportion of persons	Proportion of codes	Rank	ICPC-2 code	Label	*n*	Proportion of persons	Proportion of codes
1	A03	Fever[†]	35	35.4%	17.9%	1	T03	Loss of appetite	13	24.1%	14.1%
2	T03	Loss of appetite	23	23.2%	11.8%	2	A03	Fever	9	16.7%	9.8%
3	R05	Cough[†]	20	20.2%	10.3%	3	N17	Vertigo/dizziness	7	13.0%	7.6%
4	R02	Shortness of breath/dyspnea	18	18.2%	9.2%	4	R02	Shortness of breath/dyspnea	5	9.3%	5.4%
5	A29	General symptom/complaint other	13	13.1%	6.7%	4	D06	Abdominal pain localized other[†]	5	9.3%	5.4%
6	D15	Melaena	8	8.1%	4.1%	6	A29	General symptom/complaint other	4	7.4%	4.3%
7	D01	Abdominal pain/cramps general	6	6.1%	3.1%	6	D15	Melaena	4	7.4%	4.3%
8	A02	Chills	5	5.1%	2.6%	6	S07	Rash generalized	4	7.4%	4.3%
8	A91	Abnormal result investigation	5	5.1%	2.6%	9	A02	Chills	3	5.6%	3.3%
8	D10	Vomiting	5	5.1%	2.6%	9	R05	Cough	3	5.6%	3.3%
						9	S18	Laceration/cut[†]	3	5.6%	3.3%

Abbreviation: ICPC-2, International Classification of Primary Care, Second edition.

[†]Code differs from the other group at the $p < 0.05$ significance level.

TABLE 3 Top 10 Diagnoses among admission and non-admission groups with emergency referrals using the ICPC-2.

Admission group ($n = 99$)						Non-admission group ($n = 54$)					
Rank	ICPC-2 code	Label	*n*	Proportion of persons	Proportion of codes	Rank	ICPC-2 code	Label	*n*	Proportion of persons	Proportion of codes
1	R81	Pneumonia[†]	17	17.2%	18.7%	1	A97	No disease[‡]	8	14.8%	11.6%
2	D98	Cholecystitis/cholelithiasis	7	7.1%	7.7%	2	D73	Gastroenteritis presumed infection[†]	5	9.3%	7.2%
3	D88	Appendicitis	4	4.0%	4.4%	2	R78	Acute bronchitis/bronchiolitis	5	9.3%	7.2%
3	D99	Disease digestive system, other	4	4.0%	4.4%	4	U70	Pyelonephritis/pyelitis	3	5.6%	4.3%
3	K77	Heart failure	4	4.0%	4.4%	5	A85	Adverse effect medical agent	2	3.7%	2.9%
6	D86	Peptic ulcer other	3	3.0%	3.3%	5	D99	Disease digestive system, other	2	3.7%	2.9%
6	K90	Stroke/cerebrovascular accident	3	3.0%	3.3%	5	H82	Vertiginous syndrome	2	3.7%	2.9%
6	U70	Pyelonephritis/pyelitis	3	3.0%	3.3%	5	L76	Fracture: other	2	3.7%	2.9%
6	U71	Cystitis/urinary infection other	3	3.0%	3.3%	5	R76	Tonsillitis acute	2	3.7%	2.9%
10	K75	Acute myocardial infarction	2	2.0%	2.2%	5	R77	Laryngitis/tracheitis acute	2	3.7%	2.9%
10	K84	Heart disease other	2	2.0%	2.2%	5	R80	Influenza	2	3.7%	2.9%
10	N99	Neurological disease, other	2	2.0%	2.2%	5	R81	Pneumonia	2	3.7%	2.9%
10	R80	Influenza	2	2.0%	2.2%	5	R85	Malignant neoplasm respiratory, other	2	3.7%	2.9%
10	R83	Respiratory infection other	2	2.0%	2.2%	5	R95	Chronic obstructive pulmonary disease	2	3.7%	2.9%
10	R95	Chronic obstructive pulmonary disease	2	2.0%	2.2%	5	S18	Laceration/cut	2	3.7%	2.9%
10	R96	Asthma	2	2.0%	2.2%	5	U71	Cystitis/urinary infection other	2	3.7%	2.9%
10	R99	Respiratory disease other	2	2.0%	2.2%	5	U95	Urinary calculus	2	3.7%	2.9%
10	S70	Herpes zoster	2	2.0%	2.2%						

Abbreviations: ICPC-2, International Classification of Primary Care, Second edition.

[†]Code differs from the other group at the $p < 0.05$ significance level.

[‡]Code differs from the other group at the $p < 0.01$ significance level.

4.2 | Relationship and variation between EmR and admission rates

Aside from our study, there have been limited investigations reporting on the EmR rate and admission rate following EmR. To our knowledge, the only comparable study in Japan to ours was the study from an isolated island in Okinawa,[19] which showed that the EmR rate was approximately 3.3 times higher, and the admission rate following EmR was approximately 1.4 times higher than that of our study. These may be attributed to differences in population characteristics, less bypassing of care to higher medical institutions, and the provision of OOH service in that study of an isolated island. However, relying solely on these two studies can fail to provide meaningful comparisons within Japan. Future studies should focus on measuring and comparing those rates across various regions in Japan to enhance the quality of primary care related to EmR practices.

In contrast, the study in Scotland reported variations in both rates among GP practices.[13] The EmR rates showed a 2.53-fold variation between the 1st and 4th quartiles, and significant variance persisted after adjustment for confounders (2.15-fold). Additionally, the admission rates varied in relation to the EmR rates: the lowest referral quartile had 63.4%, the second referral quartile had 61.6%, the third referral quartile had 59.8%, and the highest referral quartile had a rate of 54.8%. Namely, GP practices with higher EmR rates had lower admission rates following EmR. This result contrasts with elective referrals, where GP practices with higher elective referral rates tended to exhibit higher admission rates.[22,23]

These findings suggest that practices with higher EmR rates may be associated with a higher incidence of inappropriate EmRs, signifying potential issues with the quality of care provided. However, whether similar trends exist in Japan remains to be explored and clarified in future studies in this area in Japan.

4.3 | RFEs and diagnoses among patients requiring EmR

In this pioneering EmR study, direct comparisons with other studies posed challenges. A recent Norwegian study on OOH primary care revealed that a significant proportion of cases were chapter A (general and unspecified) RFEs, particularly in life-threatening cases.[8] Although lacking referral data, we inferred that patients triaged at the red urgency level necessitate EmR, aligning with our findings of chapter A predominance in the admission group. These shared characteristics underscore the heightened prevalence of chapter A (general and unspecified) RFEs (e.g., A03 fever, A06 fainting/syncope, A07 coma, and A11 chest pain not otherwise specified) among patients requiring EmR, emphasizing the importance of PCPs proficiency in managing such cases.

While no previous study has specifically explored the diagnoses of patients requiring EmR using the ICPC, two observational studies in Japanese in-hour general internal medicine departments exhibited similarities with our study.[24,25] Diagnoses under chapters R (respiratory) and D (digestive) were among the most frequent in all three studies, consistently.[24,25] Notably, the top diagnoses in our study (i.e., R81 pneumonia, D86 peptic ulcer other, R80 influenza, R96 asthma, and R99 respiratory disease other) also ranked high in previous studies, indicating their frequent occurrence.[24,25] PCPs should be adept in managing these conditions, especially pneumonia (R81), which emerged as the most frequently diagnosed condition requiring EmR in our study. Additionally, findings from earlier studies revealed that patients with dementia who visited EDs exhibited higher admission rates than those without dementia, with pneumonia being the primary reason for ED visits and a leading cause of patient mortality;[26] this aligns with the findings from our study. Therefore, it may be reasonable to consider lowering the threshold for EmR for older patients with dementia, as they are more likely to require inpatient care and face an elevated risk of mortality due to pneumonia.

4.4 | Study strengths

To the best of our knowledge, this is the first study to describe RFEs and diagnoses of EmRs using the ICPC-2 and to report the EmR rate and admission rate following EmR in an urban primary care setting in Japan.

4.5 | Study limitations

Our study has few limitations. This study was conducted at a single clinic in an urban area of Japan, and the study population was biased toward the elderly, which may limit the generalizability of the findings. However, the study can serve as a benchmark for the scope of EmRs and represent a significant first step in comparing primary care practices in Japan. Therefore, our study results have the potential to serve as a valuable foundation for future research in this field. Second, we intended to collect information on the variables that have potential as indicators of patient severity, like body temperature, pulse rate, percutaneous oxygen saturation, respiratory rate, and the Japan Coma Scale. However, we could not use these data due to the significant number of missing values. Third, Japan has no gatekeeping system,[27] and the primary care clinic provided specialist care partially; thus, RFEs evaluated by PCPs may be affected by selection bias. Fourth, due to the small number of patients with relatively rare RFEs, type II errors could not be eliminated, and our study could only analyze relatively common RFEs. Fifth, because of study design, the episodes of EmR included duplications; that is, three patients were referred emergently more than once. However, the influence of these three patients, who accounted for seven episodes of visits, may be minimal, as the proportion of these episodes accounted for only 4.3% among EmRs. Sixth, we could not eliminate the possibility that patients in the non-admission group might be directly admitted to hospitals, that is, bypassing the clinic, following discharge from the ED. Such cases are not necessarily considered over-triage in terms of primary care

functions. Therefore, the admission rate after EmR observed in our study might be lower than a reasonable rate including the patients admitted through bypassing a clinic in terms of evaluating the quality of primary care. Finally, caution should be exercised when extrapolating the findings of this study to the post-pandemic world, as it was conducted prior to the COVID-19 pandemic.

5 | CONCLUSION

Our study unveiled the RFEs and diagnoses among EmRs and reported the EmR and admission rates following EmR in an urban primary care setting in Japan. This information may serve as a guide for PCPs in their EmR practice and as a benchmark for the scope of EmRs practice. Future research should aim to establish a consensus for standardized EmR definitions and assess variations in PCPs' EmR rates and admission rates following EmR.

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CONFLICT OF INTEREST STATEMENT

Masato Matsushima received lecture fees and lecture travel fees from the Centre for Family Medicine Development of the Japanese Health and Welfare Co-operative Federation. Masato Matsushima is an adviser for the Centre for Family Medicine Development Practice-Based Research Network and a program director of the Jikei Clinical Research Program for Primary Care. Masato Matsushima's son-in-law worked at IQVIA Services Japan K.K. which is a contract research organization and a contract sales organization. Masato Matsushima's son-in-law works at SYNEOS HEALTH CLINICAL K.K. which is a contract research organization and a contract sales organization. In addition, Masato Matsushima is an Editorial Board member of Journal of General and Family Medicine and a co-author of this article. To minimize bias, they were excluded from all editorial decision making related to the acceptance of this article for publication.

DATA AVAILABILITY STATEMENT

No data are available.

ETHICS STATEMENT

Ethics approval statement: This study was approved by the institution Research Ethics Committee of the Kawasaki Kyodo Hospital, Japan (approval number: N/A). Although we did not obtain informed consent from individual patients, we displayed posters as opt-out in the clinic that provided possible subjects with information about the collection and use of their data for this study and guaranteed them opportunities for refusal and the protection of personal information.

Patient consent statement: Although we did not obtain informed consent from individual patients, we displayed posters as opt-out in the clinic that provided possible subjects with information about the collection and use of their data for this study and guaranteed them opportunities for refusal and the protection of personal information.

CLINICAL TRIAL REGISTRATION

None.

PERMISSION TO REPRODUCE MATERIAL FROM OTHER SOURCES

Not applicable.

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REFERENCES

1. Ferrer RL, Hambidge SJ, Maly RC. The essential role of generalists in health care systems. Ann Intern Med. 2005;142(8):691–9.
2. Dempsey OP, Bekker HL. 'Heads you win, tails I lose': a critical incident study of GPs' decisions about emergency admission referrals. Fam Pract. 2002;19(6):611–6.
3. Fukuchi T, Iwata K, Ohji G. Failure of early diagnosis of infective endocarditis in Japan—a retrospective descriptive analysis. Medicine (Baltimore). 2014;93(27):e237.
4. Huerta-Ramírez R, Bertsch J, Cabello M, Roca M, Haro JM, Ayuso-Mateos JL. Diagnosis delay in first episodes of major depression: a study of primary care patients in Spain. J Affect Disord. 2013;150(3):1247–50.
5. Wilson A, Coleby D, Regen E, Phelps K, Windridge K, Willars J, et al. Service factors causing delay in specialist assessment for TIA and minor stroke: a qualitative study of GP and patient perspectives. BMJ Open. 2016;6(5):e011654.
6. Foot C, Naylor C, Imison C. The quality of GP diagnosis and referral. London: King's Fund; 2010. Available from: https://www.kingsfund.org.uk/sites/default/files/Diagnosis%20and%20referral.pdf.
7. Kaneko M, Van Boven K, Takayanagi H, Kusaba T, Yamada T, Matsushima M. Multicentre descriptive cross-sectional study of Japanese home visit patients: reasons for encounter, health problems and multimorbidity. Fam Pract. 2019;37:227–33.
8. Raknes G, Hunskaar S. Reasons for encounter by different levels of urgency in out-of-hours emergency primary health care in Norway: a cross sectional study. BMC Emerg Med. 2017;17(1):19.
9. Tandjung R, Hanhart A, Bartschi F, Keller R, Steinhauer A, Rosemann T, et al. Referral rates in swiss primary care with a special emphasis on reasons for encounter. Swiss Med Wkly. 2015;145:w14244.
10. Katz A, Chateau D, Bogdanovic B, Taylor C, McGowan K-L, Rajotte L, et al. Physician integrated network: a second look. Winnipeg, MB: Manitoba Centre for Health Policy; 2014. Available from: http://mchp-appserv.cpe.umanitoba.ca/reference/PIN2_web_final.pdf.
11. Spurrell M, Hatfield B, Perry A. Characteristics of patients presenting for emergency psychiatric assessment at an English hospital. Psychiatr Serv. 2003;54(2):240–5.
12. Wilkin D, Metcalfe DH, Marinker M. The meaning of information on GP referral rates to hospitals. Community Med. 1989;11(1):65–70.
13. Lyall MJ, Beckett D, Price A, Strachan MWJ, Jamieson C, Morton C, et al. Variation in general practice referral rate to acute medicine

services and association with hospital admission. A retrospective observational study. Fam Pract. 2023;40(2):233–40.
14. Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. J Chronic Dis. 1987;40(5):373–83.
15. van der Horst F, Metsemakers J, Vissers F, Saenger G, de Geus C. The reason-for-encounter mode of the ICPC: reliable, adequate, and feasible. Scand J Prim Health Care. 1989;7(2):99–103.
16. Cochran WG. Some methods for strengthening the common chi-squared tests. Biometrics. 1954;10(4):417–51.
17. Armitage P. Tests for linear trends in proportions and frequencies. Biometrics. 1955;11(3):375–86.
18. Hamada H. Analysis of referrals from a clinic in a remoted area. J Okayama Med Assoc. 1992;104:651–61.
19. Kaneko M, Matsushima M, Irving G. The ecology of medical care on an isolated Island in Okinawa, Japan: a retrospective open cohort study. BMC Health Serv Res. 2017;17(1):37.
20. Nelson BD, Ahn R, Markovchick V, Hines RA, Lauretti AR, Lauretti JR, et al. Emergency care and referral among isolated Island populations in The Bahamas. J Emerg Med. 2015;48(3):356–65.
21. Lasserson D, Smith H, Garland S, Hunt H, Hayward G. Variation in referral rates to emergency departments and inpatient services from a GP out of hours service and the potential impact of alternative staffing models. Emerg Med J. 2021;38(10):784–8.
22. Coulter A, Seagroatt V, McPherson K. Relation between general practices' outpatient referral rates and rates of elective admission to hospital. BMJ. 1990;301(6746):273–6.
23. Chalkley M, McCormick B, Anderson R, Aragon MJ, Nessa N, Nicodemo C, et al. Health services and delivery research. Elective hospital admissions: secondary data analysis and modelling with an emphasis on policies to moderate growth. Health Serv Deliv Res. 2017;5(7):1–186.
24. Takeshima T, Kumada M, Mise J, Ishikawa Y, Yoshizawa H, Nakamura T, et al. Reasons for encounter and diagnoses of new outpatients at a small community hospital in Japan: an observational study. Int J Gen Med. 2014;7:259–69.
25. Kajiwara N, Hayashi K, Misago M, Murakami S, Ueoka T. First-visit patients without a referral to the Department of Internal Medicine at a medium-sized acute care hospital in Japan: an observational study. Int J Gen Med. 2017;10:335–45.
26. Lin PC, Lin LC, Hsieh HF, Chen YM, Chou PL, Li CH. Primary diagnoses and outcomes of emergency department visits in older people with dementia: a hospital-based retrospective study in Taiwan. Int Psychogeriatr. 2020;32(1):97–104.
27. Tatara K, Okamoto E. Japan: health system review. Health systems in transition. Copenhagen: EU Observatory on Health Systems and Policies; 2009.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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