

Clean cold experts explore how people in Africa can access COVID-19 vaccine

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Scientists are launching a key study to help African nations prepare for the sustainable distribution of an eventual COVID-19 vaccine.

Mass, rapid COVID-19 vaccination will be an immense challenge for sub-Saharan Africa countries with significant rural populations and existing cold-chain infrastructure will need to be significantly improved if a [vaccine](#) is to reach the people who need it.

Working with the United Nations Environment Program—United for Efficiency team, researchers from the University of Birmingham and Heriot-Watt University, Edinburgh, are undertaking a fast-track study in Rwanda to explore how the cold-chain is currently used to distribute vaccines in the country.

The study will also define gaps in infrastructure and develop strategies for sustainable COVID-19 [vaccine delivery](#). Findings will help governments, vaccine development agencies, pharma and logistics companies begin to plan for the future.

The programme will run alongside the work of experts from Birmingham and Heriot-Watt in India, where they are joining forces with non-profit, commercial and academic partners to begin investigating the scale of challenge involved in distributing a potentially temperature-sensitive COVID-19 vaccine. It leverages the award-winning Rwanda Cooling Initiative that is accelerating the country's transition toward more efficient and climate-friendly cooling solutions.

Toby Peters, Professor of Cold Economy at the University of Birmingham, commented: "Universal vaccine access is already a major challenge in the Global South, but sub-Saharan Africa faces a daunting challenge. Cold-chain will be critical in rapidly transporting and delivering COVID-19 vaccines to all communities, particularly in rural areas where electricity supply and cooling infrastructure is often non-existent or unreliable.

"We likely have a 12-18 month window to engineer efficient, equitable,

robust delivery mechanisms to support a pace and breadth of vaccination never before considered. Taking Rwanda as a pilot, the majority of its population lives in rural areas and has one of the lowest Gross National Incomes. We'll create a rapid assessment method to enable such countries to understand available cooling infrastructure and create options for COVID-19 vaccine distribution and beyond."

Effective vaccine delivery requires full assessment of existing cold-chain infrastructure, particularly point-of-use, to help design robust distribution systems for a COVID-19 vaccine and long-term emergency response.

By evaluating capacity and preparedness of Rwanda's vaccine cold chain and understanding complementary temperature management services and sustainable cooling technologies, the assessment will better enable Government and Development Agencies to identify:

- gaps for mass COVID-19 vaccine distribution and skills shortages;
- likely temperature-controlled logistics and storage demands that meet vaccine volume and delivery timeframe constraints;
- cost implications of system development;
- unintended consequences such as the temporary diversion of current vaccine logistics or increased safe waste disposal demands; and
- technical skills needs.

The fast-track programme will deliver a methodology for other developing countries in Africa and the wider Global South to assess their readiness to distribute temperature-sensitive vaccines using the cold-chain network. Using this as a pilot, the work will contribute to:

- developing short- to medium-term delivery of COVID-19

vaccine in a safe, efficient, and sustainable manner, while still maintaining routine vaccine deliveries;

- creating long-term contingency health logistics frameworks that are cost-effective, sustainable, and responsive to different levels of challenge—[basic needs](#), natural disasters/ regional epidemics, national pandemics;
- embedding a vaccine delivery system that meets day-to-day demand;
- reducing vaccine losses.

Dr. Bing Xu, Associate Professor in Finance at Heriot Watt, University, commented: "This piece of work will prove hugely helpful in designing the right financing options. There is an urgent need to identify Rwanda's financing gaps to ensure COVID-19 vaccines to be adequately prepared to store, transport, and deliver to their population. We also need to explore suitable financing channels to fund the mass vaccination without impacting the country's current immunisation programme."

The Global Alliance for Vaccines and Immunization estimates that only 10% of health care facilities in the world's poorest countries have a reliable electricity supply while in some countries less than 5% of health centres have vaccine-qualified refrigerators. WHO estimates that more than 25% of some vaccines may be wasted globally every year because of temperature control and logistics failure.

Professor Peters added: "Ultimately, we need a global effort to prepare the vaccine and in parallel a global strategy to develop the appropriate sustainable and legacy equitable cold chains and achieve this with minimum environmental impact.

"Out-of-the-box thinking is needed if we are to define sustainable and inclusive solutions that can be delivered quickly and at scale to beat this pandemic and unlock connections between COVID-19 vaccine

deployment, sustainable cold chain and development of clean energy infrastructure."

Provided by University of Birmingham

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