

## **Dial-a-ride with real-time disruptions**

*29<sup>th</sup> European Conference On Operational Research  
8-11 July 2018*

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The problem considered in this work stems from a non-profit organization in charge of transporting patients to medical appointment locations. Some patients require to be transported from their home to a given location and the other way around. This organization proposes door-to-door transportation services for these requests. This problem is called a dial-a-ride problem (DARP) in the scientific literature. The DARP investigated in this application consists in determining a set of routes for a fleet of vehicles to satisfy the requests, taking into account several constraints: e.g. time window constraints (the pickups and the deliveries have to be achieved within given time intervals), maximum riding time constraints of patients, and vehicle capacity constraints. The objective function is composed of several aspects: minimizing the route length but also maximizing patient satisfaction (reduced waiting time or route duration).

The planning is generated in the evening for the following day. Patients have a fixed appointment time but its duration may vary due to unforeseen circumstances. Thus, even if all requests are known in advance, it may happen that some transportation requests are modified, delayed or cancelled in real time. The aim of this work is to propose recourse actions to adapt the planning in order to manage these real-time disruptions. The planning should be modified quickly, while trying to minimize the changes to avoid confusion for the drivers and the patients.