



**Limited Review Mission on Project Implementation of the  
Technical Upgrade Project of the Health Care System in  
Costa Rica**

**FOR THE  
Ministry for Foreign Affairs of Finland**



**FINAL REPORT**

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## Abbreviations and letter words.

Bitácora	Maintenance file (Spanish word)
CR	Costa Rica
CCSS	Caja Costarricense de Seguro Social (Social Security Organisation of Costa Rica)
EBAIS	Equipos Básicos de Atención Integral en Salud (Smaller Health Centre depending from a Clinic or Hospital)
Fischel	the Company who provided and installed the Equipment, and performed the training and the Maintenance
(F)MfFA	Ministry for Foreign Affairs (of Finland)
IWS	Infant Warming System(s)
NGO	Non Governmental Organisation
SGS	Société Générale de Surveillance.
TS	Technical Specifications
ToR	Terms of Reference

All dates in this report are according to the dd/mm/yy<sup>1</sup> notation.

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<sup>1</sup> day/month/year

## I. Executive Summary.

This report has been made by order of the Finish Ministry for Foreign Affairs of Finland following a mission in Costa Rica to investigate the alleged problems in the execution of the contract between the Costa Rican “Caja Costarricense de Seguro Social” (CCSS) and the consortium Instrumentarium – Medko Medical in the framework of the Technical Upgrade Project of the Health Care System in Costa Rica. A first contract, signed on 25/10/02 for the amount of **USD 31 999 095** has been financed by a USD 32 000 000 loan from Sampo Bank PLC to the CCCS in the framework of the Concessional Credits.

A second contract, signed on 28/8/03 for an additional **USD 7 497 736** has been signed by CCSS with the same supplier and is also covered in this review.

All equipment (both contracts) has been delivered. The first contract, including the 2 year warranty period and maintenance by the supplier, is now coming to an end. The second contract will finish by the end of this year.

Terms of Reference assigned to the Consultant requested to provide MfFA with an independent review of the project so as to enable MfFA to assess whether:

- (a) The supplier has fulfilled its obligations in accordance with contractual conditions.
- (b) Due diligence has indeed been carried out during the needs assessment phase.

For this purpose, SGS was requested to provide an objective assessment on whether the project:

- (a) Has been implemented in accordance with the terms of the interest rate subsidy;
- (b) Actual implementation was in conformity with documentation; and
- (c) If the products present the level of technology anticipated by the client.

The consultants have visited a representative sample of 17 hospitals and clinics, large en small ones throughout the country. This represents about 17% of all hospitals having received equipment and 46% of the total value of both contracts. Five health care centres have also been visited as well as CCSS and Fischel (the local company in charge of installation and technical assistance).

Documentary analysis and physical inspections as well as interviews with the staff of the visited hospitals lead to the following conclusions :

### 1. Conformity of equipment with Technical Specifications.

- ❖ The **intensive care beds** (240 units @ USD 3 915 each, total cost USD 939 600) do not have the possibility to adjust the beds in full Trendelenburg and anti-Trendelenburg position (45° according to some Medical Staff and specialists). The Technical Specifications (TS) specify that Trendelenburg position should be possible, without mentioning the degrees of inclination. The beds only allow a 12° and 7° inclination.

- ❖ The **intensive care beds for paediatrics** (56 units @ USD 2 952 each, total cost USD 165 312) have the same “problem”
- ❖ However, since the term “Trendelenburg” is often used for any position in which the patient is in an inclined position, CCSS should confirm whether the beds comply with their needs and TS, or not.
- ❖ **Central Monitoring systems:** some of them were equipped with CRT monitors (as specified in the TS), others with flat screens. The flat screens are an improvement on the CRT monitors and as such comply with TS. Since the Instrumentarium consortium offered in their commercial proposal the flat screen option however, it's the consultant's opinion that these flat screens should have been delivered with all appliances.
- ❖ The **dome surgical lamp** (50 units @ USD 3 172 each, total cost USD 158 600) does not have an intensity regulation as specified in the TS.

## 2. Quality issues.

- ❖ The **suction equipment for bodily fluids** (205 units @ USD 1 992 each, total cost USD 408 360) shows heavy corrosion on one component of the equipment. This does not interfere with the operation of the equipment but is unacceptable especially for equipment often used in operation rooms and around critically ill patients.
- ❖ The **emergency patient trolley** (56 units @ USD 1 412 each, total cost USD 423 600) shows the same problem. Severe corrosion on parts of the trolleys has been found in several hospitals. The reason may be the fact that they are used in hot and humid environment but again this is unacceptable. Often no tray was found underneath the trolley
- ❖ The above mentioned **dome surgical lamp** becomes too hot after some time, the switch is of doubtful quality and there is an apparent deterioration of the filter glass in front of the lamps.
- ❖ The **phototherapy lamp** (149 units @ USD 2 319 each, total cost USD 345 531) has, according to the users, a very high consumption of lamps.

In general however, users are very satisfied with the quality of the equipment, especially compared to the “Spanish” equipment they received earlier.

## 3. Identification of requirements.

Hospital staff declared that they have been consulted concerning their needs for new equipment before the project started. However, they could only choose from a list of 22 proposed items which did not always correspond with the real needs. This is probably the reason why so many of the equipment/apparatus delivered, are underused (See next point).

## 4. Necessity of the equipment.

Between 15% and 23%<sup>2</sup> of all delivered equipment (through the Finnish Concessional Credit) is not really needed in the hospitals. In value, this represents between 18% and 29%. In other

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<sup>2</sup> Depending on whether we include one of the biggest hospitals in our estimate or not!

words at least USD 9 million could have been saved without any negative effects on the operation of the hospitals in Costa Rica.

Since a relatively large number of perfectly working, and sometimes identical, equipment have been replaced with the newer Finnish equipment, this estimate is surely very conservative.

5. Usage of the equipment.

A relatively large number of equipment are not used at all, underused (see above) or only partially used (a lot of functions of the equipment are left unused). This differs from hospital to hospital and from equipment to equipment. The reasons for it are:

- ❖ Some equipment were not really necessary but were picked from the list because the opportunity was there.
- ❖ Lack of, and insufficient training of the users.
- ❖ Fear of new (computer assisted) technologies, especially for older medical staff.
- ❖ Redundant equipment. New deliveries replaced "older" (sometimes only 2 years old) and in some cases identical equipments.

The consultants noticed that the more sophisticated the equipment is, the more the trend becomes visible that the equipment isn't used or is underused.

6. Quality and possibilities of the equipment.

It is a fact that the equipment is of a very high quality, some exceptions confirming the rule. Some equipment is even very sophisticated. A possible consequence of this, combined with insufficient training, may explain why some equipment is either not used or a large number of its functions left unexploited. SGS' data concerning non-usage were confirmed by an internal audit of the CCSS.

7. Training.

- ❖ Documentary analysis of Instrumentarium's offer shows inconsistencies in the number of training hours when compared with the complexity of the equipment.
- ❖ This conclusion is supported by data of recommended training courses proposed by the supplier himself.
- ❖ This has also been confirmed in the field. Training has been insufficient, especially for the more sophisticated equipment and staff does often not know how to use the appliances.
- ❖ The training material (in Spanish language), as requested in the tender documents, has not been delivered to the hospitals.

From interviews, the consultants received reactions from "very useful training" to "completely un-useful".

8. Maintenance.

- ❖ Corrective maintenance has been executed correctly by Fischel.
- ❖ Preventive maintenance however has not been executed as foreseen. Based on the inspections of the maintenance reports, only 56 % of the preventive maintenance actions have been performed. This figure is confirmed by the number calculated by internal auditing of the

CCSS. Neither CCSS nor Fischel undertook actions to remediate this. As from December 2004, Fishel's technicians did a number of "late" checking rounds.

9. Budgets.

While MfFA's request was for the consultant to focus on the physical side of the project, interviews indicated that operational and (in future) maintenance budgets are too low. (corrective maintenance for the first 2 years was included in the contract)

10. Price analysis and cost of the equipment.

- ❖ Competition in the tender was very low due to the conditions imposed by the rules of concessional credits (> 50 % Finnish added value and any contract value > USD 8 000 000). This certainly did not push prices of the Instrumentarium consortium down since they knew beforehand they would be the winner of the contract. Indeed, the Instrumentarium consortium was the only consortium in the world, able to comply with above conditions.
- ❖ Price comparison with the equipment offered by Oy Philips and SIARE show that the Finnish equipment is much more expensive than the equipment from their competitors. Depending on the way the analysis is made, 28,5 to 40 and even 80 % more expensive !
- ❖ The offers of Oy Philips and SIARE were technically acceptable and were based on the same conditions as Instrumentarium's offer i.e. regarding installation, training and maintenance. Both offers have been rejected because the Finnish content was not above 50% and/or the 8 million US\$ minimum offer amount was not reached. (Apart from some non-relevant documentary issues)

11. Follow-up from Finnish and Costa Rican Government.

- ❖ The Finnish MfFA has little or no information about the real content of the contract(s) and even less about their execution. Follow-up and evaluation is not done.
- ❖ The Costa Rican Government, in casu CCSS' follow-up is insufficient. Deviations from TS have not been noticed during acceptance of the goods and quality issues are not claimed with the supplier. Training is insufficient and budget problems might occur once the 2 year free maintenance period is fully over.

**General Conclusions :**

The problems, originally made public by a Finnish NGO, do indeed exist and there are some they hadn't yet discovered. On the other hand, the existing problems shouldn't be exaggerated either. Some quality issues do exist and should be fixed by the supplier but the overall quality of the equipment is high and users are in general very satisfied with it.

The non-execution of the preventive maintenance could have (had) more serious implications especially if calibration of equipment such as the anaesthesia machines hasn't been done on time. The free maintenance period should therefore be extended at no extra cost for the CCSS.

The consultants estimate that, when these issues are solved, the Instrumentarium group can't be held accountable for further liabilities.

The real need for such high quality and sophisticated equipment, in those quantities, and thus its high cost, is another matter. This is not (only) a technical question however but rather a strategic one in the framework of the Costa Rican Health Care System.

The conditions imposed by the rules of the concessional credits on the other hand, are probably the main reason for the high cost of the contract, abstraction made of quality and sophistication of the delivered equipment.

A last conclusion is that, if the Finnish Government wishes to prevent new incidents like this one in the future, it should be much better informed about the conditions and the execution of the contracts backed by bilateral loans. Systematic and pro-active monitoring would be very useful in this context. The Costa Rican Government on its side, in casu the CCSS, should do a more precise validation of any feasibility and necessities study as well as a stricter follow-up of contract execution such as in the areas of preventive maintenance, quality and training issues, etc....)

#### **Immediate actions to be undertaken :**

(Mainly) by CCSS :

- ❖ Confirm whether the ICU beds are in accordance with the TS concerning the Trendelenburg position or not. If not, request replacement of the beds.
- ❖ Make an inventory of all patient trolleys showing corrosion and request replacement from supplier. (probably all trolleys have the same quality problem and a corrosion test can be recommended)
- ❖ Making an inventory of any other problem with any of the equipments.
- ❖ Request replacement of the part of the suction equipment for bodily fluids subject to corrosion, with a part of better quality.
- ❖ Make a complete inventory of executed preventive maintenance actions. Request extension of the free maintenance and/or warranty period from supplier in function of the data obtained.
- ❖ Check more carefully in future that preventive maintenance is executed as required in the maintenance manuals (a.o. calibration of equipment)
- ❖ Make a complete inventory of un-used equipment and possibly redistribute it to other hospitals.
- ❖ Collect comprehensive data on training needs of staff and supply additional training in order to improve the use and usage of the more sophisticated equipment.
- ❖ Request training material from supplier as specified in the tender documents.
- ❖ Investigate whether additional training can still be given by the supplier, free of charge, as foreseen in the tender documents.

## II. Introduction.

This report has been made by order of the Finnish Ministry for Foreign Affairs (FMfFA), following a request for proposal (See annex 1), SGS' proposal, and the contract between FMfFA and SGS.

The (revised) Terms of Reference (ToR, see annex 2) as included in the contract, have been followed, based on SGS' offer.

### A. History.

On 25<sup>th</sup> of October 2002, a contract has been signed between the Caja Costarricense De Seguro Social (CCSS, Costa Rican Social Security Administration) and Instrumentarium Corp. – Medko Medical Consortium. (See annex 3)

The contract amount for supply, installation, operational take-off, training, preventive and corrective maintenance during the first 2 years of operation was **USD 31 999 095**. The list of equipment included in this contract can be found in annex 4.

Payment of the contract has been financed with the resources from a credit granted by Sampo Bank plc of Finland. This credit, subject to the conditions required for concessional credits, has been made available, based on an agreement between the FMfFA and the Ministry of Foreign Affairs of Costa Rica. This agreement made a maximum of USD 50 000 000 available.

However, the Credit Line Agreement signed on 7<sup>th</sup> of December 2001, between CCSS and Sampo Bank PLC, mentions a maximum amount of USD 32 000 000.

A request for proposals has been published and consequently 3 offers have been received from SIARE, Instrumentarium – Medko and Oy Philips.

Only the offer of Instrumentarium – Medko has been judged to be in accordance with the tender documents and (Costa Rican) law Nr 8202. This was decided by the Executive Committee of the CCSS on 01/08/2002 and published in the Official Journal on 12/08/2002.

The contract has been signed (25/10/02) and equipment have been installed as from 27/01/2003 till 29/06/2003.

In the meantime, CCSS estimated that the increasing demand for health services in the country, justified the signing of an additional contract with the Instrumentarium Corp.-Medko Medical Consortium.

A second contract (See annex 5) for the amount of **USD 7 497 736** has been signed on 28/8/2003. This contract is not covered by an agreement with the Finish government but it DOES mention however that payment is guaranteed by Sampo Bank PLC, Finland.

In Finland as well as in Costa Rica, rumours were spread that there are problems with the execution of the contract(s). Equipment was supposed to be not delivered, corroding, of too high technology, underused etc.

Alleged corruption is also mentioned and currently under investigation in Costa Rica. (See annex 6 )

This report covers the possible allegations concerning the equipment and their use but, in accordance with the ToR, not the aspect of possible corruption.

	Date	Event
1	6/9/2001	Appraisal report of the technical upgrade and renovation program of the health care system in Costa Rica
2	?	Agreement between FMfFA and Costa Rican MoFA (USD 50 000 000)
3	7/12/2001	Credit Line Agreement between Sampo Banc and CCSS (USD 32 000 000)
4	27/12/2001	Publication in Costa Rica of the Law Nr 8202 concerning the "Programa de Renovación del Sistema Hospitalario Nacional Costarricense"
5	?/02/2002	Publication of the Request for Proposals Nr LP-GMD-001-2002 in Costa Rica
6	10/5/2002	Reception and opening of the offers received (Siare, Instrumentarium-Medko, OY Philips AB)
7	1/8/2002	Attribution of the contract to the consortium Instrumentarium Corp. – Medko Medical
8	25/10/2002	Signature of the commercial contract.
9	9/9/2003	Signature of second contract for the amount of USD 7 497 736

## B. Experts Involved.

Ing. MSc. Luc De Groote (LDG)

Ir. Jean Mercier (JM)

Ir. Rodolfo Mata Solano (RMS)

SGS Price Analysis Division (PAD)

Project Coordinator, Public Procurement Expert.

Electronics Engineer, Quality Assurance and Maintenance Expert.

Electronics Engineer, Medical Equipment Specialist.

## C. Schedule.

Although the FMfFA insisted from the beginning on an early start of the mission and SGS engaged itself to do so, the mission has been delayed due to the absence of necessary documentation regarding the project.

SGS decided finally to start the in-country mission on 29/01/2005 with only partial information being available.

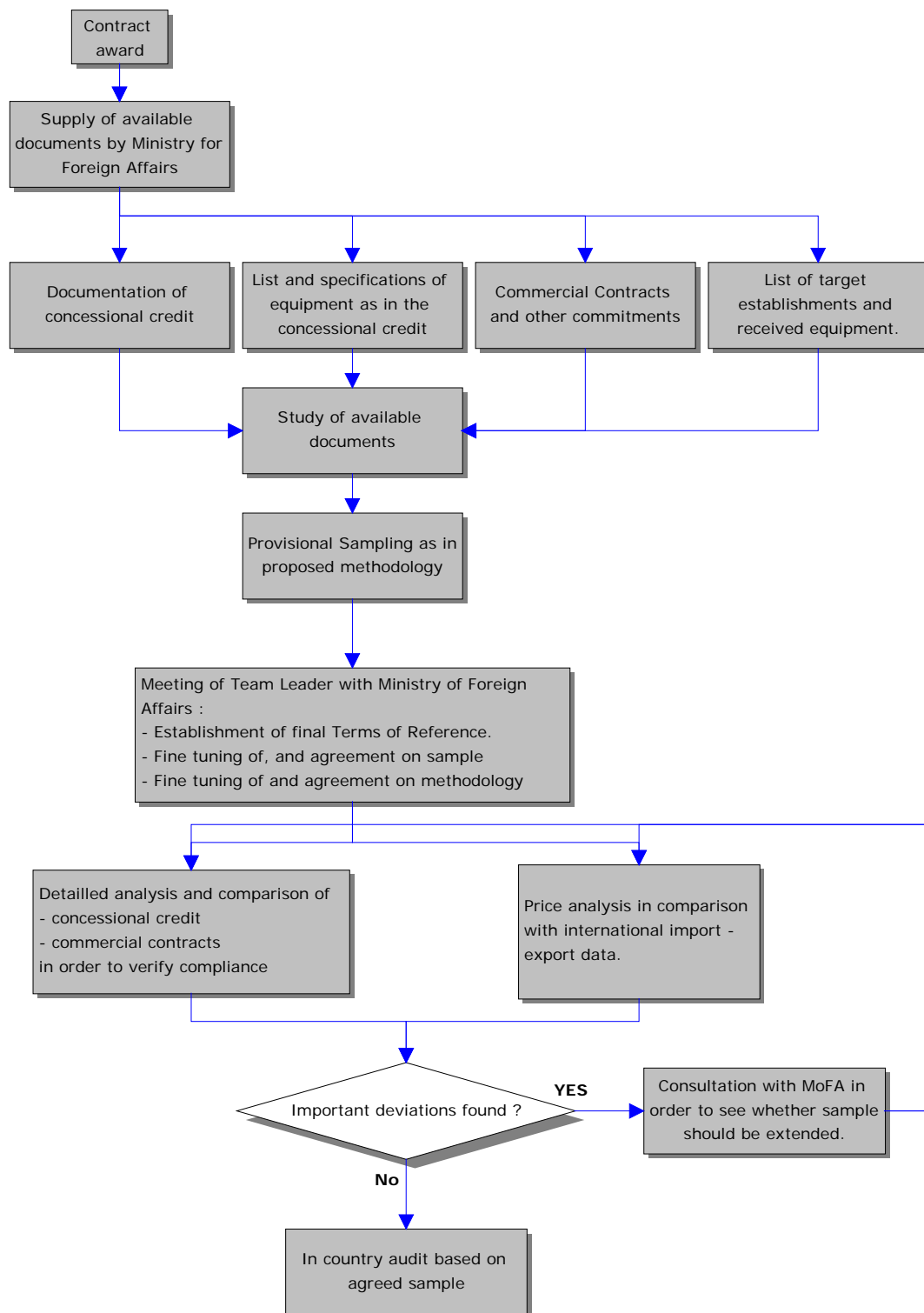
The different steps followed are described below:

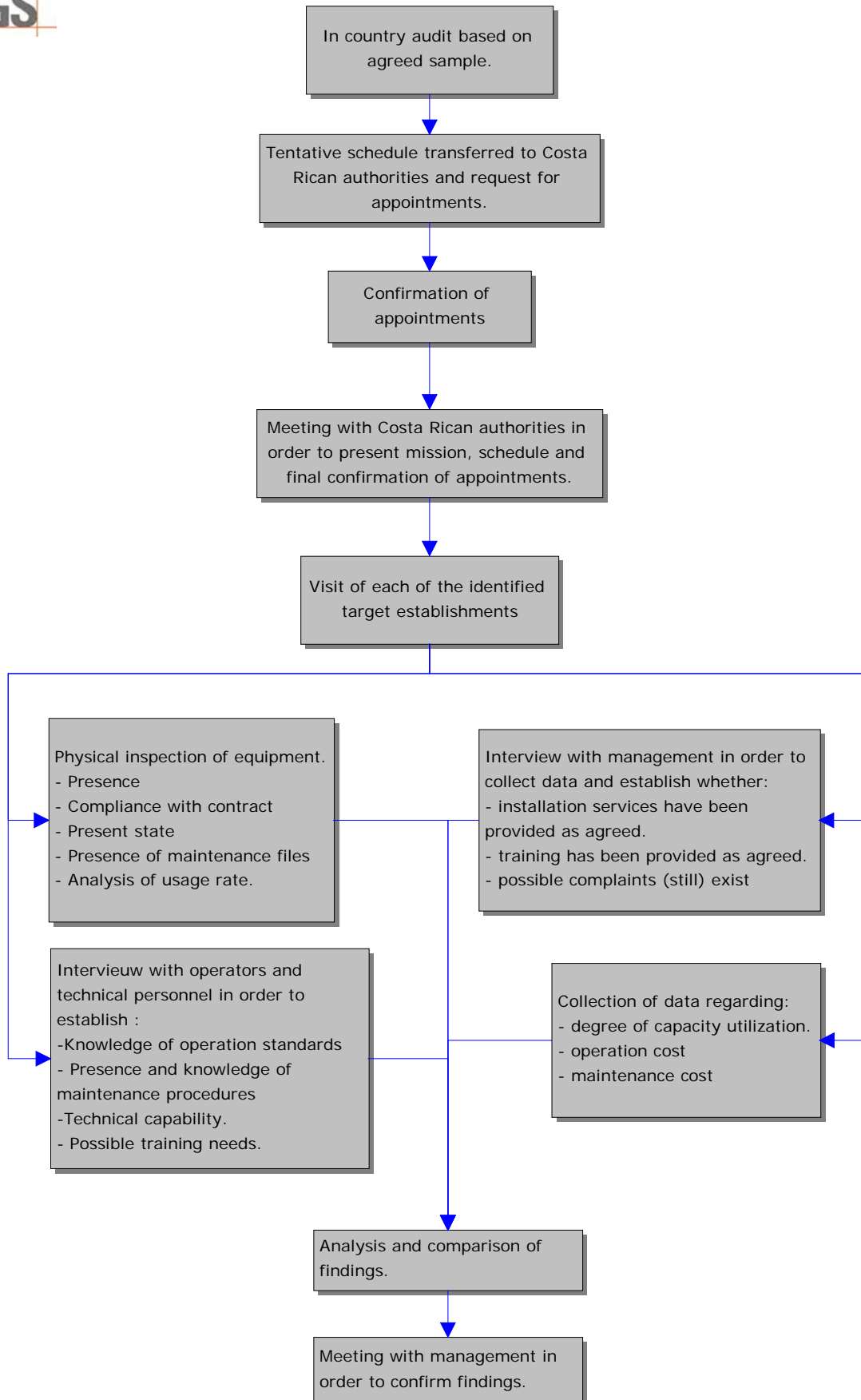
Step	Starting date	End date	Duration (days)	Expert(s) involved
Request for Proposals	29/10/04	10/11/04	12	Luc De Groote
Award of contract	17/11/04			
SGS' request for documentation	18/11/04			Luc De Groote
Contract negotiation	26/11/04	26/11/04	1	Luc De Groote
Contract signature	08/12/04			
Arrival of first supporting documents (tender docs)	31/12/04			
Reception of coordinates of local counterparts	11/01/05			
Request for additional information from CCSS	13/01/05	28/01/05	15	Luc De Groote Jean Mercier
Reception of partial information from CR	22/01/05	28/01/05	6	Luc De Groote Jean Mercier
Start of in-country mission	29/01/05	13/02/05	15	Jean Mercier Rodolfo Mata Solano
Reporting	15/02/05	02/03/05	15	Luc De Groote Jean Mercier Rodolfo Mata Solano
Presentation of draft report	03/03/05	04/03/05	2	Luc De Groote Jean Mercier
Final report	05/03/05	13/03/05	7	Luc De Groote Jean Mercier

### III. Methodology.

#### A. Methodology as in SGS' offer and deviations.

The methodology of the audit has followed the one presented in SGS' offer as much as possible.





The meeting with the FMfFA has been advanced however and documentary study as well as sampling has started afterwards.

## B. Sampling.

The sampling has been based on the list of hospitals found in the offer of Instrumentarium (See annex 7). It has been done on incomplete data since pages were missing in the file and CCSS was very late in supplying the additional data.

### Sampling Methodology :

Since the Finnish Government has first been alerted about possible problems in the Costa Rican project by a NGO, it has been decided that the hospitals mentioned by the NGO should be part of the list of hospitals to be visited in order to confirm or deny the allegations.

These hospitals were:

1. Hospital C.N. Rehabilitación in San José (known as CENARE),
2. Hospital San Vicente de Paul in Heredia,
3. Hospital México in San José,
4. Hospital San Carlos in Ciudad Quesada near San Carlos,
5. Hospital San Juan de Dios in San José.

After that, SGS tried to obtain a good mix of:

- hospitals and/or clinics that received a lot of equipment as well as hospitals having received few equipments and
- hospitals and/or clinics in or in the neighbourhood of San José and those further in country.

According to the ToR, at least 10 hospitals should be visited. The final sample list contained 17 hospitals (+ 5 EBAIS) as follows:

	Hospital	City	Region	Distance from San José	Nr of eqpt. received
1	Hosp. C.N. Rehabilitación (CENARE)	San José	San José		23
2	Hosp. Nacional de Niños	San José	San José		71
3	Cl. San Rafael	Heredia	San José	10 km	16
4	Hosp. San Vicente de Paul	Heredia	San José	10 km	108
5	Hosp. México	San José	San José		338
6	Clin. Coronado	San José	San José		6
7	Hosp. Max Peralta	Cartago	San José	20 km	153
8	Hosp. Alajuela	Alajuela	San José	20 km	32
9	Hosp. San Carlos	Ciudad Quesada	San Carlos	110 km NW of San José	133
10	Cl. Fortuna	San Carlos	San Carlos	110 km NW of San José	6
11	Cl. Hojancha	San Carlos	San Carlos	110 km NW of San José	6
12	Hosp. San Juan de Dios	San José	San José		144
13	Hosp. Calderon Guardia	San José	San José		230
14	Hosp. Cartago	Cartago		20 km	153
15	Hosp. Limón	Limón	Limón	220 km East	76
16	Hosp. William Allen	Turrialba	Turrialba	67 km	61
17	Cl. Marcial Fallas	San José	San José		20
				<b>TOTAL</b>	<b>1 570</b>

- Hospital Nr 7 in above list (Hosp. Max Peralta) and Nr 14 (Hosp. Cartago) are in fact one and the same hospital. This was not clear in the different lists.
- Clinic Hojancha has not been visited since the clinic was not located in San Carlos as indicated by the CCSS, but in Guanacaste at more than 300 km.
- These hospitals have been replaced by Hospital de Guápiles and Clinic Pital.

In addition to this list, five (5) EBAIS (Smaller Health Centres) were also visited. Some hospitals and most of the Clinics are also running small Health Centres (EBAIS). In some cases, part of the equipment was installed or used in these EBAIS. The EBAIS are usually located in remote areas or villages at some distance from the main cities.

Further,

- The main office of Fischel has also been visited.
- The warehouse of Fischel has been visited in order to verify whether spare parts were available.
- The main office of CCSS has been visited several times.

The sample has been designed to cover all possible situations and to be statistically representative<sup>3</sup>:

	<b>Total</b>	<b>Nr Visited</b>	<b>% Visited</b>	<b>Observations</b>
All hospitals and clinics	97 (87 in first contract, 44 in 2 <sup>nd</sup> contract of which 10 different from 1 <sup>st</sup> contract)	17	17,5 %	The list of equipment for the second contract and the receiving hospitals wasn't available until the day before departure to CR. SGS has not been able to take into account the new hospitals from the second contract in the sample.
Hospitals and clinics in first contract	87	17	19,5 %	
Hospitals and clinics in 2 <sup>nd</sup> contract	44	6	13,6 %	
Hospitals or clinics having received < 50 equipment	73	9	12,3 %	
Hospitals or clinics having received between 50 & 100 equipment.	10	5	50 %	
Hospitals having received > 100 equipment	3	3	100 %	
Hospitals in San José region		11		
Hospitals out of San José region.		6		As mentioned in the SGS' proposal, the number of hospitals out of San José region has been limited due to budgetary and time constraints.

Further numbers concerning the quantity of equipments checked and the amount of "value" checked can be found in annex 8.

<sup>3</sup> Once the results from the field mission were known, it was clear that Calderon Guardia Hospital had much more "problems" than any other hospital and extrapolation could only be done after correction for the data of this hospital.

## **Physical Inspections in Costa Rica**

CCSS has provided the consultant with a complete list of the distribution of the equipment including inventory numbers (2 762 for the first delivery and 275 for the second delivery, being 3 037 in total), covering the two contracts.

In the first Hospitals visited, the consultants asked specifically to see “Equipment Number X” according to the inventory list.

After having visited a number of hospitals, it was decided to check as many equipments as possible since the experience showed that all equipment was indeed present. This was confirmed in smaller Health Centres where in some cases we could physically inspect 100% of the equipment.

Some equipment could not be checked because the room in which they were installed, was occupied (for instance Operating Rooms, although in one hospital we entered while there was an operation ongoing !). The consultants never had the feeling that the staff were concealing information or trying to mislead us.

During the visits of the hospitals<sup>4</sup> we generally used the following approach:

1. interview with the Director, or any other person representing him or her.
2. inspection of the equipment (in presence of one of the hospital staff)
3. inspection of the maintenance files in the maintenance department.
4. closing meeting with the Director (sometimes).

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<sup>4</sup> We will often use the word “Hospital” independently of its nature (Clinic, EBAIS)

## IV. Facts.

### A. Documentary analysis.

Following documents have been examined before the in-country mission:

- Agreement between the Ministry of Foreign Affairs of the Republic of Finland and the Ministry of Foreign Affairs of the Republic of Costa Rica.
- Credit line agreement between CCSS and Sampo Bank PLC
- The 1<sup>st</sup> contract between Instrumentarium and Costa Rica.
- The 2<sup>nd</sup> contract between CCSS and Instrumentarium.
- Request for proposals from the Costa Rican Government.
- Technical Specifications.
- The commercial offer of Instrumentarium.
- Comparison of information received from Costa Rica with RFP and commercial offer.

#### 1. Agreement between the Ministry of Foreign Affairs of the Republic of Finland and the Ministry of Foreign Affairs of the Republic of Costa Rica.

A number of statements in this agreement are important:

- The FMfFA may, provided that the terms and conditions for concessional credits are fulfilled, provide subsidy under this agreement to the credits amounting to the maximum of 50 000 000 USD.
- The Finnish content of the exported deliveries must be at least 50% of the total contract financed by the loans mentioned in this document.

#### 2. Credit line agreement between CCSS and Sampo Bank PLC

- The Lender extends to the Borrower a credit line. The maximum amount is USD 32 000 000.
- Each contract to be financed under this agreement shall be of a value no less than USD 8 000 000.

#### 3. The 1<sup>st</sup> contract between Instrumentarium and Costa Rica.

- The contract has been signed on 13/09/2002
- The contract amount is USD 31 999 095
- 70 % of the value of the equipment will be paid at the time it is dispatched from its place of origin.
- The remaining 30 % of the value of the equipment will be paid at the time it is received by the buyer according to Clause 12 of this contract.
- Maximum term of delivery of the goods shall be 150 calendar days as of the commencement order, according to the delivery schedule which will be provided to the buyer within the following 30 calendar days following the commencement order.
- The goods will be delivered in CIP position place of installation.

- The buyer will undertake all pre-installation works that may be required for the installation of the equipment. The non fulfilment of these obligations will relieve the Provider of his responsibility to mount and install said equipment on the agreed delivery date.
- Immediately after the installation, the final acceptance protocol of the equipment would be completed, which will be signed by the representative of the Buyer and the representative of the Supplier, and the equipment would be considered to have been definitively received.
- If installation of the equipment cannot begin on the date agreed upon in the installation schedule due to the Buyer's fault, ....., 15 days later the equipment will be considered accepted and the warranty period will begin. ... The Provider is committed bona fide to assist the Buyer in the installation of the equipment within a maximum of 180 days from the date of provisional acceptance.
- .... In case that the missing parts or damages are minor and they do not affect the operation of the equipment, or that, in case of User's unite uses the equipment in spite of the missing parts or said damages, the Buyer will grant the definite acceptance by means of the acceptance protocol.
- All equipment must be new..., free of defects and built with first quality materials. They should be free of defects that demean their appearance, operation or durability.
- The operation warranty of all equipment will be for a period of 24 months. This period begins at the time of acceptance of each equipment.
- .... The equipment or part of these which show to have significant failures will be replaced or repaired by the Provider .... Without any responsibility nor additional cost for the Buyer.

#### **4. The 2<sup>nd</sup> contract between Instrumentarium and Costa Rica.**

- The contract has been signed on 9/11/2003.
- Award for the purchase of medical equipment and additional services of equal nature for a total amount of USD 7 497 736 .
- Legal basis: The amount of this contract constitutes 23,4 % of the original contract, for which reason it does not amount to more than 50% of said amount.
- Payment to the Vendor shall be made by means of an irrevocable Letter of Credit issued by one of the Costa Rican State banks and guaranteed by Sampo Bank PLC, Finland.

#### **5. Request for proposals from the Costa Rican Government.**

- The price of the equipment must include :
  - Technical Assistance
  - Quality guarantee
  - Preventive maintenance during warranty period (2 years)
  - Technical support
  - Installation
  - Making the equipment operational.
  - Training in operation and maintenance.
- The equipment will be evaluated and purchased item by item.

- Technical Assistance and training consists of :
  - Training in operation and maintenance
  - Training is given in each of the 87 hospitals
  - Consists of a theoretical and practical part
  - Training material will be made available to each participant.
  - Training and material will be in Spanish language.
- Preventive maintenance will be done according to the maintenance manual but at least twice a year.
- Relevant details concerning installation, making operational, and all maintenance activities will be written down in the “Bitácora” which will be kept on site.

## V. Findings.

### A. Availability of documentation regarding this project.

In Finland :

- The FMfFA has little or no information regarding the execution of the contract. The main documents available, apart from the credit agreements and the initial feasibility study, are the commercial contract(s) and reception documents for the equipment.
- The FMfFA has also little or no information about the persons in charge of the project in Costa Rica.
- No follow up or evaluation has been done on the (correct) execution of the contract.

In Costa Rica :

- Obviously, all necessary information should be readily available at the CCSS. For various reasons however this doesn't seem to be the case.
- The Project Coordination Unit (PCU) of CCSS, in charge of the coordination of the project has been completely dismantled with the exception of 2 lower staff members. Therefore, information which is still available is difficult to find or to access.
- A large number of documents has been confiscated by the Costa Rican authorities in view of the investigation on the alleged corruption of high officials in the country and were consequently not available anymore for the SGS team.
- Important "missing" documents are (amongst others): the complete evaluation report of the initial offers received the offer of the 2 competing companies (Philips and Siare).
- The CCSS is also organised according to very strict hierarchic rules which means that access to information is sometimes a long process.
- Other missing documents, such as evaluation reports and offers might have given additional indications but we think that they would not have influenced the conclusions of this report, at least not concerning the "technical" part of it.
- We would like to stress however, that we are sure the Staff of the CCSS and especially Dra Daisy Corrales Diaz and her assistant Karen Córdoba, were indeed trying to cooperate.

### B. Evaluation of Tender documents and commercial offer(s).

#### 1. Limitations in the tender documents and competitive prices.

A number of limitations in the tender documents are mainly imposed by the Finnish Government in the framework of the concessional credits:

- a minimum of 50 % Finnish content in the total contract.
- any contract should be for an amount of not less than USD 8 000 000.

These limitations have a very serious impact on possible competition. Indeed, in practice, only 2 companies in the world are capable of meeting the constraint of 50 % Finnish content. One is Instrumentarium, the other one Merivaara.

The second company involved in this contract, Merivaara, went into a consortium with Instrumentarium because it would not have met the second constraint (any contract should not be less than 8 million USD). The part of Merivaara in the (initial) offer only being USD 7 255 601.

Since the 2 companies knew beforehand that they would be the winner of the public tender, there is absolutely no incentive for them to quote (very) competitive prices.

The question should be asked whether, in this case, public tendering was the best way (for Costa Rica) to come to a contract since the rules of public tendering imply that the contract must be given to the complying offer with the best price.

Direct contracting, with contract (and price) negotiation would probably be a better way to come to a good deal for the Costa Rican Government.

Not yet taking into account whether the price offered by the Instrumentarium – Medko Medical consortium are in line with their normal export prices, it must be mentioned that in most cases, the equipment of Siare and/or Oy Phillips for similar equipment, are much lower than the Instrumentarium – Merivaara offer. As far as we know, the equipment offered by the 2 other companies were technically acceptable and met the Technical Specifications of the tender documents.

	Item	Unit Cost IN USD			Price Comparison	
		SIARE	PHILIPS	INSTR.	Instr / Siare	Instr / Phil
1	Aspiradores de succión continua	781		1 992	2,55	
2	Cama de cuidados intensivos	2 937		3 915	1,33	
3	Cama de cuidados intensivos pediátricos	2 952		3 024	1,02	
4	Cama de partos			5 827		
5	Camillas transporte de pacientes			1 412		
6	Central de monitoreo 12 camas		128 918	247 146		1,92
7	Central de monitoreo 8 camas		88 570	165 942		1,87
8	Central de monitoreo 4 camas		53 696	87 791		1,63
9	Incubadoras abiertas UCI			13 552		
10	Incubadoras de gabinete			12 159		
11	Incubadoras de transporte			18 015		
12	Lámparas de examinación simple			955		
13	Lámpara quirúrgica de una cúpula	3 864		3 172	0,82	
14	Lámparas de fototerapia (monofoco)			2 319		
15	Máquina de anestesia alta tecnología		62 702	89 432		1,43
16	Máquina de anestesia general	26 559	37 900	60 185	2,27	1,59
17	Mesas de cirugía básicas			17 334		
18	Monitor con telemetría 6 pacientes		32 137	58 487		1,82
19	Monitor de adultos y niños		8 148	7 778		0,95
20	Monitor de adultos y niños transportable		8 221	5 797		0,71
21	Oxímetro de pulso			2 400		
22	Rayos X tipo de arco en C			93 233		

If there had been no constraints and the cheapest offer for each individual equipment had been chosen, the Costa Rican Government would have saved USD 11 263 121 or 28,5 % on the 2 contracts.

If there had been no constraints, competition would probably have been stronger; more offers would have been received, also for those items where now only Instrumentarium quoted. Savings would have been even bigger.

Indeed by comparing the equipment for which there has been an alternative offer, the offer of Philips is 40 % lower than Instrumentarium and the offer of SIARE is 80 % lower than Instrumentarium. Of course there might have been a difference in technical quality, maintenance or training but as mentioned above, as far as we know, the offers of Philips and SIARE were technically acceptable and in accordance with the technical specifications of the tender documents.

Looking at these figures in the light of the alleged corruption in Costa Rica, it must be said that the imposed constraints could incite and contribute to bribery and corruption.

## **2. Further price analysis.**

SGS has been unable to find complete, reliable and comparable data concerning the “regular sales prices” including training and maintenance for the equipments delivered in the framework of the two contracts.

Price comparison is difficult because of:

- Fluctuations of the dollar compared to the euro between date of contract and date of reference prices.
- Installation, training and maintenance content being included or not in the reference data.
- Options, spare parts etc. being available or not in the reference equipment and often not documented.

We did however several price comparisons:

Most of our reference data have been obtained from ECRI<sup>5</sup>, and are shown in the table below:

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<sup>5</sup> ECRI (formerly the Emergency Care Research Institute) is an independent nonprofit health services research agency. Their mission is to promote the highest standards of safety, quality, and cost-effectiveness in healthcare to benefit patient care through research, publishing, education, and consultation. They are widely recognized as one of the world’s most trusted organizations for unbiased, reliable information. ECRI’s focus is healthcare technology, healthcare risk and quality management, and healthcare environmental management.

		Brand	Model	Unit Cost IN USD			ECRI	
				SIARE	PHILIPS	INSTR.	Min	Max
10	Cabinet incubator (enclosed)	Care Plus	CP 3000			12 159	8 475	13 150
11	Mobile/Transport Incubators	Airb	185A			18 015	13 000	17 000
14	Phototherapy lamp (single focus/monofocus)	Ohm Med	Spot Phototherapy			2 319	2 995	3 295
15	Anesthesia machine/equipment, High-technology	Dat-Ohm	ADU		62 702	89 432	78 000	98 000
16	General anesthesia machine/equipment	Dat-Ohm	Aestiva / 5 7900	26 559	37 900	60 185	40 000	52 000
18	Monitor for bedside or telemetry patients, 6-patient capacity	Dat-Ohm	S/5 Arrhythmia		32 137	58 487	24000?	
19	Monitor, for adults & children	Dat-Ohm	Cardiocap 5		8 148	7 778	8 400	
21	Pulse oximeter	Dat-Ohm	3800			2 400	1 300	2 200
22	X-ray Machine, C-Arm type	Ziehm	Exposcop 7000 Z-7000-2009			93 233	124 500	

The table above only shows that the prices in the Offer of Instrumentarium are sometimes above and sometimes below the “unit”<sup>6</sup> prices found in the above mentioned database. Prices in ECRI database usually included warranty and service contract for the time of the warranty period.

Three reference prices of exactly the same equipment have also been found through other sources, without knowing whether training, maintenance, additional tools, etc. were included in these prices (see table below).

N°	Description	Instrumentarium	Reference Price	Source
1	Suction Equipment	1 992 US\$	1 873 €	internet
19	Monitor, for adults & children	7 778 US\$	3 309 US\$	Chilean Customs FOB
22	X-ray Machine, C-Arm type	93 233 US\$	103 292 US\$	internet

We see that two of the equipments (1 and 22) are more or less in the same price range of Instrumentarium’s offer, and one (item 19) is much more expensive (again taking into account that we are comparing with single unit reference prices).

<sup>6</sup> In the Costa Rica contract a very large number of equipment have been purchased at once, which should lead to a maximum price reduction as well.

SGS also compared almost all equipments with more or less similar equipments through a price inquiry in Costa Rica and SGS' database. This shows that the prices of Instrumentarium range from 38% cheaper to 39% more expensive, depending on the kind of apparatus. However, also here, the equipments are not always completely comparable.

When we take the average of the price "differences", Instrumentarium is 7% more expensive" than the "basket" of other equipments. If we compare the total price, Instrumentarium is 6% more expensive.

The table below shows our calculation.

Eq Nr	Name	Unit Value US\$ (INST)	Quant purch	Brand	Price other Brand	Inst. / other	Total Price other brand	Total Price Instrument.
1	Suction Equipment	1 992	205	ORDISI	\$1 750	1,14	\$358 750	\$408 360
2	Intensive care bed	3 915	240	Dolsan	\$5 900	0,66	\$1 416 000	\$939 600
3	Intensive care bed, paediatric	3 024	56	Dolsan	\$4 850	0,62	\$271 600	\$169 344
5	Emergency/Patient Trolley	1 412	300	Dolsan	\$1 200	1,18	\$360 000	\$423 600
6	Central Monitor, for 12 beds	247 146	13	NEWTECH	\$178 000	1,39	\$2 314 000	\$3 212 898
7	Central Monitor, for 8 beds	165 942	22	NEWTECH	\$135 000	1,23	\$2 970 000	\$3 650 724
8	Central Monitor, for 4 beds	87 791	52	NEWTECH	\$96 700	0,91	\$5 028 400	\$4 565 132
9	Open Incubators VCI	13 552	60	AIRSHIELS	\$14 500	0,93	\$870 000	\$813 120
10	Cabinet incubator (closed)	12 159	40	AIRSHIELS	\$13 800	0,88	\$552 000	\$486 360
11	Mobile/Transport Incubators	18 015	40	AIRSHIELS	\$16 500	1,09	\$660 000	\$720 600
12	Examination lamp, basic	955	400	ORDISI	\$850	1,12	\$340 000	\$382 000
13	Dome surgical lamp	3 172	50	STURDY	\$4 200	0,76	\$210 000	\$158 600
14	Phototherapy lamp	2 319	118					
15	Anaesthesia machine, High-T.	89 432	28	OHMEDA	\$95 000	0,94	\$2 660 000	\$2 504 096
16	General anaesthesia machine	60 185	61	OHMEDA	\$52 000	1,16	\$3 172 000	\$3 671 285
17	Surgical table, basic	17 334	39	TRUMPF	\$18 000	0,96	\$702 000	\$676 026
18	Monitor for telemetry	58 487	16					
19	Monitor, for adults & children	7 778	368	NEWTECH	\$6 500	1,20	\$2 392 000	\$2 862 304
20	Portable monitor,	5 797	304	NEWTECH	\$4 700	1,23	\$1 428 800	\$1 762 288
21	Pulse oximeter	2 400	322	NELCOR	\$2 900	0,83	\$933 800	\$772 800
22	C-arm X-ray Machine	93 233	28	SIEMENS	\$90 000	1,04	\$2 520 000	\$2 610 524
						1,07	\$29 159 350	\$30 789 661
								1,06

Explanation of the last two lines of the table:

1,07 is the average value of the column above. The numbers in US \$ are totals. The 1,06 is equal to the number above divided by the number to the left of it).

Therefore we can conclude, for this analysis, that the offer of Instrumentarium is slightly more expensive (6%) than a similar offer for almost the whole range of equipments.

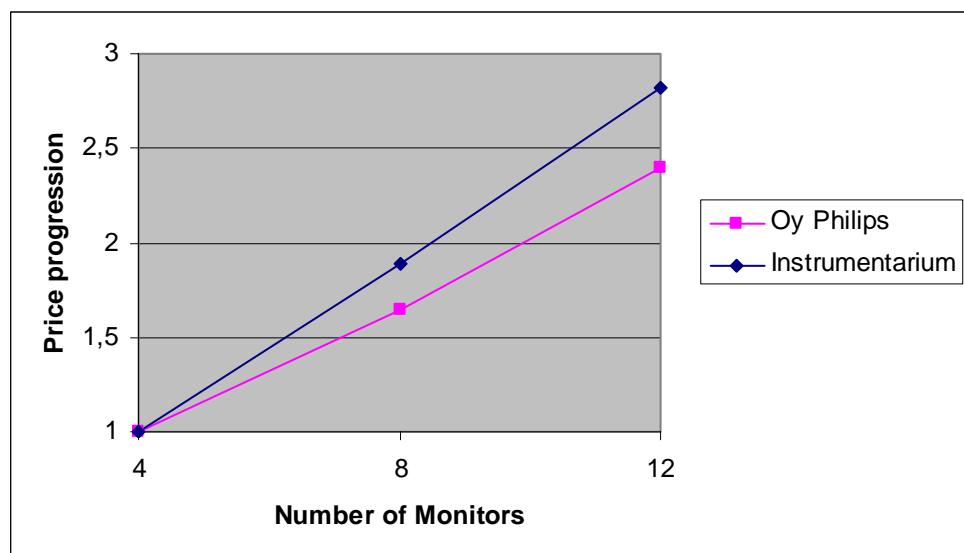
We would like to stress however that the prices found for the similar equipments of the other brands are unit prices. For important quantities, discounts of 20% and more are common practice in medical equipment!

A reverse price calculation on one of the equipments has also been executed:

The Central monitoring systems (Items 6, 7 and 8) have the following cost :

- Monitoring system for 4 beds : USD 87 791
- Monitoring system for 8 beds : USD 165 942
- Monitoring system for 12 beds : USD 247 146

This means there is a linear relationship of price increase of the Central Monitoring Equipment of 4, 8 and 12 screens.



This linear relationship is also seen in the offer of Oy Philips but there is a main difference; the price increase is not so steep.

Not only was Instrumentarium much more expensive than Oy Philips (see previous table), but we can also notice in above graph that Instrumentarium multiplies the price by almost 2 and 3 for the 8 bed and 12 bed system while Oy Philips multiplies it only by 1,6 and 2,4

Indeed, there are in our opinion fixed as well as variable costs in the 3 configurations:

- Fixed: the computer, central monitor, central software, printer and training;
- Variable: the number of monitors and their accessories + connections between monitors and central monitor (4, 8 or 12), installation and maintenance;

- Variable but with serious “discounts” for supplementary users: the license on the number of individual monitors handled by the central software.

Finally we analysed also the very extensive report of PSR Consulting Ltd. of July 2001.

This report was generated as an appraisal of the needs of the CCSS concerning the (at that time) potential “Finnish” Concessional Loan. The reports states : *“The Appraisal Team concludes that the indicative prices for the procurement package developed by Medko Medical are very fair, provided that all equipment related costs such as installation, training, starter stocks of consumables and a small number of any high turnover essential spare parts and warranties are included.”*. However, at several places in this report they stress the need of very extensive training, including training in Finland. The training program provided was, at least for the more sophisticated equipment, far from extensive and training in Finland has not been provided.

Conclusion for the Price Analysis :

Although an exact judgement on the contract price of Instrumentarium would need an even more detailed and in depth examination, several factors of our investigation, based on different references, indicate that the cost was high especially taking into account the large number of equipment that has been purchased.

### 3. Technical Specifications.

Technical specifications (TS) in the tender documents are good and correct with the possible exception of a better definition of the Trendelenburg position for the ICU beds.

SGS would however also recommend the use of international standards in the TS (Electrical, Mechanical, Electronic, Corrosion treatment, ...) when applicable. This would avoid possible discussions when equipments are having problems.

There are no real indications that the TS have been designed too specific in order to prevent other companies than the Instrumentarium group to participate in the tender.

The terms of reference for the training are insufficient. They should have specified:

- The kind of personnel to be trained, their function, background and experience.
- The minimum level the participants already have.
- The level of knowledge the participants should reach after the courses have been given.
- Verifiable indicators to test the level attained.

### 4. The offer of Instrumentarium – Medko Medical Corporation.

The equipment in the proposal usually meets the technical specifications (apart from some minor deviations) and all terms of the tender documents are met in the offer of the consortium.

A line per line analysis of the TS can be found in annex 9.

Physical inspections however show that the equipment does not always completely comply with the TS.

Analysis of the training as proposed by the consortium shows some interesting results however. In the proposal, the main lines of preventive maintenance are described for each item. As a very "crude" way of analysis, we compared the number of pages describing the necessary maintenance actions for specific equipment as well as the unit cost (which give an indication about the complexity in maintenance as well as operation of the equipment) with the number of hours for operation and maintenance.

	Equipment	# of hrs. training		# pages mainten. actions	Ratio Hrs Training / Pages Maint.	Ratio Hrs Training/ Unit Cost (x 1000)
		Oper.	Mainten.			
1	Aspiradores de succión continua	1	4	0,25	20	2,5
2	Cam a de cuidados intensivos	2	8	0,3	33	2,6
3	Cam a de cuidado intensivo (pediátrica)	2	8	0,3	33	3,3
4	Cama de partos	2	8	0,3	33	1,7
5	Camillas transporte de pacierites	1	4	0,3	17	3,5
6	Central de monitoreo, 12 CAMAS	2	4	7	1	0,02
7	Central de monitoreo, 8 CAMAS	2	4	7	1	0,04
8	Central de monitoreo, 4 CAMAS	2	4	7	1	0,1
9	Incubadoras abiertas VCI	1	8	0,5	18	0,7

	Equipment	# of hrs. training		# pages mainten. actions	Ratio Hrs Training / Pages Maint.	Ratio Hrs Training/ Unit Cost (x 1000)
		Oper.	Mainten.			
10	Incubadoras de gabinete	1	8	0,5	18	0,7
11	Incubadoras de transporte	1	8	0,25	36	0,5
12	Lámpara de examinación simple	1	4	0,3	17	5,2
13	Lámpara quirurgica de una cup ula	1	4	0,3	17	1,6
14	Lámparas de fototerapia (monofoco)	1	4	0,25	20	2,2
15	Máquina de anestesia de alta tecnologia	3	8	7	2	0,1
16	Máquina de anestesia general	2	8	2,5	4	0,2
17	Mesas de cirugia básicas	2	8	0,6	17	0,6
18	Monitor con telemetria 6 pacientes	2,5	4	0,8	8	0,1
19	Monitore de adultos y niiiios	2	8	1	10	1,3
20	Monitore de adultos y ninios transportable	2	8	2,2	5	1,7
21	Oximetro de pulso	1	4	0,3	17	2,1
22	Rayos X de tipo arco en C	24	40	6 +	??	0,7
<b>TOTAL</b>		<b>59</b>	<b>168</b>	<b>45</b>	<b>5</b>	<b>0,3</b>

If we look at above table, we can see that for simple equipment like beds, 5 to 10 hours of training is proposed while for (very) complicated equipment only the same number of hours of training is proposed.

Already from documentary analysis we can deduce that training must have been insufficient for the items 6, 7, 8, 15, 16, 18, 20 and probably for items 19 and 22 (the items marked in yellow in above table).

More thorough investigation on the website of the supplier

( <http://www.gehealthcare.com/us/en/education/index.html> ) shows that the basic training proposed by the supplier for a number of these equipment are as follows.

#### Item 16 : Aestiva 5 7900

Basic comprehension of the system with “hands-on” labs (as has also been requested in the tender) for preventive maintenance, leak testing and trouble shooting as well as disassembly, reassembly and adjustment of components : **4 days**

#### Item 9, 10 : Infant care class

Class covers IWS systems and Care plus Incubators. The course is designed to provide the knowledge necessary to identify and correct possible operator errors, identify, disassemble and reassemble major circuit boards, and understand the functionality of all components. Skills are reinforced through structured labs that guide students through calibration, adjustment procedures, and preventive maintenance of the equipment.

Duration : **3 days**

#### Item 18 : S/5 Anesthesia Monitor

Duration **2 days**

In fact the supplier has roughly 3 training modules:

- First Line Biomedical Support Rationale: These study sessions are specifically designed to provide an essential technical understanding of our equipment. These courses cover basic troubleshooting and fault finding skills.
- Front Line Rationale: This further level of training aims to provide a greater operational and clinical understanding for the more regular users and is aimed primarily at theatre and critical care personnel. These study days aim to cover all elements of equipment use from pre-operative checkouts and calibration procedures, to operational understanding and clinical applications.
- Second Line Biomedical Support Rationale: Biomedical Engineers play an increasingly important role in the support of equipment in the healthcare environment. It is essential therefore that they understand equipment theory and operational methods. These courses are designed to provide a clearer understanding of the operation and maintenance requirements of the equipment. Mapping through the Operation and Service manuals covering the basic theory of operation, equipment maintenance, fault analysis and identification of associated parts and accessories. Using this knowledge, Biomedical Engineers can help both to identify and potentially resolve equipment user problems and failures, and to provide planned preventive maintenance, ultimately maximising the uptime and life expectancy of the equipment resulting in enhanced patient safety and providing improved cost efficiencies. These courses will cover the requirements of Support Personnel from pre-operative check out procedures to first line trouble shooting and fault finding techniques. Additionally they will facilitate the provision of planned preventive maintenance and detailed fault analysis.

It's our opinion that the "First Line Rationale course" for maintenance personnel and the "Front line rationale course" for operators should have been included in the offer in order to provide a minimal training.

The training actually given doesn't come close to this minimum for the more sophisticated equipments.

### C. Findings in Costa Rica

The consultants never had any problems accessing the Hospitals, nor the different locations within the hospitals. Access was usually not possible to Operation Theatres when in use. Once however, the technician guiding us, entered in such a Theatre while they were operating on a patient!

The Hospitals visited can be found on the next table (numbers concern the Equipment delivered in the framework of the 2 contracts):

Name Hospital	Place	Equipt installed	Value (US\$) installed	Equipment checked	Value (US\$) checked
CENARE	San José	24	743 252	14	430 630
Hospital N. de Niños	San José	92	2 066 341	26	852 846
Clínica San Rafael (incl. 2 EBAIS)	Heredia	11	38 676	11	38 676
H San Vicente de Paúl	Heredia	74	1 537 650	68	1 338 438
Hospital México	San José	200	2 981 928	94	2 201 333
Clínica Coronado	Coronado	32	503 935	32	503 935
Hospital Max Peralta	Cartago	108	1 974 739	98	1 948 561
H. San Rafael de Alajuela	Alajuela	31	246 622	29	242 810
Clínica La Fortuna (inc. 3 EBAIS)	La Fortuna	16	60 511	16	60 511
Clínica Pital	Pital	15	48 862	6	25 712
Hospital de San Carlos	San Carlos	88	1 089 572	74	1 019 717
H. San Juan de Dios	San José	120	3 273 073	95	2 389 912
Calderón Guardia	San José	239	6 358 144	170	4 719 308
H. William Allen	Turrialba	47	617 379	38	592 662
Hospital Tony Facio	Limón	63	933 643	49	751 849
Clínica Marcial Fallas	San José	26	113 358	26	113 358
Hospital de Guápiles	Guápiles	87	938 095	82	907 037
TOTALS		1 273	2 3525 780	928	18 137 295
In % compared to total installed in all Hospitals in Costa Rica				30 %	46 %

Hospitals visited :

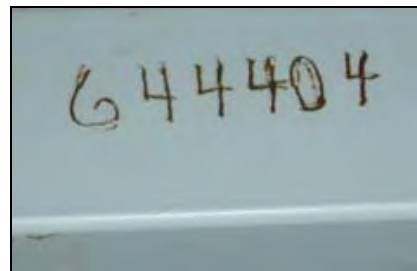


## 1. Presence, compliance and state

We can state that all Equipment has been delivered. In some of the smaller hospitals 100% of the Equipment has been located and identified.

In bigger Hospitals, often more than 90% of the equipment has been identified, the remaining part being inaccessible due to the fact that they were in use in Operating Theatres, or sometimes because it was “moving” equipment such as some trolleys, beds, or portable monitors and were not on the original location anymore.

We registered the “inventory number” of the found equipment. (See pictures below.)



For the equipment that couldn't be located, the maintenance files (bitácora) have been asked and verified, to make certain that it indeed existed in the hospital.

We checked :

- 31 % of all “delivered” equipment
- representing 46 % of the total value in US\$ (of both contracts)
- or 72% of the equipment in the visited Hospitals
- representing 77% of the installed value in US\$ in these Hospitals.

In most cases the equipment is complying with the Contract.

Some equipments show deviations from the TS or have quality problems:

Equipment 1 : Suction equipment for bodily fluids (ITKAVAC V40).

Often, oxidation was found on a fixture of part of the equipment.



This problem did allow us however, to detect more easily the non-usage of quite a lot of these appliances: indeed, when there was no oxidation, we were almost sure that the equipment was never used! We are surprised that the CCSS (or the corresponding Hospitals) did not insist on replacing this part!

Equipment 2 and 3: Intensive care beds. (Futura Nova ICU & Futura Nova Junior)

The TS do not specify the minimal Trendelenburg and anti-Trendelenburg inclination the beds should be able to incline, They only mention that Trendelenburg and anti-Trendelenburg positions must be provided. The beds delivered are capable of a 12° and 7° inclination only. The CCSS should confirm whether the beds are in line with their needs and TS.



Intensive care bed (Item 2)



Intensive care bed pediatrics (Item 3)

In a limited number of cases, corrosion has been found on these beds :

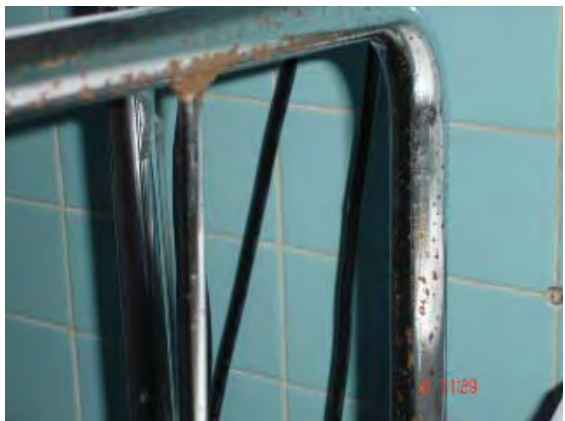


Equipment 4 : Delivery beds (Optima Plus)

This item has been cancelled from the contract.

Equipment 5: Emergency patient trolley (Patient Trolley 535)

Often, the tray underneath the trolley was missing. We assume that it was included at delivery. In some hospitals, the trolleys showed severe corrosion. (See below)





The most recommended action is to submit one or more trolleys (not showing any sign of corrosion) to corrosion testing according to international standards. If the beds do not comply with these standards they all have to be replaced. If the tested beds do comply, CCSS should make a complete inventory of the trolleys showing corrosion and then only those trolleys should be replaced.

Equipment 6, 7 and 8: Monitoring system for 12, 8 and 4 beds. (S/5 Network & Central)

Some of the monitors were equipped with CRT tubes (as required in the TS), others with flat screens.



Monitor with flat screen



Monitors with CRT Tubes

The flats screens are an improvement compared to the CRT tubes. They were proposed in the catalogues included in the offer<sup>7</sup>, and in our opinion all the screens should therefore have been flat screens. CCSS should confirm this.

It was impossible to verify whether all measuring modules have been delivered due to the fact that some of them were not even installed (plug-in modules), and they were not always accessible for physical inspections.

Equipment 9: Open incubators (IWS 3300)



The incubators comply with TS and no recurrent technical problems have been recorded.

<sup>7</sup> The Datex-Ohmeda catalog included in the offer clearly states “The thin, light-weight flat screen is an ergonomic, space saving solution” (photograph included in the same catalog).

Equipment 10: Cabinet incubators. (CP 3000)

No recurrent problems recorded



Equipment 11: Transport incubators (Airborne 185A)

No recurrent problems recorded.



Equipment 12: Basic examination lamp. (Merilux X1 FM)

No recurrent problems recorded.

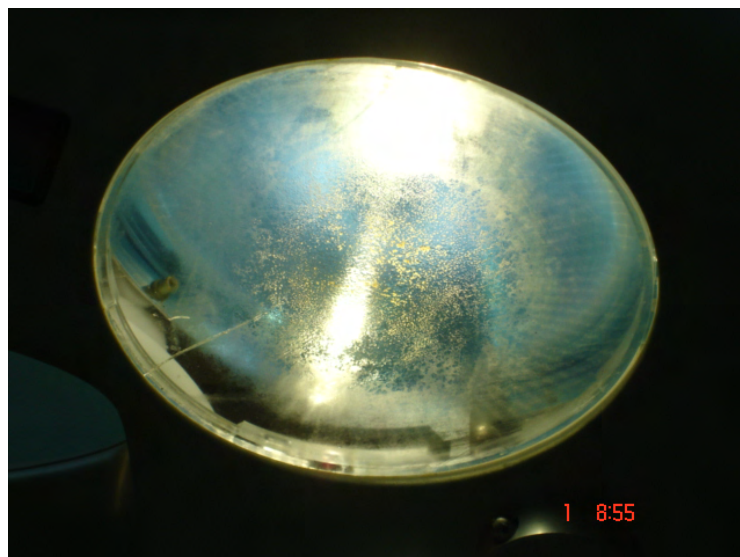


Equipment 13: Dome surgical lamp. (Merilux X5 CM)

- The lamp does not have intensity regulation as required in the TS.
- The exterior of the lamp becomes very hot after a certain time of use.
- The switch is of doubtful quality and breaks after some time (see picture below).
- The filter and protection glass of the lamp deteriorates after some time possibly due to the excess heat production or bad quality of the filter (see other picture below).
- On one lamp, deterioration of the paint has been found which will lead to corrosion once the paint has peeled of.



Lamp with missing switch.



Filter glass shows deterioration

Equipment 14: Phototherapy lamps (Spot Phototherapy)

The lifetime of the lamps is (abnormally?) low according to the users. Many of the equipments are abandoned because some lamps were not replaced, or because there was an excess of them in the hospital.



Abandoned phototherapy lamp.

Equipment 15: Anaesthesia Machine, high technology. (ADU)

In line with TS and no recurrent problems have been recorded. But they are hardly used!



Equipment 16: Anaesthesia machine, general. (Aestiva /5 7900)

In line with TS and no recurrent technical problems noted.



Equipment 17: Operation table (Opera 2001)

According to TS and no recurrent problems noted, although a corrosion problem was detected in the Hospital of Turrialba.



Equipment 18: Bedside telemetry monitors for 6 beds. (S/5 arytmia)

In line with TS and no recurrent technical problems noted.



Equipment 19: Monitor for adults and children (Cardicap 5)

In line with TS and no recurrent technical problems noted.



Equipment 20: Transportable monitor for adults and children (S/5 Light Monitor)

In line with TS and no recurrent technical problems noted.



Equipment 21: Pulse oximeter (3800)

In line with TS and no recurrent technical problems noted.



Equipment 22: C-arm X-ray machine (Ziehm Exposcop 7000)

In line with TS and no recurrent technical problems noted. Equipment is hardly used!



In spite of above observations, hospital staff was very satisfied with the quality and possibilities of the delivered equipment. The equipment is in general reliable and of higher quality than the “Spanish” equipment delivered previously according to staff.

The following table gives a summary of the main problems encountered:

	Name	Unit Value US\$	Nr checked	Comments on compliance and state
1	Suction Equipment, for bodily fluids	1 992	42	oxidation on support of liquid container
2	Intensive care bed	3 915	140	Discussion about the Trendelenburg and Anti Trendelenburg position of the bed; mattress of doubtful quality!
3	Intensive care bed, paediatric	3 024	25	Discussion about the Trendelenburg and Anti Trendelenburg position of the bed
4	Delivery/Birthing bed (usually with stirrups)	5 827	0	Has been canceled from the contract.
5	Emergency/Patient Trolley	1 412	74	Often no tray found underneath the bed. In some Hospitals, oxidation.
6	Central Monitor, for 12 beds	247 146	14	Some where equipped with ordinary CRT tubes (as foreseen in the TS), others with Flat Screens; we could not check if all measuring modules were delivered, because some were not installed by the Hospital (plugin modules)
7	Central Monitor, for 8 beds	165 942	20	We could not check if all measuring modules were delivered.
8	Central Monitor, for 4 beds	87 791	24	We could not check if all measuring modules were delivered.
9	Open Incubators VCI	13 552	44	no comments
10	Cabinet incubator (enclosed)	12 159	26	no comments

	Name	Unit Value US\$	Nr checked	Comments on compliance and state
11	Mobile/Transport Incubators	18 015	5	no comments
12	Examination lamp, basic	955	53	no comments
13	Dome surgical lamp	3 172	22	no intensity regulation; lamp becomes too hot after some time; switch of doubtful quality; deterioration of filter glass in front of lamps.
14	Phototherapy lamp (single focus/monofocus)	2 319	60	Complaints about the high consumption of lamps. But we did not find reliable data of usage to check life time of lamp.
15	Anaesthesia machine, High-technology	89 432	17	no comments
16	General anaesthesia machine	60 185	26	no comments
17	Surgical table, basic	17 334	8	no comments
18	Monitor for bedside or telemetry patients, 6-patient capacity	58 487	10	no comments
19	Monitor, for adults & children	7 778	122	no comments
20	Portable monitor, for adults & children	5 797	94	no comments
21	Pulse oximeter	2 400	69	no comments
22	X-ray Machine, C-Arm type	93 233	17	no comments

## 2. Necessity, use and usage of the equipment

In almost all hospitals the Directors stated or complained to the fact that the Equipment did not correspond to real needs. Indeed, we can describe the chronology of the project like this:

1. A lot of equipment had already been provided through the "Spanish" project in 2000.
2. The Finnish project "appeared"
3. No previous evaluation of the necessities was done.
4. Hospitals could choose in the "limited" list of 22 equipments presented
5. They chose what seemed interesting to them, even if not corresponding to immediate needs.
6. "Finnish" equipment arrived
7. Part of the now "old" "Spanish" equipment (or other equipment) was removed. The Oximeters and some of the Monitors were identical or almost identical with the previous delivery (same brand and model, sometimes slightly "updated")

See for instance the picture below of oximeters of the Finnish delivery, picture on the left, and a mixture of Oximeters of the Spanish and Finnish delivery, right side picture.

The 3 "Spanish" Oximeters are somewhat more "yellow" in colour but that's also the only difference!.



Part of the “still useful” equipment was indeed removed to install the new Finnish Equipment

The consultants made a rough estimate of the usage of the equipment, based on our interviews and physical inspections. It's estimated that a maximum of 77% of the number of equipments is really necessary. This is only 71% if we consider the price of the equipment! This means that, according to our estimates, about 12 million USD could have been saved without any negative effect on the operation of the hospitals.

We did however not evaluate the quantity of still useful “older” equipment that was removed after the arrival of the Finnish equipment. Therefore the above estimate is very conservative! The table below gives our estimate for each equipment.

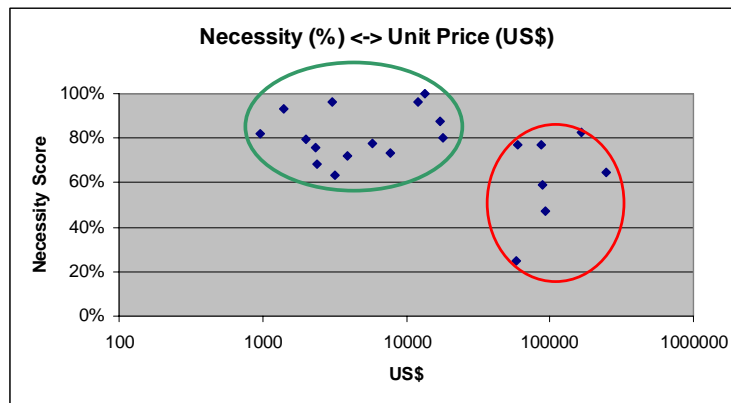
	Name Equipment	Value US\$	necessity (quantity ) %	necessity (of US\$ value) %	Comments
1	Suction Equipment, for bodily fluids	1992	80%	80%	Degree of usage has been estimated based on the oxidation level of fixture. Sometimes not used at all (smaller health Centres)
2	Intensive care bed	3915	79%	79%	Not always used. Seen in places where there is no intensive care, or in rooms without usage!
3	Intensive care bed, paediatric	3024	96%	96%	Very useful
4	Delivery/Birthing bed (usually with stirrups)	5827			Not delivered
5	Emergency/Patient Trolley	1412	95%	95%	Very useful
6	Central Monitor, for 12 beds	2471 46	71%	71%	Quantity in excess of the needs; not all possibilities are used! Some measuring modules are never used, some monitors are not connected.
7	Central Monitor, for 8 beds	1659 42	85%	85%	Quantity in excess of the needs; not all possibilities are used!
8	Central Monitor, for 4 beds	8779 1	79%	79%	Quantity in excess of the needs; not all possibilities are used!
9	Open Incubators VCI	1355 2	100%	100%	Often used, but sometimes lesser usage in smaller Hospitals
10	Cabinet incubator (enclosed)	1215 9	96%	96%	Very used

	Name Equipment	Value US\$	necessity (quantity ) %	necessity (of US\$ value) %	Comments
11	Mobile/Transport Incubators	18015	80%	80%	Excess capacity, but used
12	Examination lamp, basic	955	82%	82%	Used
13	Dome surgical lamp	3172	77%	77%	Quantity in excess of needs! ! Sometimes installed in empty operating rooms, or next to another still usable similar Dome.
14	Phototherapy lamp (single focus/monofocus)	2319	76%	76%	A lot without usage, because of lack (and high consumption) of lamps, or because of over-capacity
15	Anaesthesia machine, High-technology	89432	59%	59%	Too complex for most Costa Rican hospitals and not very used! In fact, for this "computerised" machine, a lot more training should be given to convince conservative Doctors that this is better than the "standard machines".
16	General anaesthesia machine	60185	77%	77%	Very high quality, corresponds to the Costa Rican standards and complexity, but in excess of real needs!
17	Surgical table, basic	17334	88%	88%	Used, and corresponds to Costa Rican standards and complexity!
18	Monitor for bedside or telemetry patients, 6-patient capacity	58487	25%	25%	Almost not used! Often not even connected! Personnel are unable to use them due to insufficient training.
19	Monitor, for adults & children	7778	86%	86%	Quantity in excess of the needs! Used mainly for blood pressure follow up.
20	Portable monitor, for adults & children	5797	82%	82%	Quantity in excess of the needs. Used mainly for blood pressure follow up. . Other measuring functions often not used!
21	Pulse oximeter	2400	68%	68%	A lot of "Spanish" identical apparatus still working; a lot of <u>both</u> lots placed in cupboards and other storage rooms!
22	X-ray Machine, C-Arm type	93233	47%	47%	Some of these machines were replacing still usable, less recent machines. Moreover, they are not used very often, and few people can handle them.
	<b>TOTAL</b>		81%	74%	

When removing the Hospital Calderon Guardia from this calculation the numbers change as follows:

- necessity (of quantity): 85%
- necessity (of US\$ value): 82%

The graph below shows that the cheapest (green left circle) equipments have usually a higher usage level than the more expensive equipments (red right circle)! (The horizontal axis has a logarithmic scale)



In one of the Hospitals (Hospital Calderón Guardia<sup>8</sup>) part of the delivered equipment was still found unpacked! Some pictures can be found below.



Unused anaesthesia machines (high technology) in store

<sup>8</sup> This Hospital seems to be one of the best performing and most reliable Hospitals of the country. The actual President of Costa Rica had to spend some days in this Hospital due to health problems during our mission!



Equipment still in original boxes.



Unused C-arm



Unused intensive care unit.



Installed but unused monitors in empty rooms.



This Hospital has received more equipment than any other hospital (16% of the total value delivered!). Interesting detail is that the hospital belongs to the same Political Party of former Costa Rican president Rafael Ángel Calderón, who has been accused in the corresponding corruption scandal. This hospital was in fact founded by an ancestor of this President.

The Director of the hospital explained that an extension of the hospital was made impossible because of a lack of budgets to hire more personnel. In the meantime, the equipment has been there unused for 2 years and the hospital even received more equipment under the second contract.

The Internal Audit Department of the CCSS made an inventory of unused equipment in some hospitals. (See annex 10). This list contains 188 items. Of the 188 items, 102 were found in Hospital Calderón Guardia! Five X-Ray apparatus and five “Central Monitors, for 12 beds” were on the “Calderón” list! This means that (when only using numbers from CCSS):

- Only 57 % of the equipments delivered to Hospital Calderón Guardia are used (We estimated 44 %, but CCSS data does not include installed equipment with very low degree of utilisation!)
- This number represents 43 % of the US\$ value delivered to the hospital (our estimate being 29%!)

Fischel also made a list, containing 44 equipments not having been installed. (See annex 11). In a letter of 03/01/2005 they explain that they are ready to install them again at another location at “no charge”. In the same letter they explain that they are “in the process of executing the preventive and corrective maintenance”!.

The complete table concerning the equipments checked and the degree of usage can be found in Annex 12.

It is also important to remember that in its appraisal report of July 2001 concerning this project PSR Consulting Ltd. already expressed a very high concern about the real needs and possible overcapacity that the acquisition of new equipment could generate.

When we compare what has been stated as being necessary in the above mentioned report, to what has been “over-delivered”, we obtain the following figures<sup>9</sup> for the 4 Hospitals mentioned in their report:

Hospital	Over-delivered (US\$)	SGS necessity score
Marcial Fallas	17 956	94 %
Maternidad Khalid	23 187	Not visited
Max Peralta	1 218 875	78%
Calderón Guardia	4 216 642	44%

We quote one example: PSR’s investigation showed that Calderón Guardia needed two (2) X-Ray C-arms, while 7 have been delivered.

The PSR Consulting Report mentions clearly that *“This ‘needs assessment’ was done rapidly with consultants provided by CCSS headquarters. Admittedly, the process was ‘quick and dirty’ and, as with all other hospitals visited, the current needs will have to be profoundly revalidated in terms of items required and quantities to match the hospital’s priorities to the possibilities available under the proposed Finnish mixed credit project.”*

They also stated *“In reality, hospitals and other health facilities are restricted in hiring additional human resources that might be needed to get full utilisation out of equipment investments for service expansion.*

*In the Team’s opinion, the current plan for a very large expansion of ICU<sup>10</sup> facilities throughout the country is not justified and requires major revision. Likewise, the requests by hospitals for additional OR<sup>11</sup> equipment need to be examined more closely using rational OR planning criteria, as outlined in this report.”*

This revalidation of the real needs was however not performed, or at least not performed in a scientific or economical way!

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<sup>9</sup> We did not take into account those items that were “under-delivered” compared to the appraisal of PSR Consulting.

<sup>10</sup> ICU: Intensive Care Units

<sup>11</sup> OR: Operation Rooms

### 3. Training

It was impossible to obtain reliable data concerning the training offered to the Costa Rican Hospital personnel. Almost none of the hospitals kept a record! Moreover, we heard opinions going from "Very good training from a Mexican specialist" to very basic and useless training.

Fischel however had copies of records concerning training of the CCSS, but without indication of the duration nor the material remitted to the participants (see annex 13).

However, we believe that the conclusions already made on the basis of the documentary analysis are confirmed on the work floor :

- training on some of the most complex equipment (High-technology Anaesthesia machine, or Telemetry Equipment) was very poor;
- no specific material was delivered as asked for in the terms of reference! This made it "almost impossible" for the trained personnel to subsequently train other personnel of the hospital (in case of absence or rotation of personnel – "Trainer of Trainer concept").

PSR Consulting Ltd. already mentioned in its report of 2001: *"Product training on-site for users and maintenance personnel, and also more specialised training for key technical staff in Finland, should be included in and fully funded by the contract. Concerning the training of personnel in Finland, the CCSS indicated that the end-users may prefer the ToT<sup>12</sup> approach, in which case only suitable key technical staff would be sent to Finland. It is also in the supplier's interest to ensure that appropriate hospital staff are fully acquainted with all aspects of the use, calibration, care and maintenance of the technologies being supplied. These suggestions should be reflected fully in an appropriate clause in the contract."*

They also stated that:

*"Technical equipment such as relatively complex anesthetic equipment cannot be considered in isolation from the availability of staff who are trained to use it and, very importantly from a patient-safety perspective, who will use it frequently so that their skills are maintained at a high level. It does not appear to the Team that a convincing case has been made by CCSS and the health facilities involved that both of these conditions will be met. There are shortages of particular specialists such as anesthetists at least in some areas. This might well lead to a situation where supplied equipment is grossly under-utilised, if used at all. In its review, CCSS should present details of availability of specialist staff and workloads to justify the provision of equipment at each facility."*

These recommendations have clearly not, or insufficiently, been take into account since the field mission shows that these equipment are most frequently not being used at all and clearly because of lack of (high level) training.

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<sup>12</sup> ToT: Training of Trainers

#### **4. Maintenance**

Corrective Maintenance was performed in an acceptable speed by the Fischel Company. When visiting the Fischel premises, we indeed found some of the apparatus mentioned as being "in repair" in some of the hospitals.

Preventive Maintenance however was not performed as promised.

Only 56% of the preventive maintenance visits of our sample have been performed. We did not take into account the equipment delivered in the second phase to calculate this number! We noticed that Fischel made a serious effort since the second half of December 2004 to accelerate the preventive maintenance, and our auditors met technicians of Fischel on several occasions.

However, preventive maintenance was in fact only a superficial checking of the status of the equipment. No real preventive maintenance tasks seem to have been performed consistently.

This could have serious implications even on patient safety if for instance calibration hasn't been performed properly or not at all on anaesthesia machines, to mention just one example.

Fischel showed us Minutes of Meeting where they propose to the CCSS to continue the Maintenance Program beyond the guarantee period.

Also here, PSR Consulting Ltd warned the CCSS that the Maintenance structure foreseen was of a level too low for the real needs of the Country: *"The current policies for management and maintenance of hospital assets (building fabric, basic services and utilities, equipment and plant) are not wholly satisfactory at present, although several of the institutions visited by the Team appeared to be coping well with basic maintenance requirements. However, if asset management and maintenance systems are not developed more systematically with appropriate budget allocations, then newly acquired assets will decay within a few years, and the return on the investment will be poor."*

## 5. Closing Meeting in Costa Rica

The consultants had a closing meeting with the CCSS on 11/02/2005, the last day in Costa Rica, with:

- Dra. Daisy Corrales Diaz, Advisor of the President of the CCSS
- Arq. Gabriela Murillo Jenkins, Operations Director
- Ing. Rene Escalante, Administrative Director

The following conclusions were transmitted orally to the CCSS:

- All equipments have been delivered;
- They are of high quality (Especially compared to the "Spanish Equipment");
- They are working as required (some smaller complaints);
- Complaints about smaller additional tools and captors have been recorded (but these are more prone to wear and are not included in the guarantee);
- The hospitals were not consulted on their real needs;
- They could choose only from a limited list of equipments;
- More than 20% of the Equipment is not used in the Hospitals. In some case it raises to more then 40%;
- Corrective Maintenance was performed as expected;
- Preventive Maintenance was performed at about 56%, but should not even be called "Maintenance". It consists only of very superficial functionality checks!
- Training was somehow performed, but did not comply with the ToR: no training support material has been provided to the participants;
- Finnish content was definitely lower then 67% as stated by Instrumentarium. Our "imprecise" calculation showed that the content was around 53%.

## VI. Conclusions and Recommendations.

### Conclusions :

1. All equipments have been delivered to Costa Rica.
2. In general it's of a high quality.
3. Some quality issues are present however, corrosion of some of the equipments being the main problem.
4. Some equipment is very sophisticated, being one of the reasons why they are hardly used or only partly used.
5. In some hospitals, the number of equipments are in excess of the real needs.
6. Training was insufficient for the more sophisticated equipment.
7. Hospitals were consulted about their needs before the project started. The choice was limited to a list of 22 items however. Therefore items have been chosen because the opportunity was there and not always because they needed the equipment.
8. The equipment is expensive. Several reasons contribute to the high price :
  - Relatively high quality compared to the material offered by other suppliers.
  - Insufficient competition in the tendering process.
  - Limitations imposed by the rules of the concessional credits.
9. Preventive maintenance by the supplier has not been executed according to the contract.
10. Possible problems, warnings and facts raised in PSR's appraisal report have not or insufficiently been taken into account.
11. Follow-up and monitoring of Finnish as well as Costa Rican Government is insufficient.

The problems that were requested to be investigated during this mission, do indeed exist. On the other hand, the problems shouldn't be exaggerated either. There are some quality issues and they should be fixed by the supplier but the overall quality of the equipment is high and users are in general very satisfied with it. The consultants estimate that, when these quality issues are solved, the Instrumentarium group can't be held accountable for further technical liabilities.

The real need for such high quality and sophisticated equipment, in those quantities, and thus its high cost, is another matter. This is not (only) a technical question however but rather a strategic one in the framework of the Costa Rican Health Care System. Also this issue was already raised by PSR however and the recommendations of the report have not been followed with a lot of unused sophisticated equipment as a result.

The conditions imposed by the rules of the concessional credits on the other hand, are probably the main reason for the high cost of the contract, abstraction made of quality and sophistication of the delivered equipment.

## **Recommendations :**

If the Finnish Government wishes to prevent new incidents like this one in the future, it should be much better informed about the conditions and the execution of the contracts backed by bilateral loans. Systematic and pro-active monitoring would be very useful in this context.

The Costa Rican Government on its side, in casu the CCSS, should do a more precise validation of any feasibility and necessities study as well as a stricter follow-up of contract execution such as in the areas of preventive maintenance, quality and training issues, etc....)

The PSR appraisal report warned for most of the mistakes that have been after all : over-investment, insufficient training combined with sophisticated equipment, ...

The consultants had a discussion with the executives of the CCSS about the usefulness of extending the Preventive Maintenance program beyond the guarantee period (this to conform with the quantity of preventive maintenance that should have been performed). We suggested that, it would be more interesting to extend the warranty period instead of only the Preventive Maintenance period. Indeed, as the preventive maintenance has not been performed as required, the equipment is more prone to failures, and therefore the extension of only the "visual checks" is a handy way for Fischel to sell more spares to the CCSS.

The maintenance technicians should register more detailed information in the "Bitácoras":

- Date and time of preventive maintenance or repair – Date and time of "maintained and installed"
- Time spent to repair
- Replaced parts and their cost
- Preventive maintenance tasks executed (lubrication, tightening, calibration, etc.)
- Cause of problems
- Name of technician(s)

The CCSS should try to set up a Maintenance Management system for the Hospitals and Clinics and Smaller Health Centres! Maintenance Management means:

- Cost follow-up
- Activities planning
- Problem analysis
- Improvement projects
- Etc.

The technical level of the maintenance technicians (those assigned for the medical equipment) is often too low. In most Clinics, EBAIS and some of the smaller Hospitals it is probably economically difficult

to justify the presence of a permanent medical equipment maintenance team. Therefore we would like to suggest to subcontract the maintenance of medical equipment to an external partner or to create a new Maintenance Entity in the CCSS. The external partner should not necessarily be the Original Equipment Manufacturer, but should of course (especially for the calibration of measuring equipment) have the necessary expertise and recognition.

### **3. Immediate actions to be undertaken :**

(Mainly) by CCSS:

- ❖ Confirm whether the ICU beds are in accordance with the TS concerning the Trendelenburg position or not. If not, request replacement of the beds.
- ❖ Make an inventory of all patient trolleys showing corrosion and request replacement from supplier. (Probably all trolleys have the same quality problem and a corrosion test can be recommended).
- ❖ Making an inventory of any other problems with any of the equipments and request repair or replacement.
- ❖ Request replacement of the part of the suction equipment for bodily fluids subject to corrosion, with a part of better quality.
- ❖ Make a complete inventory of executed corrective maintenance actions. Request extension of the free maintenance and/or warranty period from supplier in function of the data obtained.
- ❖ Make a complete inventory of un-used equipment and possibly redistribute it to other hospitals.
- ❖ Collect comprehensive data on training needs of staff and supply additional training in order to improve the use and usage of the more sophisticated equipment.
- ❖ Request training material from supplier as specified in the tender documents.
- ❖ Investigate whether additional training can still be given by the supplier, free of charge, as foreseen in the tender documents.
- ❖ Do a much better follow-up of preventive maintenance actions, especially on "high risk" equipment such as the anaesthesia equipment.

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**Notes :**

