

1 Introduction

Healthcare is defined as diagnosis, treatment and prevention of disease, injury, illness and other physical and mental impairments in human beings. Its services can be categorized into three main areas as primary healthcare, secondary healthcare and preventive healthcare.

Primary healthcare addresses the basic health problems that are observed in the community and provides curative and preventive services to those who are in need. Secondary healthcare services are provided to the patient by medical specialists after seen by a primary healthcare provider. When the health problems become more complex, they should be treated by someone who has expertise either on a specific body system or on a disease. Preventive healthcare includes the services provided prior to a disease. In other words, these services are given to the community to be able to prevent diseases before they occur instead of treating them.

In Turkey, a new structure was introduced to the healthcare system in 2012, which is called Family Practitioning. In this system, each person is registered to a family practice center that is the closest one to his/her residential address. Family practitioners are responsible from providing preventive and primary healthcare services to those who are registered under their names.

Each practitioner can familiarize the assigned residents that are closely located. S/he is the best medical staff that can have information on the health status, living conditions of the members of a family, so that s/he can provide the most appropriate preventive healthcare services. These doctors can evaluate the patients under an integrative approach as they know their history and above mentioned status. As a result, primary healthcare services can also be given under the supervision of the family practitioners. If there is a requirement for secondary healthcare services for a patient, these centers can dispatch the patient to the clinics or hospitals.

The aim of this whole system is to prevent the congestion in the secondary healthcare providers (clinics/hospitals) and allow the doctors to spend time on the patients that really require secondary healthcare services. If the preventive and primary healthcare services are given in the family practice centers, it will be decreasing the disease/sickness rate in the community as well as increasing the quality of the services and healthcare education given in secondary healthcare providers.

2 Problem Definition

In this system, residents who would like to get preventive or primary healthcare services will visit a family practice center. After evaluating the patients status, the practitioner has 3 alternative actions.

1. Treat patient at the center and dispatch him/her to home with appropriate medicine if necessary.
2. Request some tests from the patient and dispatch him/her to a laboratory.

3. Decide that patient cannot be treated in the center so that transfer him/her to a hospital with advanced equipment and tests. The decision that will be made is to determine the locations of the family practice centers according to different criteria.

3 Logistics Requirements

When placing Family Practice Centers (FPCs), the followings should be considered:

1. An FPC is aimed to be placed within a *certain radius* of the districts that people live.
2. An FPC should be *nearby* to laboratories so that if the family practitioner requests a simple test, they could easily go to the related lab.
3. An FPC should also be *close enough* to the hospitals (secondary healthcare providers) so that people can be easily transferred to these locations if the primary healthcare services are not enough to treat the problem.

4 Case Questions

Considering the logistics requirements, you need to find the best locations for the FPCs.

- Each FPC should have a laboratory at most 5 (10) kilometers away so that people are willing to go and give the samples to take the tests that are required by the family practitioner.
- Each FPC should have a hospital at most 10 (5) kilometers away so that people can be dispatched to the secondary healthcare providers if necessary
- The number of FPCs to be placed is 4.

The three distances of interest are:

- District-to-Labs
- Labs-to-Hospitals
- District-to-Hospitals

Question 1: Try to cover as many people as you can within a coverage radius of 6 kilometers while taking into account the logistics requirements. Where should you place the FPCs?

Question 2: In addition to the logistics requirements, if each district has to be reached within a coverage radius of 20 kilometers and if you want to minimize total distance between the districts & the FPCs, where should you place the FPCs?

Question 3: In addition to the logistics requirements, if each district has to be reached within a coverage radius of 20 kilometers and if you want to maximize the number of people which are also covered within a radius of 4 kilometers, where should you place the FPCs?

About Grading:

- Report Format: 20%
 - Executive summary
 - Overall explanation and language
 - Clarity
- Quality of workmanship: 40%
 - Stating the assumptions if any
 - Explanation of methodology and technique
- Quality of the solution: 40%
 - Correctness
 - Objective values