

Accelerate Non-Animal Batch Release Testing for Human Vaccines

Year 3 Report

Executive Summary

In Year 3, the project intensified global and local actions to accelerate uptake of non-animal approaches in human vaccine batch release and quality control. Workstreams covered expert engagement through the International Steering Committee (ISC), participation in high-impact regulatory and scientific meetings, targeted liaison with national authorities, industry and pharmacopeial groups, and a robust calendar of webinars and trainings. These efforts culminated in a hybrid international conference in Bangkok (December 2–4, 2025), showcasing tangible progress across India, Brazil, Indonesia, South Korea and other regions.

Country-specific implementation planning advanced for priority topics including in vitro potency for diphtheria-containing vaccines, transition from rabbit pyrogen testing and LAL to recombinant endotoxin methods (rBET/rFC), adoption of the Monocyte Activation Test (MAT), rationalization of legacy in vivo safety tests, and exploration of high-throughput sequencing (HTS) for adventitious agent detection.

Stakeholder readiness increased through continuous dialogue, practical training, and dissemination of technical resources. While global alignment remains a challenge for certain assays, the year closed with stronger momentum, clearer roadmaps, and public commitments by regulators and manufacturers to progress replacement, reduction and refinement of animal use.

1. Engagement of International Experts

Quarterly updates were shared via email throughout 2025. Dedicated ISC meetings were not held, as members were actively engaged through ad hoc calls to support the organization of webinars and workshops and served on the scientific committee for the hybrid conference held December 2–4, 2025.

Members included representatives from EDQM, Health Canada, the U.S. FDA, the Indian Pharmacopoeia Commission, national control laboratories (Germany, Austria, Thailand), and industry associations (EFPIA, IFPMA, DCVMN, KoBIA/South Korea, RDPAC China), alongside IABS, PATH and NC3Rs. A joint position statement was prepared for publication (to be submitted to VeriXiv).

Key international events attended and/or supported:

- 6th General Meeting of WHO Network of National Control Laboratories for Biologicals (WHO-NNB), 26–27 November 2024: co-led workshop on transitioning DTP vaccines to animal-free batch release; pre-workshop survey captured NCL testing practices.
- EFPIA workshop “3 Basket Approach: Recommendations Towards the Commission Roadmap to Phase Out Animal Safety Testing in Chemicals”, Brussels, January 16, 2025.
- WHO stakeholder meeting on “Guidelines on the phasing out of animal tests for the quality control of biological products”, Geneva, February 27–28, 2025.
- EMA 3Rs Working Party Stakeholders Meeting, April 2, 2025.
- SCoMRA, Mombasa, Kenya, November 11–13, 2025.
- WHO National Control Laboratory Network for Biologicals, Lyon, France, November 26–27, 2025 (attended online).

2. Local Engagement with Authorities and Manufacturers

India: Online coordination with the Indian Pharmacopoeia Commission (IPC) on May 20, 2025 regarding ongoing plans; participation in IPC’s 4th Expert Working Group on alternatives to animal methods on November 25, 2025.

Brazil: Online meeting with ANVISA COFAR (Coordination of the Brazilian Pharmacopoeia) on September 12, 2025.

Approach in Year 3 prioritized remote engagement, leveraging the December conference to convene stakeholders from India, Indonesia, Brazil, and South Korea either in person or online. Individual and joint ad hoc calls kept industry and regulators aligned on implementation priorities.

3. Implementation Plans and Country Readiness

Country-by-country implementation plans were refined, mapping regulatory status and practical readiness against criteria such as guideline/pharmacopoeia updates, awareness, acceptance, and execution (planned, ongoing, implemented).

Key considerations observed across target countries:

- Growing interest in in vitro potency assays for DT-containing vaccines; Korea has a regulator-led five-year program, and two Indian manufacturers initiated outreach for SOPs and critical reagents.
- Broad movement to replace animal-based pyrogenicity tests: notable progress in Brazil and strong planning in India; several manufacturers (India, Brazil) and NRAs (Brazil, Indonesia) reported starting transitions from LAL to rBET, with one Brazilian manufacturer reporting MAT implementation for immunobiologicals. Partnerships with PATH supported recombinant BET adoption.

- Rationalization of in vivo safety testing proceeds at varied pace depending on management buy-in, regulatory openness, and product/process specifics; alignment with EDQM, EPAA and NC3Rs (wP MWGT) remains important.
- Interest in HTS for adventitious agents is high, with common requests for equipment and training details; coordinated with PATH to share knowledge resources.

4. *Webinars*

- January 29–30, 2025: Transitioning DTwP containing vaccines to animal-free batch release testing strategy. Strategies for implementation.

Registered: 270; Attended: 120 (Day 1), 140 (Day 2); participation from manufacturers and regulators across India, Brazil, Thailand, Indonesia, Egypt, Serbia, Hungary, Pakistan, Belgium, South Korea, France, Mexico, Taiwan, Nigeria, South Africa, Canada, Ghana, Argentina, Russia, Germany, France, Italy, Tunisia, Norway, and China; plus PATH, WHO, NGOs, and DCVMN.

- February 20, 2025: The future of pyrogen testing in Brazil: The new strategy for determining pyrogenicity potential.

Registered: 278; Attended: 153 from universities, pharma companies, CROs, kit suppliers, and government (human and veterinary).

- March 20, 2025: Recombinant Factor C in Korea: Advancement and Applications (managed by KoBIA).

50+ attendees from industry and institutes including KTR, KIT (Korea Institute of Toxicology), KTC, Katri and related organizations.

- April 16, 2025: Moving away from animal-based vaccine batch release testing: Opportunities and ongoing activities in China.

Registered: 151; Attended: 93; manufacturer representation included Sinovac, Sanofi, Walvax, Maxvax, GSK, Baihui and others; one registrant from NIFDC; university attendees from Army Medical University and Sichuan University Western Hospital.

- October 22, 2025: Replacing the monkey neurovirulence test: challenges and opportunities for the future.

Registered: 105; Attendance: 53 (~50%); attendees spanned regulators (AUDA-NEPAD, UK, Italy, Russia, Indonesia, China, India, Mexico, Nigeria, Africa), manufacturers (India, China, Netherlands, Brazil, Vietnam) and NGOs.

- November 13, 2025: Biopharmaceuticals animal-free viral assessments.

Registered: 124; Attendance: 57 (~50%); participation from Azerbaijan, Belgium, Brazil, China, Egypt, France, Germany, India, Italy, Morocco, Mexico, Namibia, Nigeria, South Korea,

Switzerland, Tunisia, Uganda, UK, USA, Vietnam; regulators included Uganda, Egypt, Nigeria, Namibia, Morocco, Tunisia, Mexico, Brazil, Belgium, Italy, Azerbaijan, plus WHO and NC3Rs.

5. Hands-on Training on Recombinant Endotoxin Methods

A two-day workshop on Recombinant Factor C (rFC) for bacterial endotoxin testing was held on September 18–19, 2025, organized by Humane World for Animals India with bioMérieux. It brought together nine officials from the National Institute of Biologicals on Day 1 and 26 participants from the Indian Pharmacopoeia Commission and CDSCO on Day 2, including senior scientific officers and regulatory leaders. The program featured expert presentations on endotoxin science, LAL versus rFC methods, regulatory considerations, and sustainability benefits, along with hands-on training using Endolisa and Endonext kits and case study discussions. The workshop achieved strong endorsement from CDSCO for rFC adoption, IPC confirmed plans for a revised pharmacopoeia chapter in 2026 to enable alternative methods, and all stakeholders agreed on the need for industry data to support validation and inclusion in monographs. This event advanced technical readiness and regulatory dialogue for transitioning to recombinant endotoxin testing in India.

6. International Conference: “Animal testing replacement for vaccines – A One Health View”

The project co-organized a hybrid conference with IABS, held December 2–4, 2025 in Bangkok and online. Registration totaled 200, with 170 participants attending (in person and remote).

In-person attendees included academia, government and industry from Brazil, India, South Korea, Thailand, Indonesia, Japan, Vietnam, Malaysia, Singapore, Germany, France, Spain, Sweden, Canada, USA, UK, Senegal, Ghana, Israel, the Russian Federation, the Netherlands, South Africa and Belgium. Approximately 50 participants joined remotely from India, China, South Korea, Egypt, Tunisia, Indonesia, USA, UK, Germany, France, Mexico, the Netherlands, Italy and Norway.

The conference showed not only how engagement of global, regional and local stakeholders had increased but also how many of the targeted country’s stakeholders actively worked in advancing the transition from in vivo to in vitro. Public presentations highlighted progress and commitments by: Serum Institute of India, Biological E, the Indian Pharmacopoeia Commission, Indonesia BPOM (NRA and NCL), Brazil ANVISA (NRA) and Fundação Butantan (manufacturer), and the South Korea Regulatory Science Center (on behalf of MFDS). The conference platform also showcased ongoing initiatives by WHO and PATH (including NGS for nOPV, adventitious agents, recombinant BET, and reagent availability).

Impact and Progress in Year 3

- Expanded multi-level engagement (global, regional, local) leading to wider awareness and concrete planning for animal-free batch release strategies.
- Demonstrated feasibility through case examples (e.g., Brazil's MAT implementation; rBET transitions initiated in India and Brazil).
- Improved readiness among NRAs and manufacturers via targeted webinars and practical training.
- Strengthened alignment with complementary international efforts (WHO, PATH, EDQM, EPAA, NC3Rs)