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Lessons learned from the COVID-19 pandemic—Identifying key diagnostic & socioeconomic factors for pandemic preparedness

The COVID-19 pandemic exposed critical deficiencies in the global health system and provides important lessons to improve preparedness for future emergencies. A case in point is Latin America, where access to testing was constrained by affordability and poor infrastructure. In recent months, three pivotal studies have converged to highlight critical vulnerabilities and lessons for global health resilience and equity. From diagnostic limitations in resource-limited settings to socioeconomic disparities in testing capacity, these findings underscore the need for collaborative and globally equitable health strategies.

Social inequality, in addition to wealth, constrains countries' ability to test

A socioeconomic study published in BMJ Open in February 2025 highlights how differences in wealth and governance affected global testing capacity during the COVID-19 pandemic. By analyzing the relationship between laboratory testing capacity for the SARS-CoV-2 virus and socioeconomic factors—particularly wealth, governance and social inequality—in 109 countries in 2020-2021, the study identifies potential determinants of global variation in testing capacity during the pandemic.

The analysis reveals stark contrasts in access to testing. "We found that socioeconomic and gender inequalities play a significant role in access to SARS-CoV-2 testing," says Prof. Felix Drexler of Charité - Universitätsmedizin Berlin, lead author of all three studies. The study highlights the need for equitable access to health care and the urgent need to increase diagnostic capacity to contain the spread of pathogens and improve pandemic preparedness.

Systemic weaknesses in testing capacity and access to health care

The analysis also confirms the findings of a joint report by DZIF researchers and the German Institute for Global and Area Studies (GIGA), published in November 2024 by the EU-LAC Foundation, a joint foundation of the EU and its member states and the Latin American and Caribbean (LAC) countries. The report highlights systemic vulnerabilities uncovered by COVID-19 and calls for improved regional capacity for drug and vaccine production, as well as a more balanced intellectual property rights framework to foster innovation.

Major challenges in environments with limited resources

A third study, published in Health Policy in March 2025, also finds that diagnostic services are critical to the global response to COVID-19, but that they face significant challenges in low- and middle-income countries. The study evaluates COVID-19 diagnostics in 20 countries where DZIF scientists had established new tests in the field and trained laboratory staff during the pandemic. It finds that capacity building is hampered by expensive and difficult-to-access reagents, poor infrastructure and limited human resources.

The study concludes that increased and secure funding, a clear mandate from regional and national stakeholders, and strong integration of diagnostics are critical for pandemic preparedness. "Our collective findings underscore a call to action for sustained international cooperation, equitable distribution of resources, and resilient health systems," says Drexler, who is a scientist in the "Emerging Infections" research area at the German Center for Infection Research (DZIF). Highlighting the substantial research contributions of the DZIF beyond Germany and traditional laboratory-based research, including in collaboration with DZIF's African Partner Institutions, he adds: "Integrating these lessons will be essential to fostering a more inclusive global health landscape that is better prepared for future pandemics."

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Originalpublikation:

Socioeconomic determinants potentially underlying differential global SARS-CoV-2 testing capacity: an ecological study (2025), <https://doi.org/10.1136/bmjopen-2024-090804>
Shared Challenges, Shared Responsibilities: Lessons Learnt for EU-LAC Cooperation in Global Health (2024), <https://eu-lacfoundation.org/en/shared-challenges-shared-responsibilities-lessons-learnt-eu-lac-cooperation-global-health>
Strengthening Diagnostic Services in Latin America Requires Regional Leadership, Sustainable Funding, and Enhanced Data Sharing (2025), <https://doi.org/10.1016/j.healthpol.2025.105287>

URL zur Pressemitteilung: <https://www.dzif.de/en/lessons-learned-covid-19-pandemic> Press release of the German Center for Infection Research (DZIF)



During a visit to the border region between Colombia and Venezuela in 2021, a member of Prof. Jan Felix Drexler's team demonstrates how to perform a rapid antigen test.
Charité/Edmilson de Oliveira Filho