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Cost optimization for patient referrals

Kambiz Farahmand^{a,*}, Mahmoud Mostafa^a, Satpal Singh Wadhwa^a,
Sudhindra Upadhyaya^a, Vahid H Khiabani^b

^aDepartment of Industrial & Manufacturing Engineering, NDSU, Fargo, ND 58108

^bDepartment of Construction Management & Operations Management, MSUM, Moorhead, MN 56563

Abstract

The purpose of this study is to determine the cost model associated with surgical referrals of a level one surgical department in a large city for two large departments namely orthopedic and Podiatry, and to analyze the feasibility of increased capability specifically in these two departments within the referral area to minimize travel time and cost for the patients and the provider. Patient data was obtained and used to determine origin and the distances patients had to travel to reach the hospital with surgical capability. The out of town patients are considered referred patients and they were clustered into five clusters based on average distances (weighted) from their hometown to the hospital. It is the purpose of this project to determine the cost associated with surgical referrals to the surgical department for the two procedures and to examine the alternative for a location(s) to maximize access for the patients and minimize cost to the provider.

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1. Introduction

The geographic area under consideration includes New Mexico and West Texas which is mainly served by the surgical department located in Albuquerque New Mexico. The focus of this study is on the surgical referrals to this facility from three main areas including West Texas, North Albuquerque and South Albuquerque.

* Corresponding author. Tel.: 701-231-5694; fax: 701-231-7959.
E-mail address: kambiz.farahmand@ndsu.edu



Fig. 1. The five clusters formed in the geographic area under consideration.

Patients who live in Southern or Northern New Mexico and West Texas who require non-emergency surgery are referred to the Albuquerque Medical Center surgical department. Rural patient requiring emergency surgeries are referred to the nearest clinic or hospital with surgical capability. The referral patients who are scheduled for surgery will also have pre and post-surgery visits to the Albuquerque Medical Center. Considering the volume of referral patients for these departments and the cost associated with the referrals, it may be feasible to build additional clinics or Medical Centers with pre or post and/or surgical capability in areas such as West Texas or other locations in New Mexico. The initial focus is on developing rural facilities to pre and post-surgical needs of the patients using physician assistants or surgical nurses if possible.

In this study, patients, and the cities they come from, are clustered based on the distance they travel to reach Albuquerque. The number of partitions was arbitrarily chosen to be five. The means for these partitions are shown in Table 1 and they are depicted with their respective colors in Figure 1. The clusters will be used to create patients from this region for simulation purposes.

Figure 1 shows the five clusters formed in the region of New Mexico and West Texas served by the medical center and their radial configuration as we move away from Albuquerque. The average hourly arrival rate for each cluster used to simulate the arrival of patients from each zone in the geographic region under consideration is shown in Table 2.

Table 1. The five clusters and their average distance to the medical center.

Cluster	Average one way Distance to ALBQ in miles	Color Code
FCL1	612	Red
CL2	883	Green
CL3	415	Blue
CL4	193	Yellow
CL5	25	Orange

Table 2. Average hourly arrival rates of patients for each cluster.

Cluster #	Arrival Rate
Cluster 1	0.021759
Cluster 2	0.00370371
Cluster 3	0.20885417
Cluster 4	0.902835648
Cluster 5	3.23119213

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