

# Designing Immunization Supply Chains to Maximize Access: A Case Study from The Gambia



unicef  
for every child



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## Objective

Most existing supply chain optimization models aim at minimizing costs or maximizing profit, and do not always fit the context of LMICs. An optimization model for vaccine network design was developed by MIT and validated using The Gambia as a case study to provide useful insights regarding the applicability of the solution to enhance access to immunization services.



## Methodology

A literature review found 6 papers had similar characteristics to the object scope of the study and were used as the basis formulation of the model. Expert opinion from UNICEF and the EPI program was used to define the characteristics the model should possess and defined in the Python formulation for the toy model.

The project aimed to answer the following: **'how can an efficient vaccine network model be formulated in order to maximize access?'**

Recent analysis of the immunization supply chain in The Gambia provided real data for use to validate the model developed. The model focused on the last-mile distribution to the 317 outreach sites in country.

## Findings

The following factors resulted in positive outcomes that could increase access to immunization services.

### Allocation of parent facility

Allocating outreach sites to the nearest health facility irrespective of administrative boundaries **reduced average distance travelled by up to 60%.**

### New outreach sites

Expansion of outreach sites from **317 to 445** in optimized locations using the model would maximize access to immunization services.

### Frequency of outreach

**Optimizing the frequency** of outreach sessions whilst ensuring that no site is visited more than needed using the model.

## Conclusions

The results of The Gambia case study demonstrated the ability of the model to increase access to immunization services. Through the opening of new outreach sites and an optimization of the outreach allocation and scheduling, immunization access could increase from **91% to 97.1%.**

