

Mobile Clinics Deployment for Humanitarian Relief: A Multi-period Location Routing Problem

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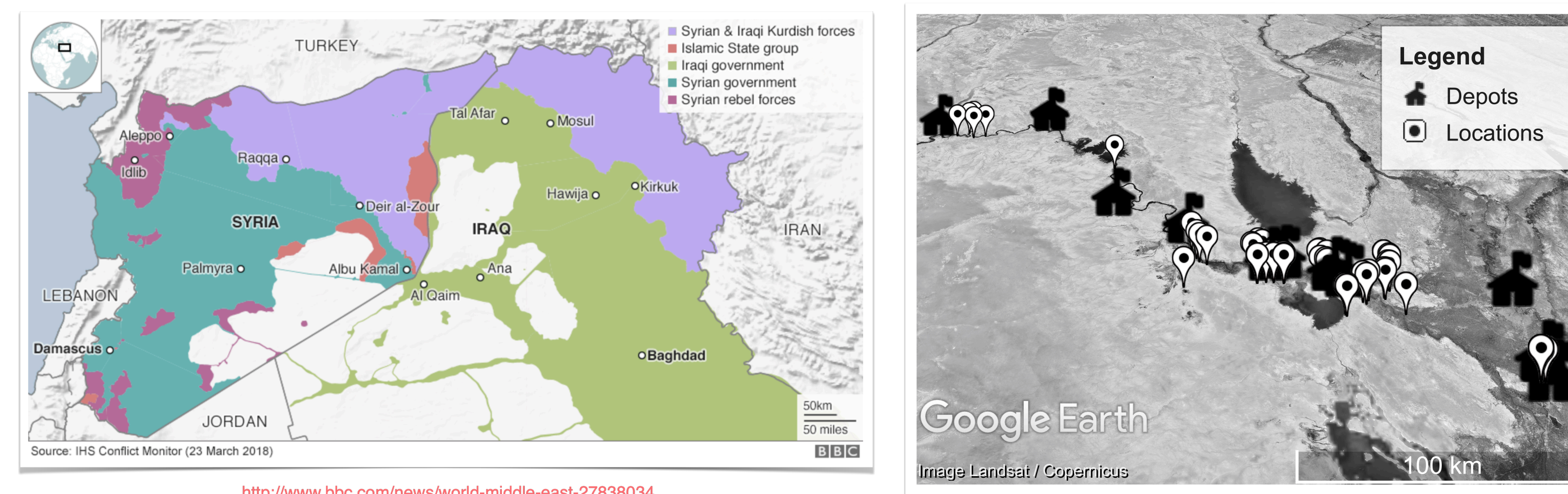
What are Mobile Clinics?

TEMPORARY HEALTHCARE SOLUTIONS



The Mobile Clinic Application

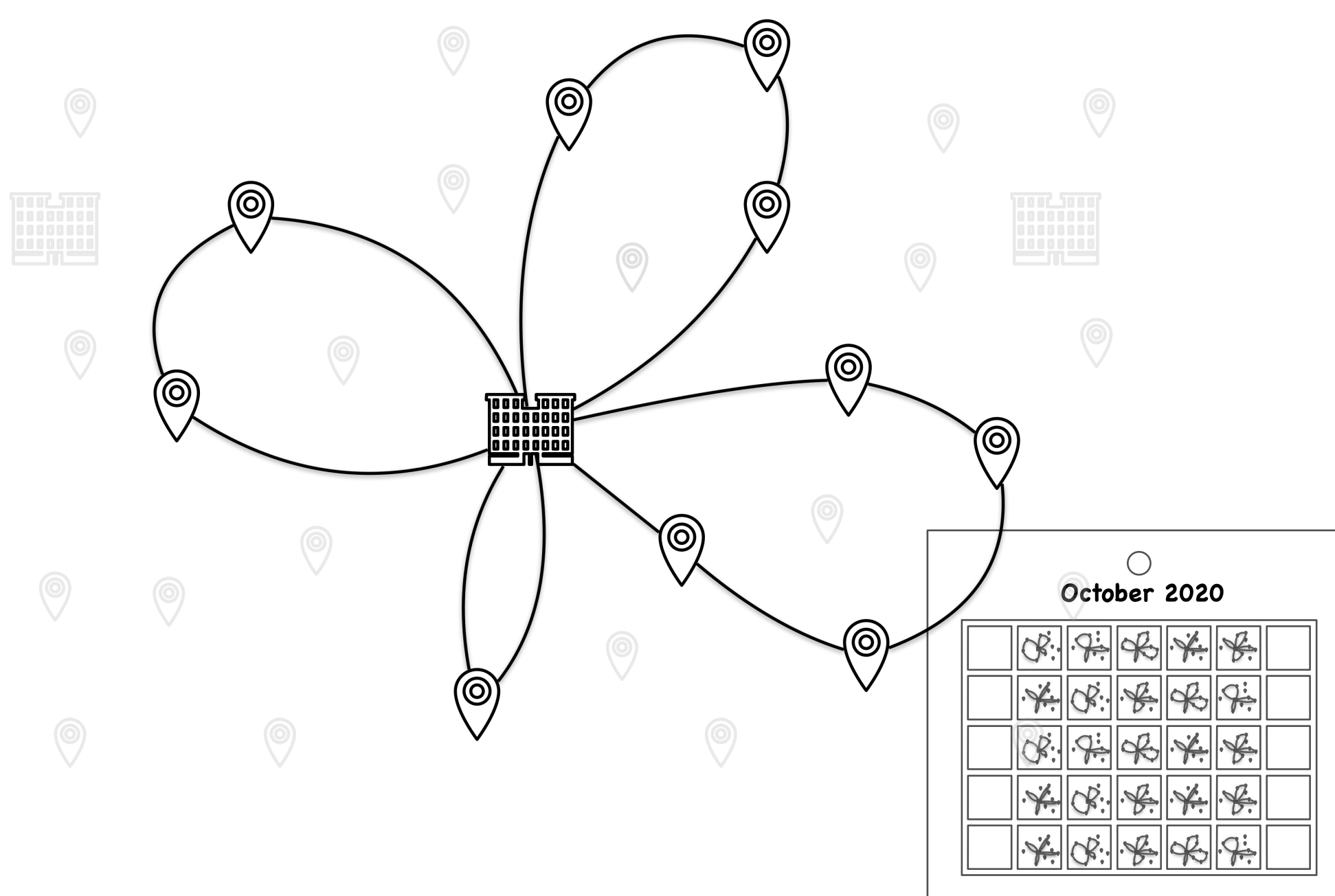
A COLLABORATION WITH PREMIÈRE URGENCE INTERNATIONALE



Photos Shared by PUI in Iraq
Conditions of the Villages

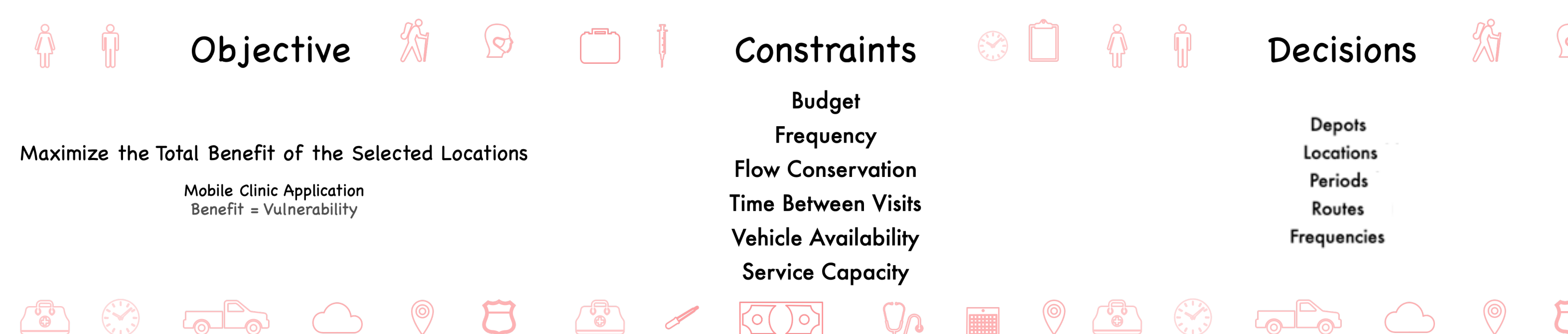
Multiperiod Location Routing

WHAT DEPOTS SHOULD CLINICS DEPART FROM?
WHAT LOCATIONS WILL BE VISITED?
WHAT ROUTES SHOULD BE USED?
WHEN WILL THE LOCATION BE VISITED?



The Mathematical Model

A SET PARTITIONING MODEL



Managerial Insights

FROM PUI'S DEPLOYMENT IN IRAQ

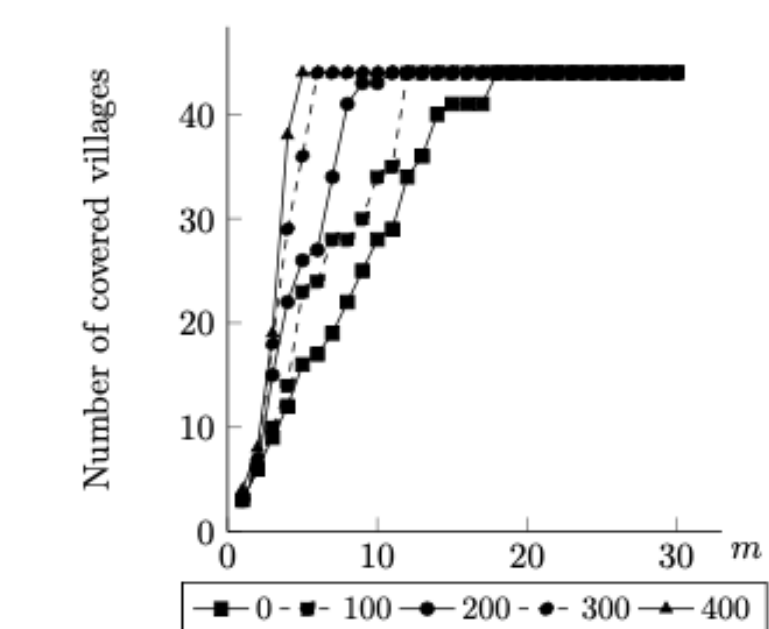
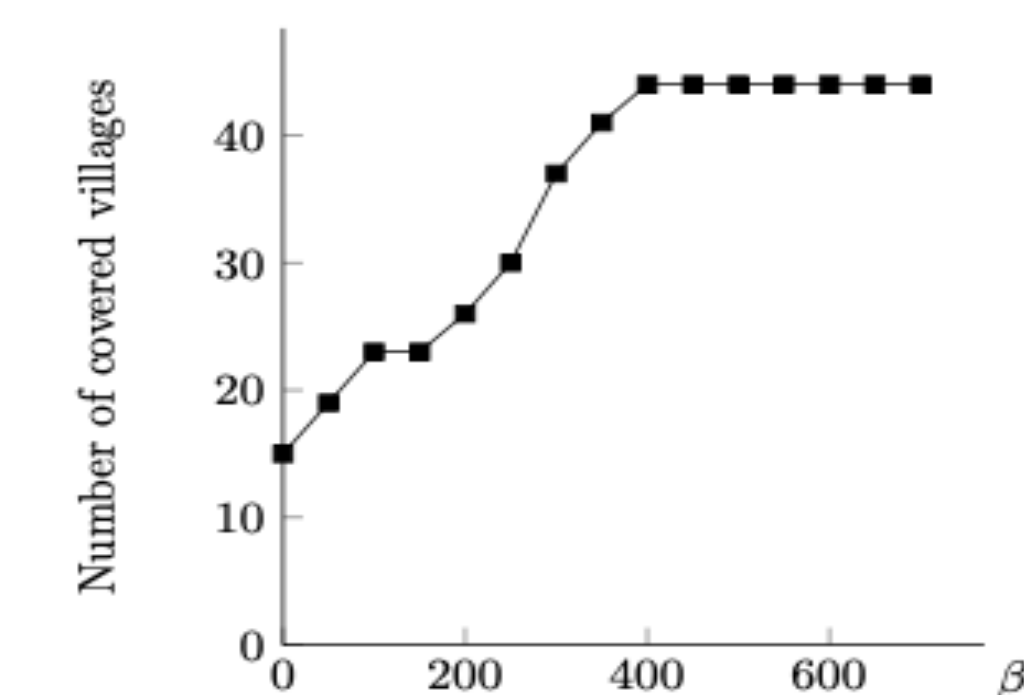


Figure 7: Number of covered villages ($B = \infty$)

Figure 11: Marginal benefit functions, $|V| = 3$

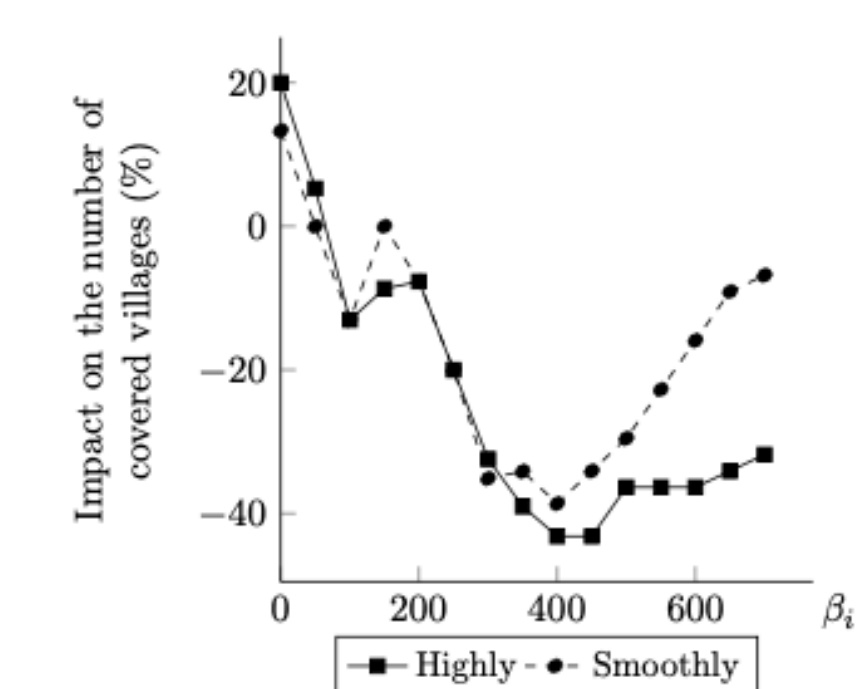


Figure 13: Impact on the number of covered villages when considering highly and smoothly diminishing marginal benefits ($m = 5$, $B = 5000$)

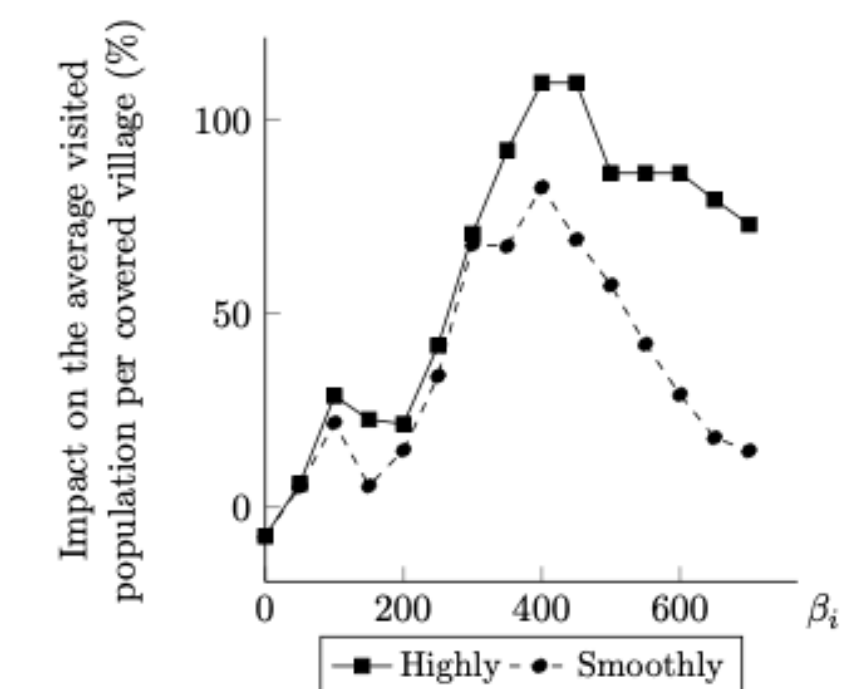


Figure 14: Average proportion of the population visited at least once with highly and smoothly diminishing marginal benefits ($m = 5$, $B = 5000$)

Contributions

USING OR/MS FOR MOBILE CLINIC DEPLOYMENT

- First to propose a **Mobile Clinic Deployment** solution approach using an **MLRP**
- Real world data** and **direct collaboration** with the NGO
- Derived **managerial insights** on:
 - benefit function models**
 - number of clinics**
 - continuity and coverage trade-offs**