BMJ Global Health

Integrating mobile laboratories into global health security: advancing collaboration through GOARN-DiSC

Oleg Storozhenko,[1] Ahmed Albarraq,[2] Tarek Al-Sanouri,[3] Kym Antonation,[4] Cindi R Corbett,[4] Laurent Dacheux,[5] Sophie Duraffour ,[6,7] Laurence Flevaud,[8] Jean-Luc Gala,[9] Michelle M Haby,[10,11] Edmund N Newman,[12] Philomena Raftery ,[13] Flavio Salio ,[14] Peter Torda,[15] Sabrina Weiss [16]

To cite: Storozhenko O, Albarraq A, Al-Sanouri T, *et al*. Integrating mobile laboratories into global health security: advancing collaboration through GOARN-DiSC. *BMJ Glob Health* 2025;**10**:e022083. doi:10.1136/bmjgh-2025-022083

Handling editor Seema Biswas

Received 10 October 2025
Accepted 5 November 2025

For numbered affiliations see end of article.

Correspondence to
Dr Philomena Raftery;
praftery@who.int

SUMMARY BOX

⇒ Rapid Response Mobile Laboratories (RRMLs) provide deployable, adaptable and scalable diagnostic surge capacity in all types of health emergencies, enhancing outbreak response, surveillance and International Health Regulations (2005) core capacities, especially in resource-limited settings.

⇒ The evolution of RRMLs—from early outbreak response tools, to essential assets during Ebola outbreaks and the COVID-19 pandemic—has demonstrated their value in scaling up diagnostics, supporting research and strengthening public health systems globally.

⇒ The establishment of the Global Outbreak Alert and Response Network Strategic Group for Diagnostic Surge Capacities (GOARN-DiSC) in 2024 has created a coordinated global platform for RRML partners, promoting integration with global emergency preparedness and response frameworks through collaborative and sustainable models. DiSC focuses on leadership, standardisation, quality assurance and workforce development to harmonise operations and improve interoperability.

⇒ The WHO Minimum Operational Standards and Typology (MOST), published in 2025, establishes evidence-based, standardised guidance for developing and deploying RRMLs, enhancing diagnostic surge capacity, interoperability and trust to strengthen national health systems during emergencies.

⇒ GOARN-DiSC calls for One Health multisectoral collaboration, innovation and sustainable financing to build scalable, interoperable and quality-assured RRMLs—advancing equitable, timely and effective responses to future health emergencies within the global health security architecture.

In the face of complex global health threats—including climate-driven zoonotic spillovers, rising antimicrobial resistance, emerging pathogens and extreme weather events—there is a rising imperative for adaptable and accessible laboratory capacity, particularly in resource-limited settings. In this context, Rapid Response Mobile Laboratories (RRMLs) offer a strategic solution, providing scalable diagnostic surge support across all phases of the health emergency management cycle.[1] Unlike stationary laboratories, RRMLs can be swiftly mobilised to deliver services at the point of need, including high-containment diagnostics in hard-to-reach areas. This accelerates turnaround times, enables timely public health interventions and real-time decision-making, improves diagnostic access and helps bridge persistent gaps in fragile health systems. Moreover, RRMLs reinforce outbreak response and disease surveillance, contributing to the development and maintenance of core capacities required under the International Health Regulations (2005).[2]

The origins of mobile laboratories date back to the 19th century when they were first deployed during cholera and animal disease outbreaks. Their role evolved throughout the 20th century—from military applications for biological and other hazard detection to broader public health use. Between 1990 and 2010, RRMLs became increasingly integrated into public health emergency responses. A significant shift occurred during the 2014–2016 Ebola virus disease epidemic in West Africa,[3] which demonstrated the value of RRMLs in contributing to outbreak response as well as to research and development, including supporting development of new rapid diagnostics, vaccine research, treatment trials and evaluation of prevention and control strategies. This catalysed the expansion of RRML capabilities across sectors, including national public health institutes, civil protection agencies, academia and NGOs. The COVID-19

pandemic reinforced the relevance of RRMLs in low-income and middle-income settings,[4] as well as in urban centres of high-income countries.

The diverse array of institutions operating RRMLs—each with its own protocols and practices—highlights the need for standardisation grounded in evidence-based approaches. Building trust between RRMLs and the public health authorities of emergency-affected countries is essential for effective coordination, data sharing, sample management and long-term sustainability. Integration with national laboratory systems and emergency coordination mechanisms is likewise critical to ensure RRMLs are effectively incorporated into broader public health responses.

Under the umbrella of the Global Outbreak Alert and Response Network (GOARN),[5] the WHO Regional Office for Europe has led efforts to address these challenges in a structured and coordinated manner, helping to elevate the RRML initiative from a regional undertaking to a global platform. A 2017 stakeholder meeting hosted by the Robert Koch Institute marked the beginning of this process, which was strengthened through simulation exercises (figure 1) and field deployments. These efforts culminated in the establishment of the GOARN Strategic Group for Diagnostic Surge Capacities (GOARN-DiSC) in 2024. GOARN-DiSC brings together RRML partners to collaborate around four strategic pillars: leadership and coordination, standardisation, quality assurance and workforce development. GOARN-DiSC, as the convening platform for the global RRML community of practice, facilitates technical exchange, joint planning and institutional alignment, with the overarching goal of strengthening resilient national health systems supported by coordinated international RRML surge capacity.

In 2025, the WHO published the normative document Minimum Operational Standards and Typology (MOST) for RRMLs,[6] developed by the GOARN-DiSC community. This global reference guides the consistent, quality-assured deployment of RRMLs. The MOST typology embeds the One Health approach, considering diagnostic needs across human, animal and environmental health domains. It positions RRMLs as critical tools for advancing collaborative surveillance, joint outbreak investigations and implementing point-of-care diagnostics. The document reflects the One Health priorities of the Pandemic Agreement[7] and calls for strengthened coordination and interoperability with relevant actors, including Emergency Medical Teams, the Public Health Emergency Operations Centre Network and other WHO-supported operational partnerships. These efforts align with WHO's Health Emergency Preparedness, Response and Resilience[8] architecture and the Global Health Emergency Corps framework.[9]

To advance its role as an emerging contributor to the global health security architecture, GOARN-DiSC invites collaboration among One Health partners across sectors involved in the development and deployment of RRMLs, including those from low-income and middle-income countries. Priority areas for collaboration include implementing a quality management system grounded in the MOST requirements, fostering innovation in mobile diagnostic technologies (including integrating artificial intelligence and robotics), improving diagnostic portability, strengthening the RRML workforce and supporting deployments. GOARN-DiSC is also exploring sustainable financing models to support RRML deployments and enhance national capacities. Through coordinated investment, it aims to establish scalable and interoperable diagnostic surge capacity—aligned with WHO's 14th General Programme of Work[10] and the GOARN Strategy[11]—thereby contributing to more timely, effective and equitable responses to future health emergencies.

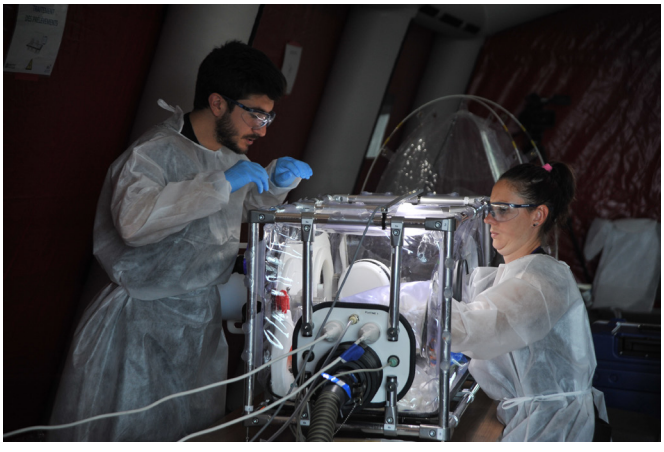

Figure 1 Participants of the Interregional Field Simulation Exercise for Rapid Response Mobile Laboratories in Istanbul, Türkiye, 2023. Copyright: WHO Regional Office for Europe.

Author affiliations
[1]Health Security Division, World Health Organization Regional Office for Europe, Copenhagen, Denmark
[2]Public Health Authority, Riyadh, Saudi Arabia
[3]Eastern Mediterranean Public Health Network (EMPHNET), Amman, Jordan
[4]National Microbiology Laboratory, Public Health Agency of Canada, Winnipeg, Manitoba, Canada
[5]Laboratory for Urgent Response to Biological Threats, Unit for Environment and Infectious Risks, Institut Pasteur, Université Paris-Cité, Paris, France
[6]Bernhard-Nocht-Institute for Tropical Medicine (BNITM), Hamburg, Germany
[7]German Center for Infection Research, Hamburg, Germany
[8]Medical Department, Médecins Sans Frontières, Barcelona, Spain
[9]Center for Applied Molecular Technologies, UCLouvain and Head of the Belgian Mobile Laboratory B-LiFE, Louvain-la-Neuve, Belgium
[10]Faculty of Biological and Health Sciences, University of Sonora, Hermosillo, Sonora, Mexico
[11]School of Population and Global Health, University of Melbourne VCCC, Parkville, Victoria, Australia
[12]UK Public Health Rapid Support Team (UK-PHRST), UK Health Security Agency (UKHSA), London, UK
[13]WHO Health Emergencies Programme, World Health Organization, Lyon, France
[14]Emergency Medical Teams Initiative, World Health Organisation, Headquarters, Switzerland

[15]Directorate-General for European Civil Protection and Humanitarian Aid Operations - ECHO, European Commission, Brussels, Belgium
[16]Centre for International Health Protection, Robert Koch-Institut, Berlin, Germany

Contributors OS led the writing and coordination of input from all authors. All authors contributed to conceptualisation, writing and review of the final manuscript. During the preparation of this work, the author(s) used https://chatgpt.com/ to improve language and readability. Following the use of this tool/service, the author(s) reviewed and edited the content as needed and accept(s) full responsibility for the final content of this publication. With the exception of the first author, all other authors are listed in alphabetical order.

Funding This work was funded by the WHO.

Disclaimer The author is a staff member of the World Health Organization. The author alone is responsible for the views expressed in this publication and they do not necessarily represent the views, decisions or policies of the World Health Organization. Authors hold sole responsibility for the views expressed in the manuscript, which may not necessarily reflect the opinion or policy of WHO.

Competing interests Some authors are staff members of WHO. All authors declare no conflicts of interest.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data sharing not applicable as no datasets generated and/or analysed for this study.

ORCID iDs
Sophie Duraffour https://orcid.org/0000-0002-1239-4372
Philomena Raftery https://orcid.org/0000-0002-2683-7154
Flavio Salio https://orcid.org/0000-0002-5024-1318
Sabrina Weiss https://orcid.org/0000-0002-4835-3695

REFERENCES

1 World Health Organization. *Strategic group for diagnostic surge capacities of the global outbreak alert and response network (GOARN): Concept Note*. Geneva: World Health Organization, 2025. Available: https://iris.who.int/handle/10665/380418
2 World Health Organization. *International health regulations (2005)*. 3rd edn. Geneva: World Health Organization, 2005. Available: https://www.who.int/publications/i/item/9789241580496
3 Wölfel R, Stoecker K, Fleischmann E, *et al*. Mobile diagnostics in outbreak response, not only for Ebola: a blueprint for a modular and robust field laboratory. *Euro Surveill* 2015;20:44.
4 Affara M, Lagu HI, Achol E, *et al*. The East African Community (EAC) mobile laboratory networks in Kenya, Burundi, Tanzania, Rwanda, Uganda, and South Sudan-from project implementation to outbreak response against Dengue, Ebola, COVID-19, and epidemic-prone diseases. *BMC Med* 2021;19:160.
5 Mackenzie JS, Drury P, Arthur RR, *et al*. The global outbreak alert and response network. *Glob Public Health* 2014;9:1023–39.
6 World Health Organization. *Minimum operational standards and typology for rapid response mobile laboratories*. Geneva: World Health Organization, 2025. Available: https://www.who.int/publications/i/item/9789240107113
7 World Health Organization. WHA78.1 annex: WHO pandemic agreement (annex to wha78/1). Geneva World Health Organization; 2025. Available: https://apps.who.int/gb/ebwha/pdf_files/WHA78/A78_R1-en.pdf
8 World Health Organization. Strengthening the global architecture for health emergency prevention, preparedness, response and resilience (hepr). Geneva World Health Organization; 2023. Available: https://www.who.int/publications/m/item/strengthening-the-global-architecture-for-health-emergency-prevention--preparedness--response-and-resilience
9 World Health Organization. Global health emergency corps framework. Geneva World Health Organization; 2025. Available: https://iris.who.int/handle/10665/381484
10 World Health Organization. Fourteenth general programme of work, 2025–2028. World Health Organization; 2024. Available: https://www.who.int/about/general-programme-of-work/fourteenth [Accessed 9 Jun 2025].
11 World Health Organization. *Global outbreak alert and response network strategy, 2022–2026*. Geneva: World Health Organization, 2023. Available: https://iris.who.int/handle/10665/366066