September 22, 2023

Dear editors,

My name is Dr Geraint Palmer, lecturer at the School of Mathematics at Cardiff University. I am writing on behalf on of a team of authors as we wish to submit a research article entitled *"Optimising Heterogeneous Ambulance Fleet Allocations in Jakarta"* for consideration in the European Journal of Operational Research.

In this paper, we propose a modelling approach to consider where to optimally locate different types of emergency response vehicles in order to maximise patient outcomes within a heterogeneous population. We use this modelling approach within a heuristic algorithm to optimally allocate the vehicles, and use a novel discrete event simulation to evaluate the found allocations. This paper is a continuation and extension of previously published work, namely *"Ambulance allocation for maximal survival with heterogeneous outcome measures"* by Knight, Harper and Smith. This paper extends that work of that paper in four ways:

- we extend the model to include heterogeneous fleets, that is both primary transport vehicles and secondary response vehicles;
- we overcome one problem identified in the first paper, that is the circular nature of the vehicle utilisations, by numerically solving implicit equations relating allocation and utilisation;
- we develop a sequential discrete event simulation of the calls and emergency response vehicles' logic to evaluate the found allocations on a range of KPIs;
- we apply the work to the real life situation in the city of Jakarta, in a developing country.

Thank you for your consideration of this article.

Yours Faithfully,

Dr Geraint Palmer