

博士論文審査結果報告
Report on Ph.D. / Doctoral Dissertation Defense

National Graduate Institute for Policy Studies (GRIPS)

政策研究大学院大学

Professor SUNAMI Atsushi

客員教授 角南 篤

審査委員会を代表し、以下のとおり博士論文審査に合格したことを報告します。

On behalf of the Doctoral Dissertation Review Committee, I would like to report the pass result of the Doctoral Dissertation Defense as follows.

プログラム名 Program	科学技術イノベーション政策プログラム Science, Technology and Innovation Policy Program	
学位申請者氏名 (ID) Ph.D. Candidate (ID)	岩城 洋子(DOC18152) IWAKI Yoko	
Dissertation Title 論文タイトル (タイトル和訳)	Essays on Evaluation of Global Health Policy on Tuberculosis Control 結核に係るグローバルヘルス政策の評価に関する論考	
学位名 Degree Title	博士 (公共政策分析) Ph.D. in Public Policy	
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審査委員会/ Doctoral Dissertation Review Committee	主査 Main referee	角南 篤 SUNAMI Atsushi
	審査委員 Referee	林 隆之 HAYASHI Takayuki
	審査委員 Referee	飯塚 倫子 IIZUKA Michiko
	審査委員 Referee	中村 安秀 日本 WHO 協会 NAKAMURA, Yasuhide Friends of WHO JAPAN
	審査委員 (博士課程委員会) Referee (Doctoral Programs Committee)	山内 慎子 YAMAUCHI Chikako

※ タイトルが英文の場合、文部科学省に報告するため、和訳を付してください

Please add a Japanese title that will be reported to MEXT.

1. Summary of Defense and Evaluation

In the area of tuberculosis (TB) control research in Japan, there are only few studies which have evaluated comprehensive policy for global health in TB control in low-income countries. At the same time, the key elements of global health policy (as presented in Basic Design for Peace and Health) emphasize the importance on policy evaluation in carrying on such policy effectively. Therefore, it is essential to acquire an understanding of the needed degree of effectiveness, which would support the global health policymaking and would utilize the findings to policy recommendations. Under these objectives, the dissertation analyzes the following: (a) the knowledge accumulation of Japan and global TB research trends; (b) TB awareness associated with social economic determinants of health system in low and middle-income countries (LMICs), and; (c) the effectiveness of TB screening policy toward TB infection control in Japan's high vulnerability counterpart country. Without exception, scientific, evidence-based evaluation analysis would be of considerable value for decision making toward successful implementation with trackable outcomes and process on global health policymaking. In particular, these policy analyses for evaluation will help implement the research on the specific aspects of the TB strategy for research and innovation nationally and globally, tackling innovative strategies in all countries to ensure interventions that are more effective. In addition, the key research characteristics and major research priorities scaled research engagement would help understand the challenges and improve policymaking of health systems with more efficient service delivery.

In the investigation of social determinates that affect the awareness of TB, the dissertation takes an approach of analyzing survey data which emphasizes the consequences of TB including determinants outside the health sector. Therefore, assessing the effectiveness of local implementation strategies and innovative tools for acquiring information are key elements of achieving essential prevention, treatment, and care interventions in migrant communities. Moreover, the cost and benefit analysis and health policy frameworks across the countries could reinforce case notification, vital registration, quality and rational use of medicines, and infection control. Such progress can be achieved through the financing of health care with comprehensive geographical coverage with quality service under adequate monitoring and evaluation. Therefore, the dissertation carried out case studies targeted on Nepal because of the increasing presence of emigrant Nepalese students and workers in Japan, which makes TB control collaboration between Japan and Nepal a significant key to the advancement of global health. Taking a detailed approach to the above issues, the dissertation conducts evidence-based analysis of available data to capture global research trends in TB control, and to develop a policy evaluation method for use in the framing of specific policy recommendations towards global health research.

The dissertation consists of five chapters: After the background introduction in Chapter 1, Chapter 2 demonstrates bibliometric evaluation, a method for obtaining an understanding of the structure of TB research including its trends, characteristics, and networks from publication outputs. The research uses natural language processing with text mining at Python platform. It holistically identified the characteristics of scientific TB research based on national healthcare policy by topic modeling analysis, which enables implementation of plausible policy, allowing for acceleration of element in relevant infectious control research. Future healthcare system innovations would continue to be needs-driven in line with the urgent priorities in TB research and innovation.

Chapter 3 conducts a social evaluation using STATA and R programming to find relationships between variables influencing improvements in TB awareness in Nepal. It highlighted that socioeconomic determinants such as wealth quintile, level of education, and owning a mobile phone were significantly associated with TB awareness at the national and regional levels. It showed the importance of formulating tailored strategies to increase TB awareness. Therefore, a mobile-focused approach for medical infrastructure could improve TB awareness and access to treatment. Consequently, it provides a valuable evidence to support future research on the contribution of Information and Communication Technology (ICT) usage to improve TB awareness.

Chapter 4 discusses the validation of economic evaluation using cost-benefit analysis of the economic impact of TB screening and testing policies targeted on Nepal. It illustrates the risks of TB incidence related to cost and benefit with transmission risks, as measures of policy effectiveness in each country. The TB pre-screening policy could be instituted to improve TB infectious disease recognition and to reduce productivity loss. Therefore, the optimal combination of expected cost and benefit could be identified to promote TB countermeasures nationally as well as internationally. Finally, Chapter 5 wraps up the dissertation with conclusions.

The candidate presented the dissertation over Zoom. The review committee was generally satisfied with the contribution of the dissertation. The referees however suggested several areas for improvement, including corrections of the presentation of data as well as overall logical structure of the main argument particularly both in the introduction and the conclusion. After several revisions to the dissertation, the committee was satisfied that the revisions were made appropriately based on the comments by the referees.

2. Dissertation overview and summary of the presentation

The dissertation addresses the importance of public health policy analysis with respect to infectious respiratory diseases which have threatened our lives and had a global impact on our health and our economy for decades. In particular, Tuberculosis (TB) is a threat to global health; it was one of the top 10 causes of death worldwide in 2019, according to the World Health Organization (WHO). In low and middle-income countries (LMICs), TB control is ineffective due to inadequate health care development and insufficient systems; there has been only limited reduction in TB morbidity and mortality. Moreover, comprehensive evaluation of global health policy in terms of TB control by means of Japanese research in LMICs has not been sufficiently evaluated. Therefore, international health research, related to LMIC issues on respiratory tract infections are essential for human security. For that reason, it is essential to achieve a full understanding of the effectiveness, through evaluation studies that can support global health policymaking. For example, in 2021, Nepal was a high TB burden country, with an increasing prevalence of cases. The dissertation chose Nepal as the target country of this study, because of the increase in the number of Nepalese students and laborers in Japan since 2010. To fill a perceived evaluation analysis methodology gap, the study in this dissertation conducted evidence-based evaluations of TB controls to confirm the validity of the results and develop a policy evaluation method to support the policy recommendations.

First, the dissertation evaluated the contributions of scientific research to global health achievements aimed at the elimination of TB by identifying major trends in Japan's scientific research using the data on published articles. Then, it conducted topic modeling to generate a probability distribution of topics influenced by academic text documents on TB research in the pre-proceeded dataset for the period 1999–2019. In-depth analysis for the learning of latent topics was conducted using Latent Dirichlet Allocation (LDA) modeling using the Python library Gensim. In addition, it categorized the results of the analysis into five spectra of TB research for each affiliated country in terms of intensified research and innovation toward the implementation of the END TB Strategy. The dissertation found that Japan had the highest proportion of clinical studies and medical trials as case reports in the fields studied. At the same time, the contribution of Japan to reciprocal linkage with social factors affecting wider health systems and dynamics among policy effectiveness was extremely low. Furthermore, the dissertation conducted policy effectiveness evaluation, evaluating the reciprocal relationship between social factors, to identify weaknesses in Japan's TB research engagement. Gaining an understanding the priorities and contributions of pulmonary tuberculosis research in Japan by means of international comparisons will help guide decision-making toward the implementation of future medical and health policies.

Secondly, it applied multilevel logistic regression to examine the association between demographic and socioeconomic factors and TB awareness, using data from the Nepal Demographic and Health Survey (June 2016 to January 2017). The results showed a high level of TB awareness in all seven provinces of Nepal. Importantly, socioeconomic factors such as wealth, education, and owning a mobile phone were found to be significantly associated with TB awareness—and socioeconomic determinants were found to be influential factors associated with TB awareness in Nepal. The wide variation in the level of awareness at the regional level emphasizes the importance of formulating tailored strategies for the raising of TB awareness. For instance, mobile phones promise to be an effective strategy for the promotion of TB awareness at a regional level.

Thirdly, the dissertation conducted cost-benefit analysis of data sourced from the Nepal Demographic and Health Survey and Japan's Legal Affairs Bureau and Tuberculosis Surveillance Center, to examine the effect of Japan's pre-entry TB screening policy, including testing and treatment in Japan and Nepal for the period 2014–2018. The total cost, total benefit, and net benefit for both countries were compared for two policy scenarios, "With" and "Without", using net present value (NPV). In order to address parameter difference for uncertainty, it conducted a sensitivity analysis using Monte Carlo simulation with secondary transmission rate. The results showed that implementing a policy of pre-entry TB screening for foreign migrants with a high TB burden arriving in Japan from Nepal would achieve efficient cost-saving by reducing the number of newly diagnosed TB cases, including those with transmission risk. Moreover, the results indicate that pre-entry TB screening would have prevented an increase in the number of new TB cases in Japan and reduced TB healthcare costs and capacity loss. The research findings highlight the importance of TB research on trend identification, technology application, and collaboration in TB control towards significant progress in global health, science, and technology diplomacy. Finally, the dissertation concludes with research limitations, and the prospects of global health policy studies.

Ms. Yoko Iwaki presented the dissertation via Zoom and responded to the questions and comments from the referees one by one. Although the review committee was more or less satisfied with the presentation of the dissertation more or less, however the committee suggested several areas for improvement, particularly clearer expression of the logical arguments constructed in the dissertation. After continuous efforts in revisions of the dissertation over several months, ultimately, the committee was satisfied that the revisions were made appropriately in line with the suggestions by the referees. Therefore, after long discussions among the reviewers, the committee reached a consensus to recommend GRIPS to award the degree of Ph.D. in Public Policy to Ms. Yoko Iwaki.

3. Evaluation Notes from the Doctoral Dissertation Review Committee (including changes required to the dissertation by the referees)

The dissertation review committee was generally satisfied with the contribution of the dissertation. They however suggested several areas for improvement, including the following.

1. The title should reflect the objectives and their conclusions more clearly, particularly placing the analysis of Japan appropriately. Better to include the introduction of the research question in Chapter 2. Also better to discuss why we should care about the relative size of the contribution of Japanese research on TB.
2. It is better to come up with the arguments to logically linking the chapters 2, 3, and 4. Also, both the introduction and the conclusion should address the overarching themes of the dissertation and the overall findings from the analyses in Chapters 2,3, and 4 together.
3. Better to address the point that logistic regression results do not necessarily show a causal relationship as they indicate the partial association between the outcome and controls. Also, the interpretation of the positive coefficient for province 3 seems too stretched.
4. Better to introduce your research question by discussing the globalization and inevitable spread of diseases across countries first, and then introduce the case study between Nepal and Japan. The current introduction seems to be concerned about the condition in Japan only.
5. In the conclusion, it may be better to suggest how to improve global health policy based on this study.
6. Numerous corrections in tables and figures as well as statistical presentations have been pointed out throughout the dissertation.

Several weeks after the defense, the candidate sent the revised dissertation to the members of the committee along with a note that described changes in response to the suggestions of the referees. However, the first round of revisions did not reach the median score of PASS required by the rules. Therefore, the candidate took another several weeks to go over the revision for the second round. Again, the second round of revisions did not still reach the median score required for PASS. Thus, the candidate worked on the third round of

revisions, but still failed to reach the required score. Finally, in her fourth revision, the committee gave the score reaching the necessary median score of PASS after the almost eight months since her defense.

4. Confirmation by the Main Referee that changes have been done to the satisfaction of the referees and final recommendations

The candidate made a presentation of her research, which deals with various issues related to tuberculosis. Although each of the analysis chapters were relatively well organized, an overarching framework to link all the chapters was missing and the discussion in introduction and concluding chapters lacked consistency and was not adequately developed. Furthermore, there were errors in the presentation of figures and tables including some editorial problems, which the reviewers considered that these need to be addressed. After four rounds of revisions, the committee finally recognized that the revisions were made appropriately in line with the suggestions by the referees. Therefore, the doctoral dissertation review committee recommends that GRIPS award the degree of Ph.D. in Public Policy to Ms. Yoko Iwaki.