

Researchers retrofit refrigeration container to ensure and prolong COVID-19 vaccine cooling

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ORNL researchers proved that COVID-19 vaccines can be kept ultra-cool for an extended period in a retrofitted commercial storage container, providing a resource for safe delivery to remote locations. Credit: ORNL, U.S. Dept. of Energy

Oak Ridge National Laboratory researchers have retrofitted a commercial refrigeration container designed to ensure COVID-19 vaccines remain at ultra-low temperatures during long transport and while locally stored.

Most COVID vaccines, depending on the manufacturer, are stored at minus 70 or 30 degrees Celsius. Current transport methods use dry ice to maintain desired temperatures. However, longer travel times, particularly to remote locations without supportive infrastructure, require extended refrigeration.

In a study, researchers collaborated with Carrier and created a testbed using a lightweight aluminum container equipped with a refrigeration system, [vaccine](#) packages and optimal cargo layout and storage rack design that kept temperatures consistent and uniform throughout

the container. Simulation studies demonstrated this method can hold required temperatures twice as long.

"We significantly increased the dry ice life, providing reliable temperature control and a safe, secure solution for [cooling](#) vaccines for transport and last mile storage," ORNL's Jian Sun said.



A retrofitted commercial storage container created by Carrier and ORNL provides a resource for safe delivery of COVID-19 vaccines to remote locations. Credit: ORNL, U.S. Dept. of Energy

More information: Jian Sun et al, COVID 19 vaccine distribution solution to the last mile challenge: Experimental and simulation studies of ultra-low temperature refrigeration system, *International Journal of Refrigeration* (2021). [DOI: 10.1016/j.ijrefrig.2021.11.005](https://doi.org/10.1016/j.ijrefrig.2021.11.005)

Provided by Oak Ridge National Laboratory

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