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CORRESPONDENCE

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The Japanese initiative for the Global Research Network and Link on Infectious Diseases (J-GRID+) Program and its prospects

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Abstract: In response to the urgent need to strengthen Japan's capabilities in vaccine and pharmaceutical development for future infectious disease outbreaks, a global research "network" aimed at enhancing international collaboration was conceived. As a result, the Japanese initiative for the Global Research Network and Link on Infectious Diseases (J-GRID+), funded by the Japan Agency for Medical Research and Development (AMED), was launched in 2023. The aim of this article is to share our initiative to strengthen the global research network to prepare for infectious disease crises. Institutions participating in the J-GRID+ network have been conducting infectious disease research hubs under the previous "Japan Initiative for Global Research Network on Infectious Diseases (J-GRID project)" which supported over 20 years. The J-GRID+ was established for two key components: *i*) the "Overseas Research Centers Development", which strengthens research capacities in regions affected by infectious diseases through collaboration between Japanese universities and overseas research institutions, and *ii*) the "Operation of the J-GRID+ Network Core Center" to strengthen the monitoring of the information of signs of infectious disease outbreaks globally, to support each research center, and to strengthen communication as a global network. In April 2025, the newly established Japan Institute for Health Security (JIHS) will serve as the core center. With this outlook, J-GRID+ strives to be an enduring platform that supports global health security while respecting and strengthening international relationships.

Keywords: J-GRID+, infectious disease research network, health security, Japan

Introduction

The COVID-19 pandemic has had a profound global impact, exposing vulnerabilities in various systems worldwide. Japan was no exception (*1*). The pandemic revealed weaknesses within our healthcare and public health systems, prompting recognition of the need for substantial revisions and the construction of more resilient frameworks. Among the key areas identified was the need to enhance Japan's vaccine research, development, and production capacity. As a result, in 2021, the Japanese government adopted the "Strategy to Strengthen Vaccine Development and Production Systems" as a long-term national strategy. A central policy under this strategy was the expansion of monitoring systems, which are essential for the swift development and distribution of vaccines (*2*).

In response to the urgent need to strengthen Japan's capabilities in vaccine and pharmaceutical development for future infectious disease outbreaks, a global research "network" aimed at enhancing international collaboration was conceived. As a result, the Japanese initiative for the Global Research Network and Link on Infectious Diseases (J-GRID+), funded by the Japan Agency for Medical Research and Development (AMED), was launched in 2023 and operated by National Center for Global Health and Medicine (NCGM) and National Institute of Infectious Diseases (NIID) which will going to be Japan Institute for Health Security (JIHS) from 1st April 2025. Its primary goal was to reinforce existing collaborations between domestic universities and overseas institutions by networking these relationships to maximize the benefits of mutual research endeavors and lay the groundwork for rapid and coordinated responses to future health crises (*2,3*). The aim of this article is to share our initiative to strengthen the global research network to prepare for infectious disease crises.

Brief history: Toward the establishment of J-GRID+

Institutions participating in the J-GRID+ network have been conducting infectious disease research for the past 20 years with support from public research funding (*4*).

Phase 1 (2005-2009): The program to establish overseas research centers for emerging and reemerging infectious diseases was implemented by the Ministry

of Education, Culture, Sports, Science and Technology (MEXT). This phase focused on promoting cross-border collaborative research on infectious diseases. Its key components include establishing joint research centers between Japanese universities/research institutions and their counterparts in Asia and Africa, based on mutual benefit, with researchers from both sides working together on a daily basis.

Phase 2 (2010-2014): This phase is the so-called "Program to Promote the Establishment of Strategic Research Centers for Global Infectious Diseases" and aims to strengthen and solidify the established research hubs. The program provided a foundation for sustainable research activities, deepened collaborations with domestic and international institutions, and promoted the accumulation of knowledge and technologies in basic, clinical, and applied research. It also prioritized fostering the next generation of globally active experts in the field of infectious diseases, contributing to both international public health efforts and safeguarding Japan's health security.

Phase 3 (2015-2019): With the establishment of AMED in 2015, the program evolved into the "Japan Initiative for Global Research Network on Infectious Diseases (J-GRID)" (*5*). During this phase, epidemiological studies and basic research on diagnostics, therapeutics, and vaccines were conducted at overseas research centers across Asia and Africa. The program prioritized developing new technologies for infection control, advancing human resource development, and strengthening collaborative research frameworks with Japanese universities and research institutions.

After 15 years' J-GRID program to establish the research platform and infrastructure and to implement the research, the new program called "Japan Program for Infectious Diseases Research and Infrastructure" was launched in 2020. This new program aims to promote the participation of a diverse range of researchers and accelerate collaboration with countries conducting advanced research. These efforts will strengthen Japan's infectious disease research capabilities by fostering the development of new talent equipped with advanced skills and expertise, encouraging the involvement of young researchers, and facilitating innovative research (*6*).

List of research sites of J-GRID+

The current J-GRID+ program includes ten Japanese universities and 11 overseas research centers. Table 1 shows the list of Japanese universities with corresponding counterpart institutions and the contents of their research (*7-15*), and Figure 1 illustrates the locations of overseas research centers and the core centers (J-GRID+).

Under the "Overseas Research Center Development", Japanese researchers are, in principle, stationed locally and engage in collaborative research with trusted local universities and research institutions aiming to reinforce the research capabilities of Japanese universities' overseas centers. This long-standing, trust-based collaboration allows for access to invaluable resources such as clinical samples, epidemiological data, and patient information from infectious disease hotspots. These data would otherwise be unattainable within Japan. For instance, Osaka University has maintained a relationship with Thai research institutions since 1958, while several other centers boast similarly long-standing ties. Recently, Nagasaki University also established a new research hub in Brazil, marking a significant expansion into Latin America.

Details of each center, including their respective partnerships and research highlights, are published on the J-GRID+ website and are aavailable for public viewing (*16*). The program emphasizes the importance of nurturing respectful relationships with overseas counterparts, particularly when sensitive tasks such as sharing infectious disease information or biological samples are involved. Careful consideration is given to avoid undermining established relationships, ensuring mutual benefit, and minimizing the burden on partner institutions.

The prospect of J-GRID+ Network Core Center

The J-GRID+ Network Core Center, which has been jointly managed by NCGM and NIID, will transition to the Japan Institute for Health Security (JIHS) on April 1, 2025. The JIHS is tasked to serve as a knowledge hub for infectious diseases, integrating high-quality scientific evidence and swiftly providing this information to the Ministry of Health, Labour and Welfare (MHLW) and other relevant bodies. While NCGM and NIID have historically focused on strengthening monitoring systems and research networks, JIHS will expand these efforts. It will prioritize facilitating collaboration between domestic and international research institutions and private-sector companies engaged in developing vaccines, diagnostics, and therapeutics. Furthermore, JIHS will play a crucial role in pandemic preparedness by collecting and analyzing epidemiological data, monitoring global infectious disease policy trends, and supporting research and development initiatives.

The J-GRID+ Network Core Center in JIHS would continue *i*) to strengthen the monitoring of the information of signs of infectious disease outbreaks globally, *ii*) to support each research center, and to strengthen communication as a global network. One example of strengthening the relationship is a meeting held in November 2024, where the J-GRID+ Network Core Center organized a meeting in Zambia, bringing together researchers from participating Japanese universities and overseas research centers. This meeting proved highly effective in strengthening inter-hub collaboration, resulting in new discussions for joint

Table 1. List of J-GRID+ Japanese universities with corresponding counterpart institutions and the contents of their research

Japanese university Representative of the project	Country: counterpart institutions, (year of establishment)
Nagasaki University (*7*) Prof. Futoshi Hasebe	Vietnam:National Institute of Hygiene and Epidemiology, Viet Nam (Since: 2005)
Infectious diseases handled: Mosquito-borne viral infections (dengue fever, Zika fever, chikungunya fever, Japanese encephalitis, *etc.*), respiratory viral infections (COVID-19, influenza, respiratory syncytial virus infection, *etc*.), enteric viral infections (norovirus infection, rotavirus infection, enterovirus infection, *etc*.), zoonotic viral infections (Nipah virus infection, Hantavirus infection, rabies, *etc.*), diarrhea-causing bacteria (Vibrio bacteria, pathogenic *E. coli*, *etc.*)	
Osaka University (*8*) Prof. Tetsuya Iida	Thailand: National Institute of Health of Thailand (Since: 2005)
Infectious diseases handled: Diarrhea (cholera, dysentery, salmonella, norovirus, rotavirus, *etc.*) and mosquito-borne viral infections (dengue virus, chikungunya virus, *etc.*)	
The University of Tokyo (*9*) Prof. Yasushi Kawaguchi	China: Institute of Microbiology, Chinese Academy of Sciences; Harbin Veterinary Research Institute, Chinese Academy of Agricultural Sciences (Since: 2005)
Research: Basic research on the development of new treatments and diagnostic methods for enveloped viruses, such as influenza viruses, flaviviruses, and herpes viruses, which are currently circulating or are expected to become circulating in the future and may cause imported infectious diseases, with a focus on SARS-CoV-2, in collaboration with Chinese research centers, domestic institutions, the National Institute of Infectious Diseases, and overseas research centers of other universities are dealt.	
Hokkaido University (*10*) Prof. Hirofumi Sawa	Zambia: School of Veterinary Medicine, University of Zambia (Since: 2007)
Infectious diseases handled: Viral zoonoses (arthropod-borne infections, hemorrhagic fever, respiratory infections, intestinal infections, hepatitis, rabies, *etc.*), bacterial zoonoses (tuberculosis, relapsing fever, rickettsiosis, cholera, anthrax, AMR, *etc*.), protozoal zoonoses (leishmaniasis, trypanosomiasis, cryptosporidiosis, *etc.*)	
Kobe University (*11*) Prof. Yasuko Mori	Indonesia: Airlangga University Institute of Tropical Disease (Since: 2007)
Research: Research into the discovery of new pathogens (zoonotic pathogens) in monkeys living in Indonesia, epidemiological surveys of viral diarrhea, trends in AMR, and elucidation of the pathogenesis of dengue hemorrhagic fever.	
Okayama University (*12*) Prof. Shinichi Miyoshi	India: National Institute for Research in Bacterial Infections (Since: 2007)
Infectious diseases handled: Cholera and Vibrio infections, pathogenic *E. coli* infections, AMR infections, Salmonella infections (typhoid fever), viral diarrhea, rotavirus infections	
Institute of Science Tokyo (*13*) Prof. Toshihiko Suzuki	Ghana: Noguchi Memorial Institute for Medical Research, University of Ghana (Since: 2008)
Infectious diseases handled: Mosquito-borne viral infections (dengue virus, yellow fever virus, *etc.*), rotavirus infection, falciparum malaria, bacterial infections (Buruli ulcer, AMR, *etc.*)	
Tohoku University (*14*) Prof. Hitoshi Oshitani	Philippines: Research Institute for Tropical Medicine (Since: 2008)
Infectious diseases handled: Pediatric respiratory infections (RS virus, enterovirus, rhinovirus, influenza virus, human metapneumovirus, parainfluenza virus, adenovirus, human coronavirus), pediatric diarrhea (norovirus, sapovirus, rotavirus), *etc.*	
Niigata University Prof. Reiko Saito	Myanmar: National Health Laboratory (Since: 2015)
Infectious diseases handled: Respiratory infections (influenza virus, respiratory syncytial virus, SARS-CoV-2, rhinovirus), pediatric meningoencephalitis (enterovirus D68, parechovirus A), severe pediatric diarrhea (rotavirus), *etc.*	

Table 1. List of J-GRID+ Japanese universities with corresponding counterpart institutions and the contents of their research (continued)

Japanese university Representative of the project	Country: counterpart institutions, (year of establishment)
Osaka Metropolitan University Prof. Yasutoshi Kido	Democratic Republic of Congo: National Institute of Biomedical Research (Since: 2020)
Infectious diseases handled: Mpox, Malaria, Covid-19, AMR, NTD, cancer-causing pathogens (HBV, H.pylori)	
Nagasaki University (*15*) Prof. Jiro Yasuda	Brazil: Keizo Asami Institute, Federal University of Pernambuco (Since: 2024)
Infectious diseases handled: Expected diseases include dengue fever, chikungunya fever, Zika fever, influenza, COVID-19, yellow fever, West Nile fever, Oropouche fever, South American hemorrhagic fever, malaria, leishmaniasis, schistosomiasis, and leptospirosis. Current research: Research into emerging viral infectious diseases, research into parasitic diseases such as Chagas disease, genomic and epidemiological research into pathogens, pathological research to clarify the pathological mechanisms of infectious diseases prevalent in Latin America, research into arboviruses.	

Figure 1. Location of overseas research centers and the core centers (J-GRID+).

research initiatives. With this outlook, J-GRID+ strives to be an enduring platform that supports global health security while respecting and strengthening international relationships.

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