

## **Author's response to reviews**

**Title:** Correlation between Patients' Reasons for Encounters/Health Problems and Population Density in Japan: A Systematic Review of Observational Studies Coded by the International Classification of Health Problems in Primary Care (ICHPPC)" and the International Classification of Primary Care (ICPC)

### **Authors:**

Makoto Kaneko (makotokaneko0314@gmail.com)

Ryuichi Ohta (ryuichiohta0120@gmail.com)

Naoki Nago (nago@tbu.t-com.ne.jp)

Motoharu Fukushi (fukushimoto@gmail.com)

Masato Matsushima (masato@jikei.ac.jp)

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### **Author's response to reviews:**

Responses to the reviewers' comments

Reviewer 1

Thank you very much for your constructive feedback.

Reviewer's comment #1

On page 6, last paragraph, the authors claim that there is no published data on health problems specific to primary care physicians. I am under the impression that at least one study has collected data on all health problems managed in a small sample of clinics over a three year period (Yamada et al)

## Response #1

Thank you for your advice and it is our apology that we should have explained to readers more clearly. We would like to describe that there are no systematic review of clinical research utilizing ICPC-2 in Japan. We, therefore, have changed the expression (page 6, lines 64-65).

(Page 6, line 64-65)

“there has been no systematic review which target surveys using ICPC-2 in Japan.”

## Reviewer's comment #2

Methodology, page 12. What is the validity of the division of health problems and RFEs into internal medicine and non-internal medicine issues? In the first case, should it not be a division between primary care and non-primary care problems/RFEs, and then all the codes in ICPC would refer to primary care concepts. As such, why exclude areas such as mental health problems, pregnancy, skin, musculoskeletal, etc. from a study of primary care RFEs and health problems? Secondly, has this approach been used before, and if so, has it been tested for validity? So, for example, warts (skin) is not a problem which cannot be managed in primary care. So why is it judged differently from, for example, a blood disorder such as anemia? In the third instance, can you divide this cleanly across chapters? So then lymphoma is an internal medicine (or primary care) problem, but an ankle sprain is not?

## Response #2

Thank you for your important feedback. In this systematic review, we did not use the division of RFEs and health problems to divide primary care and non-primary care but internal medicine and non-internal medicine. In Japan, physicians who received internal medicine based training play a principal role as primary care physicians because the Japanese health care system has yet to establish structured training for primary care physicians as mentioned in the Background section (Miyazaki<sup>2</sup>). Physicians having received internal medicine based training do not generally deal with non-internal medicine related RFEs and health problems because patients can freely select medical institutions such as internal-medicine clinic, clinic of dermatology, clinic of orthopedics and so on due to the free-access system in Japan. Therefore, we think it is needed to clarify the degree to which they deal with non-internal medicine related RFEs and health problems for the refinement of the Japanese primary-care-physician training program. Although the validity of the division between internal medicine and non-internal medicine related has never been reported,

we had no choice but to define the non-internal medicine related RFEs and health problems for this study.

To clarify our aim, we added the explanation about Japanese primary care setting in the Method section on page 12, lines 143-145.

(page 12, lines 143-145)

In Japan, physicians who were trained in an internal medicine-based residency program continue to play a principal role in the primary care setting<sup>2</sup>.

Also, to uncloud our purpose, we added “Japanese” on page 12 line 146.

(page 12, line 146)

To clarify the comprehensiveness of RFEs in Japanese primary care settings,

In addition, the type of doctors (internist/primary care physicians) and the type of training were not described in studies included by our systematic review. If some internists in the researches included by our systematic review acquired the knowledge and skills of primary care physician by self-directed learning, the proportion of non-internal medicine related RFEs and health problems might be overestimated for internists in general. Therefore, we added this issue to the limitation of our manuscript. (pages 21-22, lines 266-275)

(pages 21-22, lines 266-275)

Third, unfortunately, the type of doctors (internist/primary care physicians) and the type of training were not described in studies included by our systematic review. In addition, whether patients with non-internal medicine related RFEs/health problems choose primary care physicians or specialists, i.e. orthopedics might depend on type of training which a physician received (internist/primary care physician). If some internists in the researches included by our systematic review acquired the knowledge and skills of primary care physician by self-directed learning, however, the proportion of non-internal medicine related RFEs and health problems might be overestimated for internists in general.

### Reviewer's comment #3

On page 16, Table 5, the study period definition probably contains an error (see last line: ">1 year and <1 year"?)

### Response #3

Thank you for your comments and I am sorry to have caused confusion. This category includes 4-month study and 2-year studies in the same research. (Shiraishi et al.<sup>21</sup>) We have changed from ">1 year and <1 year" to "Others: one study contained two study periods (2years and 4 month)" on page 16, Table 5.

### Reviewer's comment #4

On page 19, last paragraph, the statement that all studies were of insufficient quality and sample size is an oversimplification and cannot be made without justification. I cannot agree with this statement. The statement (same paragraph) that coding is only valid when performed independently by multiple coders is wrong. Clinician coding at the point of care is an extremely valid process, as long as the clinicians are appropriately trained and motivated.

### Response #4

We are very grateful that you have brought these important points to our attention. We agreed with your opinion that clinician coding at the point of care is the best in the case that the clinicians are appropriately trained and motivated. However, some studies<sup>21,26</sup> included by our systematic review indicated the importance of multiple coders to ensure reliability and other studies<sup>27,28</sup> described their training for coding. Thus, we changed the sentences as below. (page 20, lines 247-250)

(page 20, lines 247-250)

Even though the quality of data collection is important when using data from patient records such as ICPC<sup>32</sup>, 15 studies did not describe the evaluator's experience of attending ICPC-coding training program and the numbers of coders.

#### Reviewer's comment #5

Page 20, first paragraph. The coding with ICPC and ICHPPC are very well described in books published for that purpose by Wonca, and one cannot state that the coding method and process is not well described if such books have been referenced and their methods followed.

#### Response #5

Thank you very much for pointing it out. We agreed with your opinion. Therefore, we have changed the sentence as below. (page 20, lines 247-250).

(page 20, lines 247-250)

Even though the quality of data collection is important when using data from patient records such as ICPC32, 15 studies did not describe the evaluator's experience of attending ICPC-coding training program and the numbers of coders.

#### Reviewer 2

Thank you for your constructive feedback.

#### Reviewer's comment #1

-The number of urban settings/studies versus rural settings/studies is small to test the accessibility. Also, is the population density the major reason for accessing a "non-internist" specialist? Why is it selected? How easy is to travel from a low to a high "population density" area with an increased number of specialists?

#### Response #1

Thank you for your comments. As you mentioned, the sample size is small, especially urban settings. However, we sought to examine the correlation between the proportion of non-internal medicine related RFEs/health problems and population density because we would like to

formulate the hypothesis that accessibility is related to the proportion of non-internal medicine related RFEs/health problems. In the Discussion section, we mentioned small sample size. (page 20, lines 243-248)

Also, as you pointed out, population density is not the best index to test the accessibility and our method has several limitations. Therefore, we have discussed the point as limitation in the Discussion section on page 21 lines 260-262 “It was not possible to consider detailed medical circumstances such as the existence of a nearby specialist clinic and/or the distance to a secondary care hospital.”.

In general, researchers use “Provider-to-population ratios”, “Travel impedance to nearest provider”, “Average travel impedance to provider” etc. as an indicator of accessibility. (Guagliardo, Mark F. "Spatial accessibility of primary care: concepts, methods and challenges." International journal of health geographics 3.1 (2004): 3.)

However, it is impossible to evaluate these indicators from the studies conducted in the past and past census data. Thus, we used the population density as a surrogate indicator of accessibility. Population density sometimes is used as an indicator of rurality.

(Minore, Bruce, et al. "Rurality literature review." Centre for Rural and Northern Health Research, Thunder Bay (2008). )

Therefore, we added the sentence in the method. (page 15, lines 178-183)

(page 15, lines 178-183)

Because population density can be used as an indicator of rurality<sup>10</sup>. In addition, usual indicators of accessibility such as “Provider-to-population ratios”, “Travel impedance to nearest provider” and “Average travel impedance to provider”<sup>11</sup> could not be evaluated from the studies conducted in the past and past census data.

Reviewer’s comment #2

Missing type (internist/general practitioner) of doctor in the health settings of the articles. There is a bias by the patient that knows by past visits if his/her doctor handles "non internist health problems". This attitude controls the direct access to specialists.

## Response #2

We are very grateful that you have brought these important points to our attention. Unfortunately, the type of doctors (internist/primary care physicians) was not described in studies included by our systematic review. Because the Japanese health care system has yet to establish structured training for primary care physicians, physicians who were trained in an internal medicine-based residency program continue to play a principal role in the primary care setting (Miyazaki<sup>2</sup>) as mentioned in the Background section. On the other hand, some doctors might acquire the knowledge and skills of primary care physician by self-directed learning.

Therefore, we added this information in the Discussion section on pages 21-22, lines 266-275.

(pages 21-22, lines 266-275)

Third, unfortunately, the type of doctors (internist/primary care physicians) and the type of training were not described in studies included by our systematic review. In addition, whether patients with non-internal medicine related RFEs/health problems choose primary care physicians or specialists, i.e. orthopedics might depend on type of training which a physician received (internist/primary care physician). If some internists in the researches included by our systematic review acquired the knowledge and skills of primary care physician by self-directed learning, however, the proportion of non-internal medicine related RFEs and health problems might be overestimated for internists in general.

## Reviewer's comment #3

A small description about issues in each paper found in the systematic review could be included in the discussion

## Response #3

Thank you for your feedback. We have already described characteristic of each paper in table 4 in the result section. Table 4 is an additional file. Please confirm table 4.

In addition, we added a small description in the Discussion session.

(page 19, lines 234-236)

For example, one of the included study<sup>22</sup> in urban area described the non-internal medicine related health problems were only 11.4%.

We also changed the sentence as below. (page 19, lines 233-235)

(page 19, lines 235-237)

However, in some studies in rural area, the percentage of “non-internal medicine-related” RFEs or health problems reached over 40%<sup>18, 20, 23, 29</sup>.

We believe that your advice has made the manuscript better. Thank you once again.

To the editor:

We changed the Availability of data and materials section from “Not applicable” to “Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study.” (page 23, lines 302-303)