

## Cost Analysis of the Blood Collection at the Patient's Home Compared with the Blood Collection at the Hospital

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# COST ANALYSIS OF THE BLOOD COLLECTION AT THE PATIENT'S HOME COMPARED WITH THE BLOOD COLLECTION AT THE HOSPITAL

**Abstract:** The cost data of the home blood collection project was compared with the current blood collection service. Using direct and indirect cost data from full cost data, including output data for the number of outpatient services, and assessing the cost per unit cost or average cost of services together with the standard costing method of calculating the cost of medical services. Only the cost per unit of medical technology services, medical record and statistics services, and finance and accounting services were calculated. The cost per visit for blood collection services was 21.37 USD. The direct non-medical costs of the blood collection service at the hospital were 30.62 USD. The cost structure of the blood collection at the hospital is mostly fixed (95% of the total cost) and only 5 percent is variable, while the home service can save the cost by about 50% (the cost at the hospital is 30.62 USD, compared to 15.34 USD at home). So, the blood collection at home can reduce the patient's cost burden by 50 percent and the hospital's cost by 5 percent, as well as being able to respond to the policy of reducing congestion in hospitals during the pandemic situation.

**Keywords:** home lab service, Rajavithi Hospital, new normal, cost analysis

## Introduction

The transformation of the medical service system to reduce congestion in hospitals is important for reducing the risk of COVID-19 infection. One way to do this is by providing blood collection services at home, which helps reduce the burden on hospitals and makes it more convenient for patients, as they do not have to wait in line for blood collection and do not have to travel to the hospital. This also helps to reduce travel expenses. Conducting a cost analysis of the home blood collection service can be a useful way to assess the economic value of this service and determine whether it is a cost-effective alternative to blood collection at the hospital. Therefore, we are interested in studying the cost analysis of the home blood collection service, which can help assess the economic value of saving time and resources for patients and the healthcare system. The objectives of this study are to analyze the cost of the blood collection at a patient's home in comparison to the service at Rajavithi Hospital, Bangkok, Thailand, and to assess the level of satisfaction among patients who receive this service. In addition to analyzing the costs of the home blood collection service, it may also be useful to assess the level of satisfaction among patients who receive this service.

## Method

This study uses a comprehensive and thorough approach to analyzing the costs of the home blood collection service and comparing them to the costs of hospital blood collection. This does not include medical service fees. The sample group consists of 500 individuals who received blood collection services at home. The study period covers the period from December 2020 to March 2021. This study uses a cost analysis method to examine the cost of home blood collection services from the perspective of the provider and from a societal perspective. It employs activity-based costing and ingredient-based costing approaches to collect data on the actual activities involved in providing home blood collection service, including the blood collection, sample transportation, communication and coordination with the hospital and private company, and waste disposal. By studying the retrospective cost-benefit analysis, the incremental cost of both financial and economic costs from all related departments and activities for the home-based blood collection service will be analyzed. Financial cost is the value of money paid or expenses for resources used by the government or organizations providing the service

for the project, which does not include the value of resources already paid for, such as the salary of health personnel who have already received a salary and the value of materials and equipment already donated. Economic costs will include both costs arising from the provision of home-based blood collection services and the costs already incurred or fixed assets, such as existing equipment and assets. Opportunity cost, such as the cost of time for health personnel who have already received a salary. The economic cost framework will cover wages (such as salaries and other compensation), material costs (such as bloodletting equipment and others), and the cost of using fixed assets or investments (such as equipment, vehicles, buildings, and construction).

This study is based on the concept of economic cost, and the cost analysis may have different perspectives. These perspectives can be divided into three categories: the provider perspective, the patient perspective, and the societal perspective. Costs are grouped using various criteria. Here, only the grouping of costs using the criterion of "medical care" will be discussed. The criteria for grouping costs using "medical care" are as follows:

1. Direct medical costs, including medical costs starting from diagnosis, initial treatment, ongoing treatment, rehabilitation, and end-of-life care, both in hospitals and home care, self-medication, and elective treatment.
2. Direct non-medical costs refer to costs incurred as a result of illness and treatment, but not necessarily as part of the medical treatment itself. These may include costs for hiring caregivers, purchasing assistive devices or equipment, modifying a home to accommodate a patient's needs, using a wheelchair, and the time and effort spent caring for a patient by non-professional caregivers such as family members or friends. However, hospital room and board costs are typically included in medical costs.
3. Indirect costs refer to productivity costs, such as the value of lost production due to illness, reduced work efficiency, premature retirement due to severe disability, and premature death. The time lost due to illness can be divided into the period of treatment and the period of convalescence. The cost of time lost during treatment may be considered a direct cost unrelated to medical care, and the cost of time lost during convalescence may be considered an indirect cost. Alternatively, the cost of time lost during illness may be considered an indirect cost in its entirety. Indirect costs also include costs related to the provision of medical care and treatment, such as the cost of medications and medical supplies, the cost of transportation to and from medical facilities, and the cost of hospitalization.

## **Results**

The service of home visits provided by Rajavithi Hospital has a cost per visit at the hospital of 21.38 USD, while the cost per home visit is 20.29 USD, which is lower by 1.08 USD or 5% compared to the hospital's cost. For patients with a cost per hospital visit of 30.61 USD, the cost per home visit is 15.34 USD, which is lower by 15.28 USD or 50%, compared to the cost at the hospital. The total cost per hospital visit is 51.98 USD, while the total cost per home visit is 35.63 USD, which is lower by 16.36 USD or 31%.

Table 1 Total cost and cost per visit of services of the Rajavithi Hospital separated by relevant departments (USD)

Cost unit	Total labour cost (USD.)	Total material cost (USD.)	Total capital cost (USD.)	Total direct cost (USD.)	Indirect cost (USD.)	Full cost (USD.)	cost visit	Cost/visit (USD.)
Medical record and statistics unit	637,252	911	8,937	647,100	243,128	890,227	664,501	0.93
Finance and accounting unit	906,939	4,284	8,120	919,342	290,173	1,209,516	964,501	1.25
Medical technical unit	876,086	387,906	243,348	1,507,340	4,075,411	5,582,751	291,221	19.18

Table 2 Cost of the patient (USD)

Lists	Median	Standard deviation
Travel expenses (round trip) to Rajavithi Hospital	400	627
Food expenses	200	170
Lost wages (for time taken off from work)	870	641
Travel expenses for accompanying person	300	474
Other expenses	150	556
Total		1,920

From a sample of participants in the home blood collection service, 63% were female and 37% were male. The oldest age group, over 60 years old, accounted for 86% of the sample. The next age group was 40-60 years old, accounting for 11%, followed by 20-40 years old at 2% and under 20 years old at 1%. The highest level of satisfaction with the home blood collection service was 70%, followed by 29% at a high level and 1% at a moderate level. The most frequent or likely to repeat use of the service was found to be 97%, with a potential for 3% to use the service again. The recommendation of this project to others was found to be the highest at 99%, with no recommendation at 1%. The most common source of information about the project was word of mouth (89%), followed by 7% from hospitals or clinics and 4% from the media. The majority of respondents (66%) were very satisfied with the coordination of the private company, while 30% were satisfied and 4% were moderately satisfied. In terms of the home blood collection service provided by the staff, the majority of respondents (81%) were very satisfied, while 17% were satisfied and 2% were moderately satisfied.

Table 3 The number and percentage of patient's characteristics and satisfaction

Data	Number (people)	Percentage
<b>Gender</b>		
Female	<b>69</b>	<b>63</b>
Male	41	<b>37</b>
Total	<b>110</b>	<b>100</b>
<b>Age</b>		
Less than 20 years	<b>1</b>	<b>1</b>
20 – 40 years	<b>2</b>	<b>2</b>
40 – 60 years	<b>12</b>	<b>11</b>
More than 60 years	<b>90</b>	<b>86</b>
Total	<b>105</b>	<b>100</b>
<b>Satisfaction of the home blood collection project</b>		
Most	<b>77</b>	<b>70</b>
Much	<b>32</b>	<b>29</b>
Moderate	<b>1</b>	<b>1</b>
Total	<b>110</b>	<b>100</b>
<b>Repeat use of service</b>		
Repeat use	<b>107</b>	<b>97</b>
May repeat use	<b>3</b>	<b>3</b>
Total	<b>110</b>	<b>100</b>
<b>Recommend this project to others</b>		
Recommend	<b>109</b>	<b>99</b>
Do not recommend	<b>1</b>	<b>1</b>
Total	<b>110</b>	<b>100</b>
<b>Coordination with the company</b>		
Most	<b>73</b>	<b>66</b>
Much	<b>33</b>	<b>30</b>
Moderate	<b>4</b>	<b>4</b>

Total	<b>110</b>	<b>100</b>
Service of home blood collection staff		
Most	<b>89</b>	<b>81</b>
Much	<b>19</b>	<b>17</b>
Moderate	<b>2</b>	<b>2</b>
Total	<b>110</b>	<b>100</b>

## Discussion

The Correct diagnosis and treatment of any disease are highly dependent on important information, such as the results of various medical tests. This information is crucial in helping the medical team make accurate diagnoses and treatment plans. When the COVID-19 pandemic began in Thailand in January 2020, the healthcare system was unable to operate as usual, with a focus on providing individualized care. Collecting various samples from patients for testing can be a burden in terms of travel, costs, and complex procedures. Sample collection for medical testing has standardized protocols and guidelines that are universally followed, as outlined by the World Health Organization in 2010 (1). The methods of collecting, storing, and maintaining the quality of various samples are widely used standards (2). The COVID-19 pandemic has greatly impacted the provision of medical testing and laboratory services, as the demand for such services has increased significantly and there have been disruptions in the supply chain of reagents and materials. To address these challenges, it has been necessary to adopt new methods of sample collection and testing, such as self-sampling and home-based testing. Self-sampling involves patients collecting their own samples at home and sending them to the laboratory for testing, while home-based testing involves healthcare professionals collecting samples from patients in their own homes. These methods can help reduce the burden on healthcare systems and ensure the continuity of medical testing and laboratory services during the COVID-19 pandemic. This can be particularly useful for patients with chronic diseases or those who are receiving chemotherapy or other treatments that may make it difficult for them to visit a healthcare facility (3). Home specimen collection can also help reduce medical expenses by eliminating the need for unnecessary hospital visits. There are a variety of methods for collecting specimens at home, including the use of devices designed for easy use by patients and the storage of samples at room temperature. In some cases, patients may be able to collect a range of specimens, including blood, urine, semen, saliva, milk, hair, hair follicles, nails, and buccal cells (4). These specimens can be transported to the hospital or laboratory for examination, and results can be compared to those obtained from traditional venous puncture procedures (5). Studies have shown that home specimen collection can be effective and stable during collection and transport, with no impact on clinical decision-making. Patients have also been found to be satisfied with the ability to collect their own specimens at home and may choose this method as their preferred screening option (6).

According to research data, the cost of home blood collection service is 5% lower than the cost of service per hospital visit. Patients have a 50% lower cost of service per home service than the cost per hospital visit. This is significantly lower than the cost of service per hospital visit and is consistent with the COVID-19 pandemic situation, which has caused major problems in medical and public health

services, resulting in a very high level of satisfaction for those who received the service, a high desire to return for repeat services at 97%, and a high recommendation rate to others at 99%.

### **Conclusion**

The blood collection service at the patient's home is highly beneficial for both the patient and the hospital, as it can reduce the patient's expenses by 50% and the hospital's costs for providing the blood collection service by an additional 5%. In addition, it helps the hospital better comply with its policy of reducing patient overcrowding during the COVID-19 situation.

### **Conflict of interest**

There are no conflicts of interest.

### **Source of funding**

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