

## **COST BENEFIT ANALYSIS OF CT AND MRI USING THE AHP**

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During the past decade Korea has witnessed rapid economic growth and increase of personnel income. As a result of this growth Koreans seek better and more advanced medical services. Therefore, many hospitals and clinics believe that importing expensive medical devices such as CT's and MRI's are key factors in maintaining their competitiveness.

With the lifting of import restrictions in 1997 the import of used expensive medical equipment has shown a dramatic increase every year. Prior to the easing of the restrictions medical devices had to go through test inspection with two institutes designated by the Department of Health and Welfare such as Korea Testing Laboratory (KTL) and Korea Electric Testing Institute (KETI). After the passage of the Pharmaceutical Law in 1997, 277 CT and 23 MRI were imported in 2000. At present, there are 1,083 CT's and 331 MRI's in Korea which is broken down into: Medical Centers 29.1% CT's and 59.2% MRI's, hospitals 36.7% CT's and 27.2% MRI's, and clinics 34.3% CT's and 13.6% MRI's. The major concern in Korea is that clinics have mostly used CT's (71.1%), which may have a detrimental effect on the patient's care.

Most hospitals and clinics realize the effectiveness and patient benefits of obtaining new CT's and MRI's but many of them are reluctant to do so because of their high cost. After the Asian Financial crisis of 1997 the Korean Won was devalued making imported new equipment prohibitively expensive. Importing used medical equipment became more cost effective as medical insurance reimbursements are the same regardless of whether the equipment is used or new. Therefore, medical institutes prefer purchasing used rather than new equipment. Many of the used equipment produced false positive results thus increasing the likelihood of seeking second opinions. This double testing put an undue financial burden on the patient.

The purpose of this paper is examine the economic feasibility of new CT's and MRI's versus used CT and MRI through costs and benefits analysis. We used a decision making tool, the analytic hierarchy process (AHP), to analyze the best decision policy on importing of new or used devices.

In this paper, the analytic hierarchy process (AHP) with two hierarchies: benefits and costs with three criteria each and total of fifteen factors. Also, there are two alternatives: used CT and MRI and new CT and MRI.

The goal of this paper is to find the most suitable medical devices to use, whether new or used CT and MRI. The criteria for costs are economic, technical and operational. The economic include initial cost; technical includes rate of break down and cost of after service; operational includes maintenance fee, personnel training cost and up grade cost. The benefits are economic, technical and public interests.

The economic include earnings and operational capability; technical include stability, accuracy, rapidity, ease of operations, comparability; and public interests include safety and patients trust.

A total of 15 evaluators' were divided into two groups: Group A comprising 9 doctors from University hospitals (teaching hospitals) and Group B comprising 6 doctors who have their own clinics. Group A is actually operating the devices at their work but B is operating the device and making purchasing decisions. Therefore, the two groups have different viewpoints. In other words Group A doesn't have much experience in using second hand equipment because teaching hospitals only use new equipment, which is less than 5 years old. Also this group is not sensitive to the economy. In contrast, Group B has more experience in operating used devices and is very in touch with the economy.

The findings of this paper are as follows:

First, Group A, the technical aspect is an important factor in both costs and benefits on CT's and MRI's. But the importance of CT is economic on both costs and benefits and MRI is operational on costs and technical on benefits.

Secondly, both groups agreed that the cost benefit of new CT's and MRI's are better than used CT's and MRI's. Even though Group B is more price consciousness than Group A they feel that the better results of new MRI's and CT's along with lower maintenance costs outweighs the higher initial cost.

The government should realize in order to increase the medical standard in Korea; an investment in new devices needs to be made. Therefore, government should encourage medical institutes to purchase new devices and thus will result in a higher quality of medical service to their citizens.