

# Installation of High Energy Radiation equipment with high quality for cancer patients



Report No: PER/CRR/2017/02



**Auditor General's Department**  
Performance and Environment Audit Division



## Contents

<b>S/No.</b>	<b>Particulars</b>	<b>Page No.</b>
01.	Executive Summary	1
02.	Introduction	
2.1	Background	3
2.2	Authority for audit	6
2.3	Selection of the topic for audit	6
2.4	Audit Objective	7
2.5	Audit Approach	7
2.6	Scope of Audit	7
03.	Detailed Findings	
3.1	Purchase of radiotherapy treatment Equipment	8
3.2	Purchase and utilization of assets	8
3.3	Construction of bunkers for plants	10
3.4	Utilization of Budgetary provisions for the purchase and installation of High Energy Radiation equipment	11
3.5	Quality of radiotherapy treatments given to cancer patients	12
3.6	Periods retained in the waiting list by patients	12
3.7	Delays in the analysis of data on cancer patients	12
3.8	Requirement of the modern equipment	13
04.	Recommendations	13
05.	Conclusion	14

## 1. Executive Summary

A project proposed in the year 2010 for the provision of High Energy Radiotherapy Treatment, in lieu of old radiotherapy system used at present in Sri Lanka for about 80 per cent of cancer patients required for radiotherapy treatment is being implemented and necessary action is being taken to purchase and instal linear accelerator, brachytherapy and CT Simulator equipment, under this project.

The approval had been granted to implement this project under the local provisions, of which the Technical Evaluation had been carried out by obtaining the approval of the Cabinet of Ministers under the provision of foreign bank financing aids, costing US\$ 53,381,701 due to disagreement with conditions imposed by foreign banks.

Even though, it was proposed to install 31 items of equipment belonging to the above 3 categories in 10 hospitals in which treatment is carried out for cancer, only linear accelerators for 4 hospitals had been purchased at the first stage. Of this equipment, the linear accelerator purchased for the Maharagama Apeksha Hospital had been installed in the year 2014 and the patients are treated through this equipment. Even though the other items of equipment had been issued to the hospitals in the year 2016, action had not been taken to install them even by May 2017. Before being treated by the linear accelerator, the place of infected with disease should be specifically diagnosed by the CT simulator and as such it was planned to purchase this equipment by the project as well. Even though the Technical Evaluation in respect of CT simulator equipment had also been carried out at the time of implementation of the project with the provisions obtained from foreign financing, any action had not been taken to purchase such equipment in the implementation of the project from domestic funds. Operating the linear accelerator in the Maharagama Apeksha Hospital is assisted by the CT simulator equipment purchased in the year 2008. Nevertheless, as there was no such equipment purchased before in the other hospitals there would be problems, even though the linear accelerator equipment purchased now was installed. Similarly, the brachytherapy equipment included in the above 3 categories of equipment is a one which can treat inside the element correctly, as similar as linear accelerator. However, action had not been taken to purchase such equipment even up to 16 November 2017.

The construction of bunkers for the installation of this equipment had been awarded to the Central Engineering Consultancy Bureau in the years 2014, 2015 and 2016 and a sum of Rs.813,724,440 had been paid. However, the construction works of bunkers had not been completed in the relevant hospitals even up to 31 May 2017.

According to the data available in the Maharagama Apeksha Hospital, radiotherapy treatments had been given to about 73 per cent of the total patients from the old machines from the year 2014 to 2016. Out of 3 machines from 4 imported could not be installed as air condition facilities could not be provided to bunkers. Even though 8 CT simulators had been included in the procurement proposals, which marks the correct location of cancer by computerizing in terms of modern Technology, not even one machine had not been purchased even up to 31 May 2017. The government had expected to reduce the waiting period of cancer patients, but the present waiting period for new machines had ranged from 01 month to 2 ½ months, and the number of patients between the year 2014 to 2016 had increased from 150 – 170 to 300 – 350. Making radiant security doors required for the imported 3 machines also had not been done even up to 31 May 2017. Number of patients who obtained radiotherapy treatment had increased by 10 per cent from the year 2014 to 2016. Even though the data in respect of cancer patients in Sri Lanka is analysed and maintained by the National anti-cancer program, analysed data had been maintained only up to the year 2010 by May 2017.

## 2. Introduction

### 2.1 Background

Cancer considered as a very much sensitive disease infected to a patient is spreading very fast by now. As a definite treatment is not found up to now, a person infected with this disease badly suffer mentally as well as physically.

The number of cancer patients registered in the cancer units established in Sri Lanka Hospitals during the period from 2008 to 2014 is as follows.

<u>Hospital</u>	<u>Year</u>						
	2008	2009	2010	2011	2012	2013	2014
Maharagama	11,163	11,756	11,513	12,403	12,550	12,689	13,247
Kandy	3,648	3,634	4,046	5,042	3,717	3,516	4,000
Karapitiya	1,764	1,866	1,793	2,193	2,158	2,455	2,479
Jaffna	412	479	659	1,055	1,048	1,061	1,032
Anuradhapura	712	551	641	698	803	850	1,114
Badulla	753	794	858	1,430	2,152	2,203	1,527
Batticalow	-	169	565	727	1,094	932	897
Kurunegala	538	804	806	1,174	1,122	1,042	1,238
Ratnapura	319	485	636	735	808	767	807
	-----	-----	-----	-----	-----	-----	-----
Total	19,309	20,538	21,517	25,457	25,452	25,515	26,341
	=====	=====	=====	=====	=====	=====	=====

(Source :- Annual Health Report – Year 2014)

According to the above information it was observed that the number of cancer patients newly registered in government hospitals had increased annually.

According to the data of the Maharagama Apeksha Hospital the number of patients referred for radiotherapy treatment had increased by 11 per cent in the year 2016 as compared with that of the year 2014.

	<u>2014</u>	<u>2016</u>	<u>Increase Percentage</u>
Number of Patients	99,596	110,636	11

A Proposal for high energy radiation treatments to cancer patients had been presented in the year 2010 by two specialist Doctors and the process of purchase and installation of equipment required therefor had been carried out as follows.

- 2.1.1 According to a project report presented on 09 September 2010 by 2 specialist Doctors in respect of cancer, an unbidden proposal had been made for the purchase of 14 Linear Accelerators, 9 pieces of brachytherapy equipment and 8 CT Simulators from 2 foreign suppliers by using financial loans obtained from 2 foreign banks valued at USD 53,381,701.
- 2.1.2 A letter had been referred by the Ministry of Health on 06 November 2011 to the Governor of the Central Bank of Sri Lanka, asking for financial coverage of this proposal. As a response to this letter, he had informed that purchasing conditions were limited as the donor agency had nominated the supplier and there was no objection in respect of conditions stated by 2 suppliers.
- 2.1.3 On the technical evaluation committee report regarding this matter, the decision had been given by the Cabinet Appointed Permanent Procurement Committee. After considering these matters, the decision of the Cabinet of Minister had been given on 06 December 2012 which included the following.
- 2.1.3.1 The value of contract amounted to USD 53,381,701 and awarding the contract to the Electa Company Ltd in the Great Britten for USD 24,129,998 and Philips Electronic (Israel) Company Ltd. for USD 29,251,703 at the evaluated price by which proposals had been sent therefor.
- 2.1.3.2 The Ministry of Health would enter into Commercial contracts with the Electa Co. Ltd in Gread Britten and Philips Electronic Co.Ltd.
- 2.1.3.3 Entrust the authority to the Director General of External Resources to discuss and negotiate with the relevant banks in order to finance this project under the conditions which could be acceptable to Sri Lanka Government.

2.1.3.4 Making provisions from the Consolidated Fund in the year 2013 in order to incur expenditure such as basic infrastructure facilities, local taxes custom duties, staff remunerations etc.

2.1.3.5 Recruitment of staff required for this project from the staff of the Ministry of Health on part time basis and the remuneration of them be paid in terms of the Management Circular No.33 relating to the project implemented under the foreign funds.

According to the above decision, the contract had been awarded to the above two companies on 23 January 2013 by the Secretary to the Ministry of Health. However the contract agreement had been entered into with only Electra Company Ltd. Even though, the Ministry had informed the Philips Electronic Co. Ltd to accept the contract, it had not been accepted by the Company.

2.1.4 The Department of External Resources had informed the Secretary to the Ministry of Health on 19 August 2013, asking to reconsider the provisions expected to be obtained from those two banks due to high interest rates, various bank charges and the short period of repayment of loans etc.

2.1.5 The Secretary to the Ministry of Health had informed the Secretary to the Ministry of Finance on 17 October 2013, requesting the approval to make provisions in the budget estimates of the years 2014 and 2015 to open letters of credit for the import of the above equipment from the local fund to the Maharagama Apeksha Hospital and to purchase the required equipment for the other Hospitals. The approval therefor had been granted by the Deputy Secretary to the Treasury on 31 October 2013.

Similarly, according to the decision of the cabinet of Ministers dated 30 April 2015 approval had been granted to purchase equipment during the period from 2015 to 2017 by utilising World Bank aids and Local Funds.

2.1.6 Accordingly, an agreement had been entered with the Electa Co.Ltd on 03 December 2013 to purchase the equipment at the same price quoted before and opened the letter of credit. Accordingly, particulars of equipment purchased up to now are given below.

Hospital	Date of Invoice	Date of receipt of equipment to the hospital	Amount Paid	Agreed amount
-----	-----	-----	-----	-----
			Rs.	USD
Maharagama Apeksha Hospital	2014.01.23	January 2014	362,157,495	2,700,000
Batticaloa Hospital	2015.12.02	March 2016	239,223,501	2,066,666
Jaffna Hospital	2015.12.02	January 2016	244,204,446	2,066,666
Karapitiya Hospital	2016.02.20	May 2016	242,105,008	2,066,666

## 2.2 Authority for Audit

Audit had been carried out under my direction in pursuance of provisions in Article 154 (1) of the Constitution of the Democratic Socialist Republic of Sri Lanka.

## 2.3 Selection of the topic for audit

It was proposed to purchase and install high energy radiation equipment to control cancer in the year 2010. Even though, action had been taken to select 10 hospitals which treated cancer patients receipt of benefits from high energy radiation had sluggished and as such this topic was selected.

## 2.4 Audit Objective

It is the objective of the selection of this topic that the examination whether the high energy radiation treatment project had been in operation economically, efficiently and effectively which was launched by the government for the expeditious and correct treatments made available to cancer patients and to give maximum relief to cancer patients.



## **2.5 Audit Approach**

**2.5.1** Study the high energy radiotherapy treatment and the installation of radiant equipment.

**2.5.2** Verification of radiation equipment existed in the hospitals in which cancer patients are treated.

**2.5.3** Analysis of data in the cancer wards available in Cancer Hospitals and teaching Hospitals and the data National Anti-Cancer Program.

## **2.6 Scope of Audit**

I conduct this audit in terms of International Standards of Supreme Audit Institutions (ISSAI 3000 – 3200).

It was proposed to obtain high energy radiation equipment for 10 hospitals in which cancer patients are treated. However, a physical verification was carried out only in the Maharagama Apeksha Hospital and Karapitiya Hospital due to limiting factors such as resources and time available. As the Maharagama Apeksha Hospital is meant for cancer patients and the equipment not purchased and installed in the Karapitiya Hospital, though bunkers had been constructed had been select and the audit had been carried out based on particulars brought down from other hospitals.

As the entities which supplied high energy radiation equipment had been named in terms of a cabinet decision, procurement process of selecting entities had not been audited.

## **3. Detailed Findings**

### **3.1 Purchase of radiotherapy treatment equipment**

All action had been taken even by calling for quotations to purchase CT Simulator, required to diagnose the correct location of cancer before radiotherapy treatment from linear accelerator under this project. However, the Philips Electronic Co.Ltd. to which the contract had been awarded had not made any response thereto.

The Ministry had informed that Company on 07 January 2016 that the contract awarded to them had been neglected. However, action had not been taken to award this contract to another entity. As a result, the treatment service, after being identified the correct location

of cancer could not be given to patients. In addition, it was observed that the anticipated treatment could not be carried out through the linear accelerator equipment.



CT Simulator

However, relevant assistance had been obtained from a simulator purchased in place of a equipment used before in the Maharagama Apeksha Hospital.

### **3.2 Purchase and utilization of assets**

The following matters were observed.

3.2.1 In the examination of the utilization of high quality radiation equipment purchased observed the following matters.

3.2.1.1 The linear accelerator purchased in January 2014 for the Maharagama Apeksha Hospital had treated patients for more than 3 years.

3.2.1.2 Even though, the linear accelerator purchased for Rs.242,105,008 for the Karapitiya Hospital had received to the hospital on 02 May 2016 the air condition system required thereto had not been installed. As such, it had not been installed even by May 2017 and required treatments had not been given to patients. According to the Technical Evaluation Committee report on 26 April 2017, the contractor for the supply of air condition system had been selected, relevant work had not been commenced even by 31 May 2017.



Bunker building being constructed (Hospital, Galle)



Equipment as packed (Hospital, Galle)

3.2.1.3 The linear accelerator valued at Rs.239,223,501 given to the Batticalow Hospital in March 2016 had not been installed even by May 2017, as bunkers had not been air-conditioned. As such the cancer patients who required radiotherapy treatment had to be transferred to Badulla, Kandy or Maharagama cancer hospitals and it had been a difficult task.

3.2.1.4 The linear accelerator valued at Rs.244,204,446 given to Jaffna Hospital on 06 January 2016 had not been installed even by May 2017. Due to incompleteness of other facilities including bunkers not air conditioned, radiotherapy treatments could not be given to cancer patients.

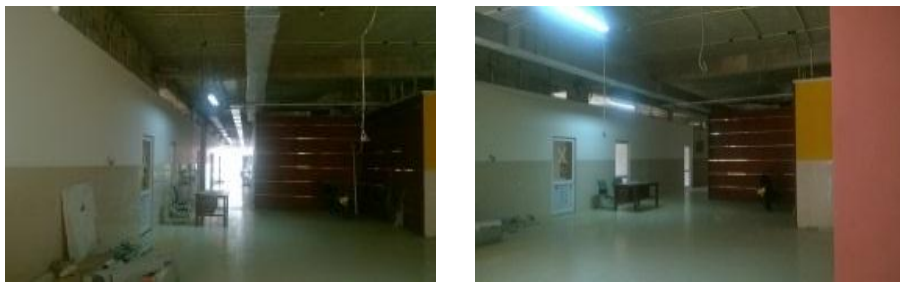
3.2.2 According to the agreement entered into with the Electa Company Ltd. for the purchase of the above equipment, it was agreed to supply and install equipment, checking, complete foreign and local training to Medical Officers and other staff and 5 years maintenance period. All these services had been provided to Maharagama Apeksha Hospital and it was observed that maintenance works are done by the Engineers of that Company.

3.2.3 Nevertheless, the equipment supplied to Karapitiya, Batticalow and Jaffna Hospitals had not been installed up to now and as such no any service whatsoever had been provided.

### 3.3 Construction of Bunkers for Plants

The Cabinet of Ministers had decided on 06 December 2012 to award the contract for the construction of 30 bunkers required for the installation of radiant equipment in 10

Hospitals to the Philips Electronic Ltd. at a cost of USD 8,551,703 (SLR 1,062,500,000). However, the cabinet of Ministers subsequently had decided to award the contract to the Central Engineering and Consultancy Bureau (CECB) on 30 May 2014 and 03 December 2015. Accordingly, the contract had been awarded to the CECB for a value of Rs.2,287,542,585. As this contract had not been awarded to the Philips Electronic Ltd. in the year 2012 and awarded it to the CECB after 2 years, a difference of Rs.1,225,042,585 was observed. Moreover, this construction work should have been completed by June 2015 according to the above cabinet decision, it was observed at a physical verification carried out on 27 April 2017 that the construction work had not been completed.



Bunkers Building (Maharagama Hospital)

At the physical verification carried out on 27 April 2017 in respect of construction of bunkers in the Maharagama Apeksha Hospital revealed that bunkers and related buildings for the installation of 03 linear accelerators 01 CT Simulator and 01 Brachytherapy machine were being in progress and only the fixing of ceilings to the roof and the installation of air condition system remained to be done. It was also observed that even though the air condition system is installed action had not been taken to purchase the above equipment to use the bunkers.

#### **3.4 Utilisation of budgetary provision for the purchase and installation of high energy radiation equipment**

According to the decision taken to finance this project from local funds particulars of the budgetary provision, targets and utilization of provisions are as follows.

Year	Provisions made		Expenditure incurred		Total utilization	Targets	Achievement of targets
	Rs.Million		Rs.Million		%		
2014	Equipment	450	Equipment	284	56	Provision of high energy radio therapy treatment with high quality to cancer patients in Sri Lanka.	It was observed that the liner accelerator had been installed and treatments are carried out only in Maharagama Apeksha Hospital and the other liner accelerators purchased had not been installed up to 31 May 2017, and CT Simulators had not been purchased. Furthermore, it was also observed that construction of any cubicles whatsoever in which equipment to be installed had not been completed.
	Construction of Bunkers	451	Construction of Bunkers	218			
	-----		-----				
	901		502				
	=====		=====				
2015	Equipment	1950	Equipment	483	31		
	Construction of Bunkers	800	Construction of Bunkers	372			
	-----		-----				
	2750		855				
	=====		=====				
2016	Equipment	1000	Equipment	320	39	Completion of construction work of cancer units in 5 hospitals and the primary construction of 5 cubicles for the installation of 8 linear accelerator to be purchased.	
	Construction of Bunkers	400	Construction of Bunkers	223			
	-----		-----				
	1400		543				
	=====		=====				

Accordingly, it was observed that the supply of goods and services expeditiously at the correction with good quality which are the principle objectives of the procurement process had not been appropriately accomplished.

### 3.5 Quality of Radiotherapy treatment given to cancer patients

It was stated in the Cabinet Memorandum along with the Cabinet paper No.අමප/12/1603/509/068/TBR dated 06 December 2012 that the radiotherapy treatment given to cancer patients in Sri Lanka from cobalt equipment was an uncertain and unsuccessful method. Instead, a high quality radiant equipment such as linear accelerator and brachytherapy equipment was required.

Number of patients obtained treatments from old equipment with low quality and new equipment with high quality during the period from 2014 to October 2016 in the Maharagama Apeksha Hospital amounted to 230,156 and 84,166 representing 73 per cent and 27 per cent respectively.

### **3.6 Period remained in the waiting lists by patients**

Data available in the Maharagama Apeksha Hospital observed that patients who required treatment from cobalt equipment, linear accelerator, brachytherapy equipment and CT Simulator had to wait in the waiting list for periods 3 – 4 weeks, 8 – 10 weeks, 3 – 4 weeks and 4-6 weeks respectively. Shortage of radiant equipment had been the reason therefor.

### **3.7 Delays in the analysis of data in respect of cancer patients**

Data in respect of cancer patients in Sri Lanka is maintained by the National Anti-Cancer Program. It was informed in writing that the data in all Hospitals where cancer wards are available is correctly analysed. Nevertheless, that Institute had published the data analysis only up to the year 2010 by now. According, it was unable to analyse the spreading of cancer patients and contribution made from radiotherapy treatment in the recent past.

### **3.8 Requirement of the Modern Equipment**

Medical officers have recommended that another 5 pieces of Linear Accelerators are required in order to reduce the waiting period of cancer patients who are in the waiting list of only Maharagama Apeksha Hospital which is meant only for cancer patients treatment in Sri Lanka. It was observed that in considering the growing trend of cancer, 9 pieces of such equipment is required by the year 2020 in addition to a CT Simulator and a brachytherapy machine necessitated to treat from this equipment.

## **4. Recommendations**

- 4.1 In purchasing equipment attention should be paid to provide other facilities simultaneously.
- 4.2 In order to full utilization of funds provided by the annual budget, a procurement plan should be prepared and take action accordingly.
- 4.3 Expedite the installation of imported machines in compliance with the regulations of the Sri Lanka Atomic Energy Board in order to protect from the damage which may cause to

environment and the staff who treats patients by using high energy radiation equipment and to get the relevant approvals.

- 4.4 Supply of required facilities to 3 machines existed now in Galle, Jaffna and Batticalowa Teaching Hospitals quickly.
- 4.5 Maintenance of updated data in respect of cancer patients and taking corrective management decisions by analyzing them.
- 4.6 Identification of radiation equipment and related facilities further required for hospitals should be carried out by a specialized Medical Board and to prepare a quick plan to get them and take future action accordingly.

## **5. Conclusions**

- 5.1 It is concluded that this radiation equipment had not been purchased in accordance with the principle objective of procuring goods at the right time.
- 5.2 Only 4 items of equipment out of 31 proposed items had been purchased by May 2017 in the process of procuring radiant equipment commenced in the year 2014 and only 01 of them had been used. As such the patients were not benefited as anticipated and it is concluded that the project must be expidised.
- 5.3 It is concluded that responsible officers should take all steps to give benefits to the patients from this project without delay by maximum utilization of annual budgetary provisions.
- 5.4 It is concluded that equipment required for the treatment of cancer patients and other related services should be identified by a panel of Specialized Doctors and taken action accordingly being well planned.