DOI: https://doi.org/10.54393/pbmj.v9i9.1465

PAKISTAN BIOMEDICAL JOURNAL
https://www.pakistanbmj.com/journal/index.php/pbmj/index
ISSN (E): 2709-2798, (P): 2709-278X
Volume 9, Issue 09 (September 2026)

Role of Academia and Research Institutions in Advancing Indigenous Vaccine Development

Saira Afzal[1*] and Muhammad Maaz Arif[2]

[1]Department of Community Medicine, Institute of Public Health, Lahore, Pakistan
[2]Department of Occupational Health and Pubic Health Lab, Institute of Public Health, Lahore, Pakistan
drsairaafzal@kemu.edu.pk

ARTICLE INFO

How to Cite:
Afzal, S., & Arif, M. M. (2026). Role of Academia and Research Institutions in Advancing Indigenous Vaccine Development: Academic Role in Indigenous Vaccine Development. Pakistan BioMedical Journal, 9(9), 01-02. https://doi.org/10.54393/pbmj.v9i9.1465

Research and academic institutions play a vital role in advancing the development of indigenous vaccines. The self-driven research and production of vaccines that suit national or regional public health needs reduces reliance on imports and enhances self-reliance, which is particularly important for developing countries[1].

These institutions contribute at many stages of the development of vaccines. Their work includes pathogen isolation and characterization, antigen discovery, and the development of platform technologies, including inactivated, recombinant, and subunit approaches. Their involvement may extend to early-stage clinical trials and immunological data that support vaccine research. Collaboration with industry provides another way by which vaccine research can progress from laboratory development to large-scale manufacturing[2].

Training of candidates for vaccine research encompasses skills development with a focus on affordable biopharmaceuticals and vaccines. Universities and research institutions can contribute in terms of discovery, clinical trial infrastructure, and specialized scientific expertise. Collaboration between academia, industry, and government can further support the movement of research towards product development[1].

Comparable roles for public research institutions can be seen in other countries. In Brazil, institutions such as Fiocruz (Bio-Manguinhos), together with partnerships involving universities, have supported technology transfer, local production of COVID-19 vaccines, and efforts to develop indigenous vaccine platforms, including mRNA approaches. These activities have also been linked to wider efforts to reduce dependence on external vaccine supply. In other low- and middle-income countries, research institutions contribute to vaccine research, scientific training, and collaborations intended to address pathogen strains and logistical needs relevant to their own settings[3].

For Pakistan, strengthening domestic vaccine production is particularly relevant because of the country's heavy dependence on imported vaccines. Approximately 90–95% of the vaccines used in the national immunization program are reported to be imported. Such dependence may increase exposure to global supply disruptions, higher procurement costs, and potential vaccine shortages during pandemics or other emergencies[4].

Overall, academic and research institutions are particularly important during the early stages of vaccine development, when evidence must be generated for subsequent regulatory and policy decisions, including those made through bodies such as India's NTAGI. Academic and research institutions also contribute to training the next generation of vaccinologists and to maintaining the scientific capacity needed to respond to emerging infectious threats. Academic research alone, however, is not sufficient. Its contribution to indigenous vaccine development depends on continued funding, supportive policy, and effective links with industry. Together, these factors can strengthen domestic vaccine capacity, improve access to vaccines, and support preparedness for future public health emergencies.

Copyright© 2026 The Authors. Published by CrossLinks International Publishers LLC, USA
This work is licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0)

DOI: https://doi.org/10.54393/pbmj.v9i9.1465

REFERENCES

[1] Swarup R, Sharma A, Logani JM. Building a Robust Ecosystem for Vaccine Research in India. International Journal of Infectious Diseases. 2019 Jul; 84: S7-9. doi: 10.1016/j.ijid.2019.03.017.

[2] Pant B, Goda J, Gota V. Drug Development in LMICs: Could the Emerging Indian Model Usher the Southeast Asian Region? The Lancet Regional Health-Southeast Asia. 2024 Oct; 29. doi: 10.1016/j.lansea.2024.100464.

[3] Marandi V. Bridging Innovation and Policy: Comparative Pathways of National Vaccine Development in Low-and Middle-Income Countries. Osong Public Health and Research Perspectives. 2025 Sep; 16(5): 425. doi: 10.24171/j.phrp.2025.0208.

[4] World Health Organization. A Case Study on the Ecosystem for Local Production of Pharmaceuticals, Vaccines, and Biologicals: The Nigeria Context. World Health Organization. 2024 May.

Copyright© 2026 The Authors. Published by CrossLinks International Publishers LLC, USA
This work is licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0)