Introduction: Response time is a very important factor in determining the quality of prehospital emergency medical services (EMS).

Objective: To model the response of Israeli ambulances and to offer model-derived strategies for improved deployment of ambulances in order to reduce response time.

Methods: Using a geographical information system (GIS), a retrospective review of computerized ambulance call and dispatch logs was performed in two different regional districts: (1) large and urban; and (2) rural. All calls that were pinpointed geographically by the GIS were included, and their data were stratified by weekday and daily shifts. Geographic areas (polygons) of, at most, eight-minute response time were simulated for each of these subgroups to maximize the timely response of calls.

Results: Mean response times in the Carmel and Lachish districts were 12.3 and 9.2 minutes, respectively, with 34% and 62% of calls responded within eight minutes. When ambulances were positioned within the modeled polygons, >94% of the calls met the eight-minute criterion. However, with one ambulance per polygon, the probability that ambulances could fall short of demand in the Carmel district exceeded 5% in 20 of 35 shifts. This was rectified by the addition of two ambulances to the district.

Conclusion: The GIS simulation model presented in this study suggests that EMS could be more effective with a dynamic load responsive ambulance.

Keywords: ambulance; emergency medical services (EMS); geographical information system (GIS); Israel; response times

Reducing Ambulance Response time by a Geographical Information System (GIS) Simulation Model

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