

## **COST CALCULATION APPROACH IN MEDICAL ONCOLOGY IN LOW-INCOME COUNTRIES**

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**Annotation.** There are about 300,000 new cases of cancer each year in low-income countries. Cancer is responsible for 7.2% of death. The cost of the management of cancer is very high and the situation is all the more worrying that more than two thirds of the population has no medical coverage. The results of impact studies on the costs related to cancer care are sufficient proof of the heavy burden incurred by households as well as the severe social and economic repercussions of a cancer disease; up to 90% of the cost of certain cancers are incurred by patients. The result being that cancer contributes inevitably to making its patients even poorer. The study shows the possible application of a top-down approach to cost calculation which consists in determining the cost per department (oncology service) and per product (chemotherapy act, transfusion, ascites puncture, Inpatient day in low-income countries). Two main methods were mainly used, namely the volume-based allocation method and the method of relative value units (RVU). The proposed top-down cost calculation approach has the advantage of being easy to implement, but on the other hand, it is not very accurate in producing results on the actual cost.

**Key words:** *cost, efficiency, healthcare, medical institution, RVU method, medical oncology*

**Introduction.** Low-income countries and lower-middle-income countries in Asia and Africa recent years have no abilities to improve high investment in healthcare. The general epidemiological profile of diseases is changing rapidly in such countries and the burden has shifted to NCDs, which are now responsible for nearly 75% of all deaths. In 2021, IARC estimated that there were 52783 new cases of cancer and 32962 cancer deaths [1]. The age-standardized (World) incidence rates of cancer were 140.7 per 100000 in men and 139.3 per 100000 in women. The most frequent cancers in men are lung and prostate cancers, and the

most frequent in women are breast and cervical cancers in lower-middle-income country (Morocco) on the Fig. 1.

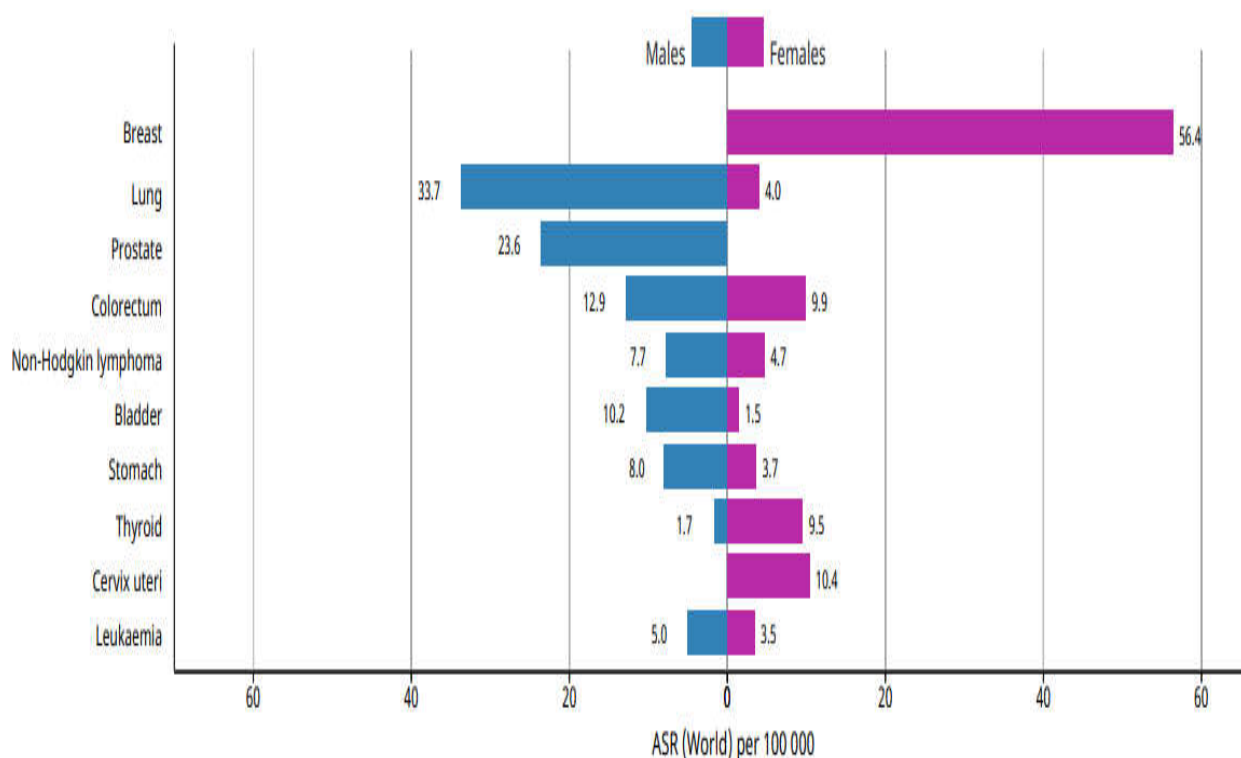


Fig. 1. Cancer burden in Morocco

In low-income countries, hospitals do not have cost accounting systems that allow them to produce reliable budget forecasts to know and justify the costs of their operations. A lot of hospitals are thus among the public organizations that do not know the cost of their services. Faced with the lack of data on the cost of care for cancer patients, this research aims to implement an approach to calculate the cost of services provided at the level of the medical oncology departments in low-income countries. The objective is to provide data that can be used in the pricing and financing process of the different services provided in medical oncology.

**The purpose of the study** to applicate a cost calculation approach in medical oncology assessment in low-income countries.

**Methods of research** a top-down costing approach.

**Results.** Costing in healthcare is currently one of the most important tools for hospital decision-makers in high-income countries, allowing them to efficiently manage health care facilities and their structures. The main objectives of the hospital cost accounting system [3]:

- To identify the costs and revenues of the various functions involved in the production of care, whether they are clinical, medico-technical or administrative functions;
- To provide management control with forecasting information based on the results of cost accounting;
- To provide management with the information necessary to make management and organizational decisions.

In the absence of a hospital cost accounting system in many low-income countries, data from the billing system cannot be used to determine the real cost of the care provided. However, measuring the cost requires taking into consideration all the resources used to care for patients. The question of how to calculate the cost of medical procedures is an innovative one in middle and low-income countries where there are no formal costing systems. Indeed, the information obtained from studies that focus on the costing of hospital services can partially fill the data gap related to the absence of hospital cost accounting.

The medical oncology department was inaugurated in 2012. The department's activities are mainly limited to the medical treatment of cancers through chemotherapy and the hospitalization of patients who are impaired or require special and palliative treatments. Table 1 presents the medical oncology department in common conditions. We directed our research from the field to cancer care services where management is costly. The choice of the medical oncology service is justified by the following elements:

- In low-income countries, few studies have focused on the implementation of a method for calculating the costs of services provided in medical oncology at a university hospital.

- At the level of Hospitals often the chemotherapy activity is very old compared to the other activities such as radiotherapy and nuclear medicine. Therefore, the medical activity is well organized and controlled and the staff of the service is familiar with the procedures implemented;

Table 1

Presentation of the medical oncology department

The medical oncology department	A medical team composed by contractual resident doctors, volunteers, 1 specialist doctor and professor doctors; - A nursing team composed of: a head nurse and polyvalent nurses; - administrative staff and agents of subcontracting companies.
The medical oncology department	
Hospitalization unit with a capacity of 12 beds	- Hospitalization of patients with treatment complications and other oncological emergencies - Hospitalization of patients with treatment protocols extending to several continuous days
Day hospital with 25 chemotherapy chairs	-Administration of chemotherapy products. -Other medical acts: punctures, transfusions, administration

In this research work, we proposed top-down costing approach using traditional costing tools. Indeed, traditional costing methods (volume-based allocation, cost/expense ratio, relative value units) have proven to be very effective in the hospital context in several countries. The proposed calculation approach is based on three steps.

Fig. 2 presents the conceptual model for calculating the cost of the chemotherapy act and other services provided in the oncology department for low-income countries.

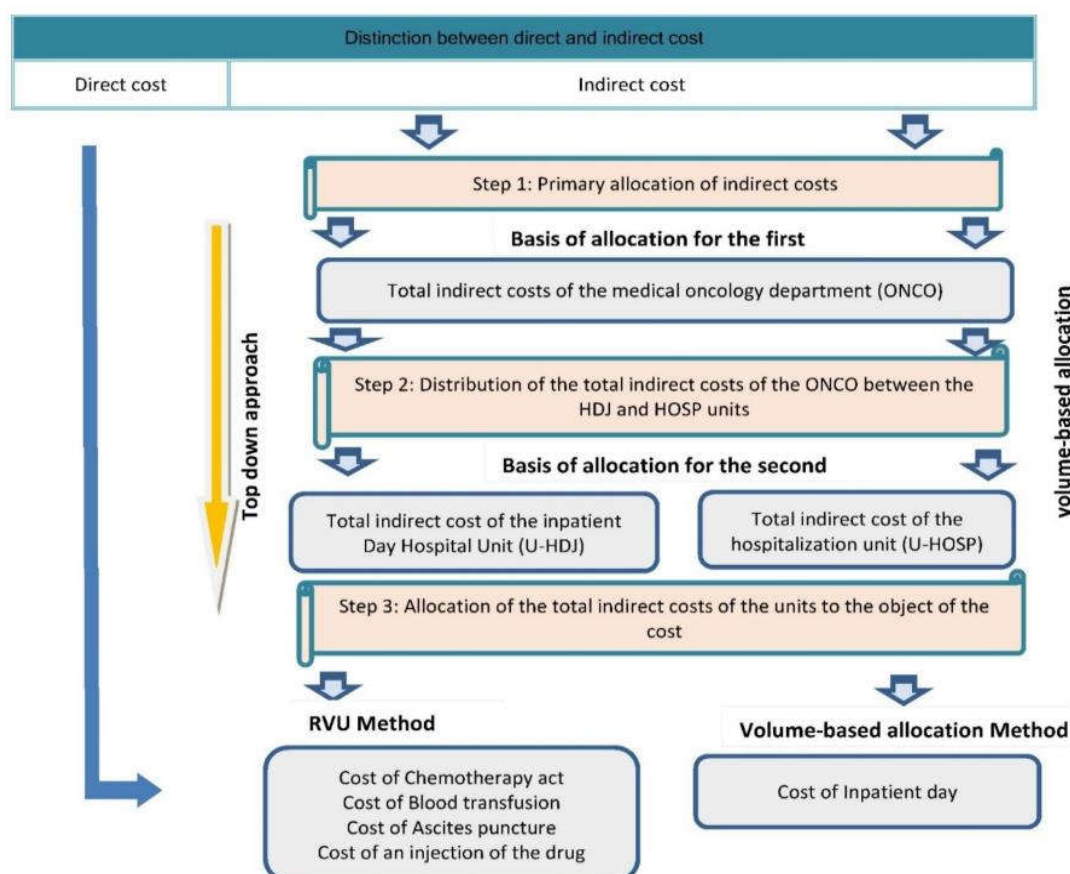


Fig. 2. Conceptual model for calculate costs in an oncology department for low-income countries

In this study, direct costs were excluded because the billing system allows direct tracking of patient consumption of pharmaceutical products and medical consumables. Indeed, direct charges vary significantly from one patient to another in medical oncology. Two main qualitative data collection tools were used: observation and document analysis. Through participant observation, we freely asked questions of the study participants in order to elicit the desired information. This observation allowed us to identify the activities, actors and resources that play a role in the care process of cancer patients in the medical oncology department of low-income countries. The visit of the premises was carried out several times. We were able to see all the rooms of the day hospital and the hospitalization unit, the

materials available, the staff (medical and paramedical) and the agents involved in the different activities of the oncology service.

**Conclusion.** Hospital reforms are directed towards rationalization and better use of resources in healthcare services in order to reduce costs while maintaining or improving the quality of care provided to patients. In low-income countries, the literature review shows that there is little work on the calculation of the costs of hospital services. The cost calculation method proposed in this study follows a top-down approach. Indeed, the top-down costing approach has been advocated for middle- and low-income countries in order to carry out costing studies while waiting for the implementation of a cost accounting system.

### References

1. Jellouli T, Benabdallah A. Implementation of the time-driven activity-based costing and the value creation in hospital oncology services: from the literature review to the analysis model sketch. *Revue ame*. 2021. №3(2). P. 162–79.
2. Benabdallah A, Fliliss A. Perspectives de réformes des modes de financement des Hôpitaux au Maroc. *Revue Int du Chercheur*. 2022. №3(2). P. 757–76.
3. Zemedikun D, Kigozi J, Wynne-Jones G et al. Methodological considerations in the assessment of direct and indirect costs of back pain: A systematic scoping review. *PLoS ONE*. 2021. № 16(5). P. 232-243.

**Резюме.** Дослідження показує можливість застосування підходу до розрахунку витрат, який полягає у визначенні витрат на відділення (онкологічну службу) і на продукт (акт хіміотерапії, переливання крові, пункція асцитів, день перебування в стаціонарі) для країн з низьким рівнем доходів на душу населення. Дослідження засновано на методах розподілу на основі обсягу та відносних вартісних одиниць (RVU).

**Ключові слова:** вартість, ефективність, охорона здоров'я, медичний заклад, метод RVU, медична онкологія