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学位論文内容の要旨

博士の専攻分野の名称　　博士（医　学）　　氏 名　清　水　一　紀

学 位 論 文 題 名

Estimation of the diagnosed proportion of people living with HIV/AIDS among foreign residents in Japan

（日本における外国籍 HIV 感染者・AIDS 患者診断割合の推定）

[Background and Objectives] While the human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) undoubtedly remains a disease responsible for a substantial number of deaths, great progress has been made in constraining it. Japan has been no exception to the global epidemiological trends of HIV/AIDS. The incidence of HIV diagnoses and AIDS cases continued to steadily increase for the two decades from 1985, followed by declines starting in 2008 and 2010, respectively. Nevertheless, several estimates of the diagnosed proportion of people living with HIV/AIDS (PLWHA) through epidemiological and modeling approaches indicate that the diagnosed proportion of HIV infections in Japan has stayed below 90%, suggesting the necessity of substantial efforts to achieve the UNAIDS cascade. Besides, there has been notably little epidemiological research focused on the increasing proportion of foreign residents among newly diagnosed HIV infections and AIDS cases in Japan. Considering that the number of foreign nationals entering Japan has increased with time, estimating the number of PLWHA among foreign residents would play a key role in clarifying the full picture of the epidemiology of HIV/AIDS in Japan. Therefore, the present dissertation aimed to estimate the diagnosed proportion of PLWHA among foreign residents in Japan, covering 1990–2017, stratified by the geographic region of the country of origin.

[Materials and Methods] The study was premised on an analysis of surveillance data based on physicians' notification of HIV diagnoses or AIDS cases following the Infectious Disease Control Law, Japan. Datasets on international travel, which included items such as visit duration and travel volume, were also explored. By combining the incidence and prevalence data with the travel data, the incidence and cumulative incidence of HIV infection were measured as person–time at risk. Five different datasets from 1990 to 2017 were explored: estimated incidence and prevalence of HIV infection in individual countries; population size in each country; the average length of stay in Japan, by country of origin; the number of foreign nationals entering Japan, by country; and yearly notification data of newly diagnosed HIV infections and AIDS cases in Japan. A balance equation model was employed to statistically estimate the diagnosed proportion as a single parameter. Moreover, as the sensitivity analysis, challenges in the key assumption that the same risk of infection exists among foreign residents in Japan and their home countries, and differences of person-time at risk between countries were addressed.

[Results] The reported number of HIV diagnoses among foreign residents in Japan peaked in 1992 and gradually declined by 1998, while an upward trend has been seen since 2014. South and South-East Asia dominated the group, followed by Latin America and Sub-Saharan Africa countries. The cumulative number of HIV diagnoses and AIDS cases among foreign residents in Japan was 4,526 in 1990–2017. The three most highly represented regions were South and South-East Asia (36.6%), Latin America (11.4%), and Sub-Saharan Africa (6.6%). The proportion varied widely by region: people from

Western Europe, East Asia and Pacific, Australia and New Zealand, and North America were underdiagnosed, while those from Sub-Saharan Africa, South and South-East Asia, and Latin America were more frequently diagnosed. In the sensitivity analysis, these characteristics were mainly followed; however, different trends of the estimates were partly observed among people from Eastern Europe and Central Asia and East Asia and Pacific. Overall, the diagnosed proportion of PLWHA among foreign residents in Japan has shown a moderate but steady improvement over the years. The value amounted to 68.6% (95% CI: 66.6%, 70.8%) in 2014. However, the estimate in 2017 was as low as 55.3% (95% CI: 53.8%, 57.0%). The estimated number of PLWHA among foreign residents in 1990–2017 in Japan was 5,100 (95% CI: 4,951, 5,248), while 2,822 persons were observed, exclusive of "unknown" nationals. A similar difference appeared in Western Europe and East Asia and Pacific. In contrast, the observed data were higher than the upper 95% confidence intervals in Sub-Saharan Africa, South and South-East Asia, and Latin America.

[Discussion] It is clear that the first component of the UNAIDS cascade was not satisfied among foreign residents in Japan, indicating a critical need to investigate the underlying mechanisms. In addition, the diagnosed proportion of PLWHA among foreign residents differed greatly by the geographic region of their country of origin. The estimated number of PLWHA clearly showed that HIV infection among those from South and South-East Asia was likelier to be diagnosed than in other groups. HIV among residents from Sub-Saharan Africa and Latin America was also more effectively diagnosed than among those from other regions. HIV in residents from higher-income and low-HIV-prevalence countries, which are majorly constituted by industrialized countries (Western Europe, Australia and New Zealand, and North America), tended to be underdiagnosed. As leaving patients undiagnosed and untreated serves as a risk factor for the secondary transmission of HIV, and treatment as prevention (T as P) and Undetectable = Untransmittable (U = U) have been widely acknowledged, along with elimination of sexual transmission by early initiation of antiretroviral therapy and successful treatment of HIV, which yields both direct and indirect benefits, the issue of HIV among foreign residents should be proactively tackled, and their access to healthcare should be ensured.

[Conclusion] This is the first study to provide statistical estimates of the diagnosed proportion of HIV infections and PLWHA among foreign residents in Japan. To contain HIV/AIDS, designing effective programs that maximize access to HIV testing, treatment, and care to reduce HIV transmission, as well as the early engagement of political leadership, is imperative. While many obstacles exist to more meticulous approaches, the present study provides essential perspectives on HIV diagnoses among foreign residents in Japan that were interpretable from existing empirical data. Given the findings indicate a critical need to deeply examine foreign residents, investigate the underlying mechanisms, and consider the heterogeneity of transmission, scrutinizing nationality data is vital, potentially constituting an important component for establishing an effective country-specific tailored approach to PLWHA. Moreover, to truly construct evidence-based, tailored testing, treatment, and care programs, more comprehensive details of risk profiles and critical pieces of information should be identified. Launching the national HIV registry system, recording these characteristics, incorporating migration data, and considering additional methods such as the use of CD4 count data, will assist in capturing the transmission dynamics of HIV among foreign residents in Japan, and both quantitatively and qualitatively exploring the details of HIV/AIDS in Japan. It is expected that in a globalized world with large-scale human mobility, estimates presented in this study can serve as a beachhead for considering better access to HIV testing and care in the future in Japan.