






Future Research in General Medicine Has Diverse Topics and is Highly Promising: Opinions Based on a Questionnaire Survey

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Abstract: In Japan, general medicine is still relatively new as a specialty, having been established in 2018 as the 19th primary specialty. The relevant research field has therefore not been fully established yet, and the detailed research areas in this field have not been identified. We conducted a descriptive questionnaire-based web survey of members of the Japanese Society of Hospital General Medicine. Respondents were asked to highlight their research topics from the following categories: diagnostic excellence, design (problem-solving and thinking methodology), symptomatology, physical examination, clinical epidemiology, home and community medicine, general medicine education, organizational management, hospital administration, and “none of the above (add description of your work if desired)”. The respondents could choose multiple topics. There were 276 respondents (14% response rate), of whom 240 (86.9%) were male, 103 (37.3%) worked at universities, and 232 (84.1%) had previous research experience. Diagnostic excellence was the most common research topic category among generalists (n=87, 21.3%), followed by clinical epidemiology (n=83, 20.3%), symptomatology (n=41, 10.0%), home and community medicine (n=39, 9.6%), and general medicine education (n=36, 8.8%). Seventy-eight respondents (19.1%) chose “none of the above (add description of your work if desired)”. The main research topics were in areas fundamental to diagnostic excellence, ie, diagnostics, diagnostic error, clinical epidemiology, and symptomatology. Home and community medicine and general medicine education were also included as research topics because of their diverse roles. The research interests of generalists are therefore diverse, and new areas and frameworks are likely to be created in the future.

Keywords: clinical research, diagnostic excellence, general medicine, medical education, research topic

Introduction

The research activities of generalists are foundational to the development of general medicine. In the United States, hospital medicine has a history of over 25 years, and many international scientific articles have been published on clinical issues, such as patient safety, cost effectiveness and healthcare economics, high-quality education, patient satisfaction in patient-centered care, and healthcare services.^{1,2} These academic activities have led to widespread recognition of generalists in the United States.³ In Japan, however, general medicine was only established as the 19th primary specialty in 2018, and thus has a short history.⁴ The relevant research field is therefore yet to be established. Clinical research reportedly accounts for approximately 60% of all research topics studied by Japanese generalists.^{5,6} However, the detailed research areas in this field are still unidentified. We therefore conducted a questionnaire-based study among the members of the Japanese Society of Hospital General Medicine to clarify the kinds of research in which generalists are involved and to generate ideas about how research in general medicine may develop in the future.

Materials and Methods

We conducted a descriptive questionnaire-based web survey among the members of Japanese Society of Hospital General Medicine from April 2, 2021 to April 19, 2021. All 1886 members were eligible for this web survey. We sent e-mails to all members using the society's mailing list, and asked them to complete a Google Form about their primary research areas. Six expert Japanese generalists, all of whom were included in the authors, used critical discussion to reach a consensus on which specific research topics for general medicine to include. They decided on the following topics: diagnostic excellence, design (problem-solving and thinking methodology), symptomatology, physical examination, clinical epidemiology, home and community medicine, general medicine education, organizational management and hospital administration, and "none of the above (add description of your work if desired)". Respondents were asked to choose their research topic from these categories, and could choose multiple topics. The results were shown as percentages for each topic with the total number of answers to the question as 100%.

The Ethics Committee of Saga University Hospital waived the need for ethical approval for this study because it was made clear at the start of the survey that all respondents were medical doctors, and no clinical information was being collected. All respondents gave informed consent on the questionnaire website and personal information was anonymized in the analysis.

Results

The background of the respondents is shown in Table 1. In total, 276 of the 1886 eligible participants responded (14% response rate), because responding was voluntary. Among the respondents, the median number of years since graduating was 21 (interquartile range: 12–33), 240 (86.9%) were male, and 103 (37.3%) worked at universities. Ninety-four (34.1%) were administrators at community hospitals; 23 (8.3%) were professors at universities; 88 (31.9%) were faculty members of universities with a position of assistant professor or above, including professors; and 232 (84.1%) had previous research experience. The total number of answers to the multiple-choice questions on the research topic was 408. Diagnostic excellence was the most common research topic category among generalists (n=87, 21.3%), followed by clinical epidemiology (n=83, 20.3%), symptomatology (n=41, 10.0%), home and community medicine (n=39, 9.6%), general medicine education (n=36, 8.8%), organizational management and hospital administration (n=25, 6.1%), physical examination (n=14, 3.4%), and design (problem-solving and thinking methodology) (n=5, 1.2%) (Figure 1). Seventy-eight respondents (19.1%) answered "none of the above (add description of your work if desired)". In the free description section, five respondents said clinical research on specific organs and diseases, three respondents said infectious diseases,

Table 1 Backgrounds of the Respondents

	Median (IQR) or n (%)
Years since graduating	21 (12–33)
Male	240 (86.9)
Affiliation	
Clinic	11 (4.0)
Community hospital	132 (47.8)
Affiliated hospitals of university	30 (10.9)
University hospital	103 (37.3)
Position	
Management position (other than university)	94 (34.1)
Non-management position (other than university)	80 (29.0)
Professor	23 (8.3)
Associate professor	22 (8.0)
Lecturer	16 (5.8)
Assistant professor	27 (9.8)
Full-time physician staff	12 (4.3)
Others	2 (0.7)

Abbreviation: IQR, interquartile range.

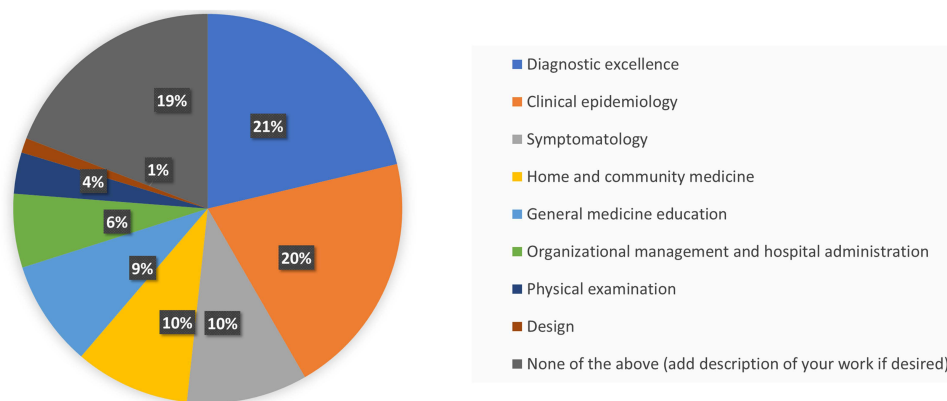


Figure 1 Research topics of generalists.

and two said pathology. Medical information and communication technology (ICT), occupational medicine, sports medicine, gerontology, *Kampo* medicine, advanced care planning, alternative medicine, rehabilitation, behavior transformation, and examination were each reported by one person.

Discussion

Diagnostic Excellence

In the field of general medicine, physicians may see a wide range of diseases, from common conditions to more challenging cases that are difficult to diagnose. The general medicine department frequently involves clinical diagnosis based on the organs.⁷ Generalists therefore focus their case reports on rare diseases and atypical courses of common diseases. Diagnostic excellence includes the physician's thoughts about diagnostics and diagnostic errors.⁸ However, in recent years, another approach to research on the quality of diagnosis has been proposed, based on two axes: physician factors and environmental factors (situativity).⁹ Clinical indicators and concepts to measure the quality of various diagnoses have also been developed, and their validation and application are currently major areas of interest in the diagnostics field.^{10,11} Generalists have diagnostic skills developed through history acquisition and physical examination.^{12,13} In-depth evaluation of diagnostic errors from the viewpoint of the professional can improve quality of clinical care.^{14,15} Numerous case reports on diagnostic errors as resources to improve the quality of diagnosis have been published in Japan, and research is being conducted on the epidemiology of diagnostic errors,^{15,16} diagnostic error education,¹⁷ clinical prediction rules, artificial intelligence (AI)-based diagnosis,¹⁸ and diagnostic concepts.¹⁹ Generalists working in various settings may discover research interests in the course of their daily clinical practice.^{20,21}

Clinical Epidemiology

Clinical epidemiology research uses epidemiological methods to answer clinical questions, and contributes to decision-making in clinical practice.²² Clinical epidemiology covers a wide range of topics, including disease, healthcare issues, healthcare services, patients' quality of life, and health status.²² In the Japanese specialty board system, those items are included in the competencies of general medicine.²³ There is therefore a high affinity between general medicine and clinical epidemiology. Clinical epidemiology is also a fundamental methodology in evidence-based medicine (EBM). That general medicine has taken the lead in promoting and developing EBM in Japan^{24,25} probably influences the research topics chosen by generalists.

Symptomatology

Symptomatology is the science of exploring diseases and pathologies through symptoms and is essential for diagnostic excellence. Generalists treat new patients with various symptoms and diagnostic challenges,²³ such as fever of unknown origin that other medical institutions have been unable to diagnose.^{26,27} In general medicine, there has been much research on diagnosis, patient background, and the characteristics of various symptoms including fever of unknown

origin, disturbance of consciousness, and abdominal pain.^{26,28–30} Generalists are also often consulted on diagnoses within their hospitals, and therefore symptomatology is likely to be a main topic in this specialty.³¹

Home and Community Medicine

The considerable diversity of clinical experiences required of Japanese generalists may account for a certain percentage of their research interest in home and community medicine. This is because the role of generalists is not limited to inpatient and outpatient care at university hospitals and community hospitals. They are also required to provide medical care in various settings, including chronic care hospitals, long-term care facilities, clinics, and home care support hospitals and clinics.^{25,32} Home and community medicine is quite different from university hospital care. Patients are treated in their everyday living environment, and close communication with patients is maintained. Under these circumstances, research on end-of-life care at home,³³ problems in community healthcare,³⁴ and medication usage are being actively conducted in the field of general medicine to provide more valuable healthcare services within the context of patients' needs and limited healthcare resources.³⁵ Additionally, community medicine-based education is important in clinical education,³⁶ and therefore many studies on education in community medicine have also been conducted.^{37,38}

General Medicine Education

Unlike organ-based specialties, general medicine must provide holistic healthcare across organ systems.^{25,39} Education for younger generations is also an essential role of generalists.²⁵ A generalist is a professional who needs extensive skills to cope with any patient need, including those beyond medical issues.⁴⁰ Training in general medicine can therefore help residents to improve their basic clinical skills.⁴¹ The Japanese Model Core Curriculum for Medicine lists 37 symptoms,⁴² and generalists' experiences give them an advantage in providing comprehensive education on these symptoms. Given this background and the high affinity of general medicine with education, we believe that education is one of the more interesting research topics for generalists. They also have a vested interest in the education of younger generations to secure the future development of general medicine.

None of the Above (Add Description of Your Work if Desired)

In total, 19% of respondents in this study chose “none of the above (add description of your work if desired)”, but many did not provide details. Based on our previous studies, these respondents are probably involved in clinical research in organ-specific specialties or basic research.^{5,6} However, there were a few respondents who mentioned specific topics such as *Kampo* medicine and alternative medicine, suggesting the diversity required by generalists. Nearly 20% of research topics could not be categorized, which implies that research in general medicine is not bound by the traditional distinctions of the past, and that there is room for further new fields and frameworks to be created and developed in the future. We consider that further research should be conducted to systematize research topics and clarify research interests in general medicine, which will eventually lead to the development of academic activities in general medicine in Japan.

Limitations

This study had several limitations. First, there could be response bias in the questionnaire survey. There would also have been selection bias because the response rate was 14%, which is lower than previous similar surveys.^{5,34,43} We were also unable to evaluate the respondents' level of experience or familiarity with general medicine research. These could have influenced our findings. Additionally, this was a descriptive study involving only Japanese generalists. Further international studies should be conducted to focus on each research topic, and clarify the research interests of generalists. Comparative studies to clarify the differences in research topics between generalists and other specialists should also be considered.

Conclusions

The main research topics of generalists were foundational areas of diagnostic excellence: diagnostics, diagnostic errors, clinical epidemiology, and symptomatology. Generalists are required to recognize and manage a wide range of conditions, and home and community medicine and general medicine education were therefore also included in their research topics. Our results suggest that there may be many topics that cannot be categorized within the framework of research themes used in this study. These findings

emphasize the diversity of research interests among generalists. We consider that new fields and frameworks will be created in the future that allow for innovative research directions for generalists, not limited to older, more traditional approaches to research.

Abbreviations

AI, artificial intelligence; EBM, evidence-based medicine; ICT, information and communication technology.

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Author Contributions

All the authors made a significant contribution to the work reported with respect to the conception, study design, execution, acquisition of data, analysis, and interpretation. All authors took part in drafting, revising, or critically reviewing the article, and they gave their final approval of the version submitted for publication. All the authors have agreed on the journal for submission and agree to be accountable for all aspects of the work.

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References

1. Messler J, Whitcomb WF. A history of the hospitalist movement. *Obstet Gynecol Clin North Am.* 2015;42(3):419–432. doi:10.1016/j.ogc.2015.05.002
2. Flanders SA, Kaufman SR, Saint S, Parekh VI. Hospitalists as emerging leaders in patient safety: lessons learned and future directions. *J Patient Saf.* 2009;5(1):3–8. doi:10.1097/PTS.0b013e31819751f2
3. Flanders SA, Centor B, Weber V, McGinn T, Desalvo K, Auerbach A. Challenges and opportunities in academic hospital medicine: report from the academic hospital medicine summit. *J Gen Intern Med.* 2009;24(5):636–641. doi:10.1007/s11606-009-0944-6
4. Japanese medical specialty board [homepage on the internet]. Japan; 2021. Available from: <https://jbgm.org/>. Accessed March 30, 2022. Japanese.
5. Watari T, Tago M, Shikino K, et al. Research trends in general medicine departments of university hospitals in Japan. *Int J Gen Med.* 2021;14:1227–1230. doi:10.2147/IJGM.S306543
6. Tago M, Watari T, Shikino K, et al. Research trends of general hospitalists in Japan: a cross-sectional questionnaire-based personal survey. *J Hosp Gen Med.* 2021;3(6):225–227.
7. Yazdani S, Hosseinzadeh M, Hosseini F. Models of clinical reasoning with a focus on general practice: a critical review. *J Adv Med Educ Prof.* 2017;5(4):177–184.
8. Singh H, Connor DM, Dhaliwal G. Five strategies for clinicians to advance diagnostic excellence. *BMJ.* 2022;376:e068044. doi:10.1136/bmj-2021-068044
9. Merkebu J, Battistone M, McMains K, et al. Situativity: a family of social cognitive theories for understanding clinical reasoning and diagnostic error. *Diagnosis.* 2020;7(3):169–176. doi:10.1515/dx-2019-0100
10. Singh H, Bradford A, Goeschel C. Operational measurement of diagnostic safety: state of the science. *Diagnosis.* 2020;8(1):51–65. doi:10.1515/dx-2020-0045
11. Singh H, Graber ML. Improving diagnosis in health care—the next imperative for patient safety. *N Engl J Med.* 2015;373(26):2493–2495. doi:10.1056/NEJMp1512241
12. Kendrick T, Freeling P. A communication skills course for preclinical students: evaluation of general practice based teaching using group methods. *Med Educ.* 1993;27(3):211–217. doi:10.1111/j.1365-2923.1993.tb00259.x
13. Janjigian MP, Charap M, Kalet A. Development of a hospitalist-led-and-directed physical examination curriculum. *J Hosp Med.* 2012;7(8):640–643. doi:10.1002/jhm.1954
14. Schiff GD, Kim S, Abrams R, et al. Diagnosing diagnosis errors: lessons from a multi-institutional collaborative project. In: Henriksen K, Battles JB, Marks ES, et al. editors. *Advances in Patient Safety: From Research to Implementation (Volume 2: Concepts and Methodology)*. Rockville (MD): Agency for Healthcare Research and Quality (US); 2005. Available from <https://www.ncbi.nlm.nih.gov/books/NBK20492/>. Accessed March 29, 2022.
15. Harada T, Watari T, Watanuki S, et al. Diagnostic error rates and associated factors for lower gastrointestinal perforation. *Sci Rep.* 2022;12(1):1028. doi:10.1038/s41598-021-04762-y

16. Watari T. Malpractice claims of internal medicine involving diagnostic and system errors in Japan. *Intern Med.* 2021;60(18):2919–2925. doi:10.2169/internalmedicine.6652-20
17. Harada T, Miyagami T, Watari T, et al. Barriers to diagnostic error reduction in Japan. *Diagnosis.* 2021. doi:10.1515/dx-2021-0055
18. Harada Y, Katsukura S, Kawamura R, Shimizu T. Effects of a differential diagnosis list of artificial intelligence on differential diagnoses by physicians: an exploratory analysis of data from a randomized controlled study. *Int J Environ Res Public Health.* 2021;18(11):5562. doi:10.3390/ijerph18115562
19. Shimizu T. System 2 diagnostic process for the next generation of physicians: “inside” and “outside” brain-the interplay between human and machine. *Diagnostics.* 2022;12(2):356. doi:10.3390/diagnostics12020356
20. Suzuki T, Itokazu D, Tokuda Y. External validation for sensitivity of the Ottawa subarachnoid hemorrhage rule in a Japanese tertiary teaching hospital. *Sci Rep.* 2021;11(1):16717. doi:10.1038/s41598-021-96320-9
21. Yamashita S, Tago M, Motomura S, et al. Development of a clinical prediction model for infective endocarditis among patients with undiagnosed fever: a pilot case-control study. *Int J Gen Med.* 2021;14:4443–4451. doi:10.2147/IJGM.S324166
22. Haynes BR, Sackett DL, Guyatt GH, Tugwell P. *Clinical Epidemiology: How to Do Clinical Practice Research.* 3rd ed. Philadelphia: Lippincott Williams & Wilkins (LWW); 2005.
23. Japanese medical specialty board [homepage on the internet]. Japan; 2022. Available from: <https://app.box.com/s/ugs2wtlj23vye2qyvbtojhf8lwrzhk5>. Accessed July 27, 2022. Japanese.
24. Koizumi S. General medicine and health professions education. *Offic J Japan Prim Care Assoc.* 2010;33(4):431–436. Japanese. doi:10.14442/generalist.33.431
25. Tago M, Watari T, Shikino K, Yosuke S, Takahashi H, Shimizu T. A statement on the ten skills characteristic of exemplary Japanese hospitalist practice. *J Hosp Gen Med.* 2021;3(2):68–70.
26. Naito T, Mizooka M, Mitsumoto F, et al. Diagnostic workup for fever of unknown origin: a multicenter collaborative retrospective study. *BMJ Open.* 2013;3(12):e003971. doi:10.1136/bmjopen-2013-003971
27. Harada Y, Masuda M, Hirokawa T, et al. Safety and efficacy of outpatient follow-up for referred patients with undiagnosed fever: a retrospective cohort study. *Medicine.* 2020;99(5):e18532. doi:10.1097/MD.00000000000018532
28. Uchida S, Ishikawa S, Kumada M, Kuroki S, Kajii E. A retrospective study of 221 hospitalized patients with fever in the department of general practice at Jichi Medical University hospital. *Offic J Japan Prim Care Assoc.* 2012;35(4):279–285. Japanese. doi:10.14442/generalist.35.279
29. Yamashita S, Tago M, Katsuki NE, Nishi TM, Yamashita SI. Relationships between sites of abdominal pain and the organs involved: a prospective observational study. *BMJ Open.* 2020;10(6):e034446. doi:10.1136/bmjopen-2019-034446
30. Yamashiro S, Oda Y, Kanegae S, et al. Informative usefulness of age, sex and vital signs in the differential diagnosis of disturbed consciousness among 175 emergency outpatients. *Fukuoka Igaku Zasshi.* 1994;85(12):353–360.
31. Kawamura R, Harada Y, Shimizu T. Diagnostic effect of consultation referral from gastroenterologists to generalists in patients with undiagnosed chronic abdominal pain: a retrospective study. *Healthcare.* 2021;9(9):1150. doi:10.3390/healthcare9091150
32. Yokota Y, Watari T. Various perspectives of “General medicine” in Japan-Respect for and cooperation with each other as the same “general medicine physicians”. *J Gen Fam Med.* 2021;22(6):314–315. doi:10.1002/jgf2.500
33. Masumoto S, Sato M, Ichinohe Y, Maeno T. Factors facilitating home death in non-cancer older patients receiving home medical care. *Geriatr Gerontol Int.* 2019;19(12):1231–1235. doi:10.1111/ggi.13800
34. Iida S, Sakamoto A. Clinic doctors’ perceptions of the problems of remote and rural medicine—qualitative content analysis of free comments from a questionnaire for community health care—. *Jichi Med Univ J.* 2009;32:29–41. Japanese.
35. Sato H, Sato M, Kawai-Kowase K, et al. The use of Kampo in community medicine. *J Hosp Gen Med.* 2020;2(4):104–110.
36. Habbick BF, Leeder SR. Orienting medical education to community need: a review. *Med Educ.* 1996;30(3):163–171. doi:10.1111/j.1365-2923.1996.tb00738.x
37. Kijima T, Hidaka M, Takahashi S, et al. A qualitative study of the current situation and strategies for general physician development in community medicine. *Bull Shimane Univ Faculty Med.* 2017;40:45–52. Japanese.
38. Hisata Y, Sakanishi Y, Kurogi K, Ogushi A, Fukumori N, Sugioka T. Mobile medical services and experiential learning in community-based clinical clerkships enhancing medical students’ positive perceptions of community healthcare. *J Rural Med.* 2019;14(2):216–221. doi:10.2185/jrm.2019-002
39. Kita K, Shimizu Y, Yamashiro S. Referral and consultation practice between generalists and specialists at a university hospital: a retrospective cross-sectional study. *Offic J Japan Prim Care Assoc.* 2019;42(2):92–97. Japanese. doi:10.14442/generalist.42.92
40. Hamada O, Tsutsumi T, Tsunemitsu A, Fukui T, Shimokawa T, Imanaka Y. Impact of the hospitalist system in Japan on the quality of care and healthcare economics. *Intern Med.* 2019;58(23):3385–3391. doi:10.2169/internalmedicine.2872-19
41. Nishizaki Y, Shimizu T, Shinozaki T, et al. Impact of general medicine rotation training on the in-training examination scores of 11, 244 Japanese resident physicians: a Nationwide multi-center cross-sectional study. *BMC Med Educ.* 2020;20(1):426. doi:10.1186/s12909-020-02334-8
42. Ministry of Education, Culture, Sports, Science and Technology, Japan [homepage on the internet]. Japan: Model core curriculum for medical education in Japan; 2016. Available from: https://www.mext.go.jp/component/a_menu/education/detail/_icsFiles/afieldfile/2018/06/18/1325989_30.pdf. Accessed March 29, 2022.
43. Iwase S, Yamaguchi T, Miyaji T, Terawaki K, Inui A, Uezono Y. The clinical use of Kampo medicines (traditional Japanese herbal treatments) for controlling cancer patients’ symptoms in Japan: a national cross-sectional survey. *BMC Complement Altern Med.* 2012;12(1):1–9. doi:10.1186/1472-6882-12-222

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