

Utilizing drones to deliver childhood vaccines could save lives, says research

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Delivering childhood vaccines via drone could be a triple whammy—saving lives, saving money and improving health outcomes—according to [research](#) in *Transportation Science*. The authors

developed optimization models to strategically design a distribution network for drones to deliver vaccines. Their proposed approach was evaluated using real-world data from the Vanuatu region, where vaccine delivery by drones was tested.

"We conducted a [case study](#) in a hard-to-reach region to investigate the value of utilizing different types of drones in addition to other transportation modes in the [distribution network](#) and the advantage of considering multi-stop drone trips," says Shakiba Enayati of the University of Missouri-St. Louis. "Our results indicate significant cost savings that facilitate routine vaccine distribution and potentially save children's lives."

The study was conducted by Enayati, alongside fellow authors Haitao Li, James Campbell and Deng Pan, all of the Supply Chain & Analytics Department in the College of Business Administration at University of Missouri-St. Louis.

"Our models for vaccine distribution by drone suggest that optimized distribution networks can generate large cost savings, with large drones replacing airplanes to handle long-range transport of large quantities of vaccines, and small short-range drones replacing trucks and boats to deliver small amounts of vaccine," says Li, founding director of the Laboratory of Advanced Supply Chain Analytics.

The paper, "Multi-Modal Vaccine Distribution Network Design with Drones," notes that multi-stop drone trips result in significant savings, but savings tend to diminish when allowing more than two drone stops.

"Drone delivery of routine [childhood vaccines](#) can save children's lives in less-developed regions where transportation is very challenging, and with lower transportation costs," says Campbell. "When using optimization models for vaccine distribution, it's also imperative to

consider the use of various types of drones to make sure you are getting the most complimentary benefits."

The team is currently finalizing research on a complementary problem of "last mile" delivery of vaccines in which [drone](#) deliveries are coordinated with health worker outreach trips to remote locations. They believe that optimizing [vaccine delivery](#) with drones has huge potential benefits, not only in hard-to-reach areas, but also in the U.S. and other developed regions.

More information: Shakiba Enayati et al, Multimodal Vaccine Distribution Network Design with Drones, *Transportation Science* (2023). [DOI: 10.1287/trsc.2023.1205](https://doi.org/10.1287/trsc.2023.1205)

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