

## OPRE 6398.001 Prescriptive Analytics

### Reading 11\*

New Haven, Connecticut faced declining revenues and increasing costs in 1990. The squeeze on public services led to a feasibility study of eliminating fire companies without causing dramatic increase in risk to the city. New Haven had 10 engine companies (to deliver water), five truck companies (to save lives), and a tactical fire unit primarily for automobile accidents and other emergencies. There were also four emergency medical units located in firehouses throughout the city.

The first proposal was to eliminate the truck company with the lowest utilization in the past, but it was dropped due to political opposition from firefighters and residents. The focus then shifted to closing an engine company. Research findings showed that this would result in an average increase of 45 seconds in expected travel time for the area of responsibility in case of a fire, but it would save the city about \$750,000 annually. The recommendation was accepted.

Next, the analysts considered elimination of one of the emergency medical units, which were utilized about 15 percent of the time, and the tactical fire unit. After a careful examination of the system, it was suggested that two of the medical teams, who were cross-trained as firefighters, be made available for both fires and medical emergencies. Cost analysis concluded that significant savings would result at minimal increase in risk.

A spatial queuing model was developed to estimate improvements in response time under the consolidation plan. Arrivals were assumed to be Poisson, and service time exponential. If a request went to a unit that was already busy, another fire unit outside of the system would handle the call. For each demand point defined by a grid of the city, the emergency units were ordered by preference for dispatching. This model made it possible to identify the best way to reorganize the deployment of fire department services in New Haven.

The plan, which was implemented in 1991, eliminated 28 positions without negatively affecting fire service delivery. It increased productivity by both reducing cost and improving public safety. Yearly savings totaled \$1.4 million and amounted to nearly 10 percent of the fire suppression budget.

\* Adapted from Swersey, A., Goldring, L., & Geyer, E., Sr. Improving fire department productivity: Merging fire and emergency medical units in New Haven. *Interfaces*, 1993, January-February, 109-129.