

Chapter IV: Medical equipment management

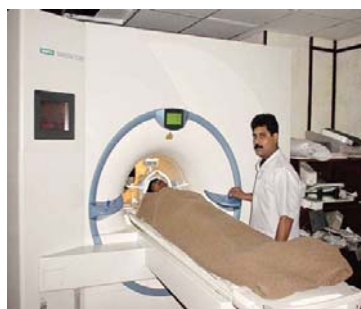
Audit objectives:

To assess whether:

- **Availability of equipment for patient care matched the authorised scales;**
- **Modernisation of hospitals had progressed as planned; and**
- **Scheme of annual maintenance and repairs to medical equipment were functioning effectively and efficiently to minimise downtime of equipment.**

4.1 General

All medical, dental and veterinary equipment required by the Armed Forces are procured, stocked and issued by the DGAFMS. Medical equipment are characterised by wide range, variety and high rate of obsolescence. Increasing dependence of medical professionals on equipment, both for diagnosis and treatment, demands their availability at all times through a comprehensive and responsive engineering support.



For the purpose of procurement, stocking, issue, repair and maintenance, the medical equipment is categorised as sophisticated equipment, electro-medical equipment and non-electro medical equipment. The 'sophisticated equipment', being state-of-the-art technology, is generally imported. The 'electro-medical equipment' is complex in design and contains electronic circuitry. The 'non-electro medical equipment' is relatively simple in design and covers all mechanical, electrical and optical equipment.

According to the policy adopted by DGAFMS, life of equipment is to be determined on the basis of vintage in case of 'sophisticated' and 'non-electro medical' equipment. For 'electro-medical equipment', the twin criteria of vintage and usage is adopted. In 2010, the policy was revised adopting vintage as the sole basis for all categories of equipment.

To cover the requirement of spares, accessories and maintenance stores during the initial period of warranty, an equipment maintenance system based on the concept of 'Complete Equipment Schedule' is provided along with the equipment by the OEM. On expiry of warranty, the repair and maintenance of all equipment is carried out through local purchase of spares and local repair contracts or Annual Maintenance Contracts (AMC) with trade. The responsibility for repairs to medical equipment is

divided between the DGAFMS and the DGEME as discussed in the succeeding paragraph.

Procurement of equipment

The procurement of medical equipment is governed by Medical Equipment Scale (ME) authorised for each hospital. Equipment falling outside the ME scale is procured on 'as required basis' by submitting a statement of case (SOC) for obtaining approval of the competent financial authority or through the Annual Acquisition Plan (AAP). The AAP indicates the outlay for procurement, the specific kind of equipment required, its quantity and the hospitals covered under the plan and caters to modernisation of the hospitals.

The expenditure on procurement is classified as 'Capital' for all equipment valuing ₹ 10 lakh each or more with a life of seven years or more and as 'Revenue' when these conditions are not satisfied. The procurement of medical equipment of Capital nature is carried out centrally by the DGAFMS and of Revenue nature both by DGAFMS and AFMSDs as per the provisions in the Defence Procurement Manual (DPM). Hospitals by themselves are not allowed to procure any equipment.

For every procurement of medical equipment of Capital nature the Ministry first accords the 'Acceptance of Necessity' (AON) followed by subsequent processes as provided in the DPM. The financial powers delegated in July 2006 by the Ministry for procuring equipment are as under:

Table- 21: Delegation of financial powers

Competent Financial Authority	Financial Limit	
	Without IFA concurrence ₹	With IFA's concurrence ₹
Capital Head		
DGAFMS	Nil	200 lakh
Revenue Head		
DGAFMS	3 lakh	100 lakh
Addl DGAFMS (E&S)	Nil	50 lakh
Addl. DGAFMS (Medical Research)	1 lakh	5 lakh
AFMSDs (Delhi, Mumbai & Lucknow)	0.10 lakh	10 lakh
AFMSD Pune	0.05 lakh	2 lakh

Procurements exceeding the delegated powers of the DGAFMS are sanctioned by the Ministry.

Stocking echelons

Until February 2010, the stocking and issue of 'electro-medical' equipment was made centrally by AFMSD Pune for all the Services. From March 2010 the responsibility for stocking and issue of such equipment was distributed amongst AFMSD Pune, Delhi and Lucknow. The responsibility for stocking and issue of 'non electro' medical

equipment vest in three AFMSDs viz. those at Delhi, Mumbai and Lucknow as per their command jurisdiction.

Maintenance of 'dues out' record

A hospital places an indent on the AFMSD for supply of equipment as per the ME scale. Indent for equipment is termed 'Initial' when it is to be procured for the first time and 'Maintenance' when in replacement for existing equipment that has outlived its prescribed life. After assessing whether the demand for equipment can be met from the stock held, the AFMSD consolidates the indents received from various Units for procurements of equipment under the said two categories separately to arrive at the net deficiency, which is termed as 'Dues Out'. The dues out against initial indents are known as 'Initial Dues Out' and those against maintenance indent as 'Maintenance Dues Out' which is projected to the DGAFMS in the Annual 'Dues Out' report for procurement. As per DGAFMS policy of May 1965 the dues out are to be maintained separately against initial indents and maintenance indents.

Procurement under Capital & Revenue Heads

Details of the orders placed for procurement of equipment by DGAFMS during 2006-11 under Capital head and Revenue head were as follows:

Table- 22: Procurement of equipment

(₹ in crore)

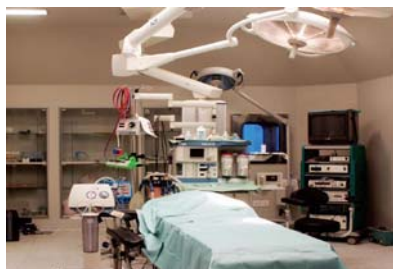
Year	Procurement of Equipment under		Total procurement
	Capital Head (4076-103-908/44)	Revenue Head (2076-110- 421/02)	
2006-07	48.20	34.26	82.46
2007-08	59.93	37.30	97.23
2008-09	87.86	40.03	127.89
2009-10	145.63	22.58	168.21
2010-11	99.84	25.51	125.35
Total	441.46	159.68	601.14

Source of data: Details of procurement furnished by DGAFMS.

4.2 Huge shortage of scaled electro-medical equipment

ME Scale authorises electro-medical and non electro-medical equipment to medical and non medical units such as MI room of a Unit/formation. In January 2008, the Ministry approved revision to the existing ME Scale of 1960s. As the types and number of equipment involved in the scale are huge, we examined the position only in respect of 'electro- medical equipment' which are generally of diagnostic nature, and deployed for intense patient care. The availability of electro-medical equipment was examined with reference to the revised ME Scale. The examination revealed the following:

Deficiency of equipment as per the scale



With the introduction of the new ME Scale, AFMSD Pune submitted to DGAFMS its Annual 'Dues out' Report showing the deficiency of equipment, both in terms of type and quantity, to be procured based on initial indents (for new requirement) and maintenance indents (for replacement). The details of the dues out reported

by AFMSD Pune were as follows:

Table- 23: Dues out position (value ₹ in crore)

Year	Dues out of Initial Indents			Dues out of Maintenance Indents		
	Types of Eqpt.	Qty.	Value*	Types of Eqpt.	Qty.	Value*
2008	45	396	4.02	37	474	1.94
2009	157	2705	11.40	59	710	3.28
2010	278	21417	176.90	71	691	2.03

**Value of equipment under dues out worked out by Audit based on PVMS rates except in case of 32 equipment (29 Initial & 3 Maintenance) (Qty 2846 = 2755 + 91) for which PVMS rates were not available.*

The Report as of December 2010 showed a total deficiency of 22,108 equipment and outlay requirement of ₹178.93 crore which was at variance with the original assurance of the DGAFMS that the revision to ME Scale would not involve any extra expenditure. A steep increase in dues out quantity from 2008 to 2010 was a pointer to the fact that not all hospitals had been correctly projecting the initial deficiency of equipment in the past years. Further, the increasing trend in 'dues out' both in respect of Initial and Maintenance Indents revealed that the procurement has not kept pace with the demands.

We also noticed that no procurement had been made till date to make up for the projected deficiencies. The DGAFMS clarified that procurements arising from Provision Review, which is based on 'Dues Out' report, were not made due to discontinuance of the review following the implementation of AAP from 2006-07 onwards.

The Ministry stated that the requirements of expendable/non-expendable items were formulated on the basis of periodic returns submitted by the units and review of the availability of equipment vis-à-vis periodic revisions of the ME Scale. The Ministry added that during last one-and-a-half years there has been significant increase in procurement.

The Ministry's response was factually incorrect since procurements against AAP are essentially meant for equipment to meet the modernisation needs of hospitals whereas those through SOC are intended for procurement of non-scale equipment. ME Scales are meant to truly reflect the normal requirement of the hospitals and huge shortages

against the same are indicative of shortfalls in availability of patient care infrastructure.

The above facts indicate that substantial outlays are required to bring the hospitals up to date with regard to the critical electro-medical equipment in order to prevent these shortages from adversely impacting the quality of treatment provided to patients.

Alarming deficiency of critical equipment

The holding of 20 equipment vis-à-vis ME Scale was further examined at 28 hospitals. The details of deficiency and surplus with reference to authorisation are given below:

Table- 24: Deficiency in respect of 20 critical equipment at 28 hospitals

PVMS No.	Nomenclature	No. of Hospitals having					
		Deficiency (percentage)			Surplus	Nil deficiency	Nil authorisation
		100	50-99	< 50			
040017	Apparatus oxygen concentrator provides 95% O2 purity at 5 LPM	3	10	7	2	5	1
040082	ECG/NIBP/SPO2/Temp Monitor	5	19	-	1	1	2
040177A	Pulse Oximeter hand held	5	3	6	2	12	-
250104	Apparatus X-ray, radiographic and fluoroscopic 160 MA at 120 KV generator with 10 KW out put, one BTL 20/40 rotating anode tube head and one motor driven table with spot film device (14" x 14") and one motorized collimator operable on 400-440 volts AC 50 Hz	9	1	-	1	14	3
250106	Apparatus X-ray mobile 60 MA at 100 KVP for 1.5 sec operating on 190 v to 230 volts, 50 Hz single phase AC with accessories	20	6	-	-	-	2
250110	Automatic film processor suitable for processing film size up to 14" x 17"	13	13	2	-	-	-
280053	Lamp operating shadow less, with halogen light 230 v AC/DC 12 volts battery	11	4	2	2	3	6
280047A/ 280624	Portable Light weight computerized Multi channel ECG machine with capability of acquiring all the 12 leads simultaneously, printing on A size thermal paper with auto measurement parameters complete	7	15	5	-	-	1
280003	App Ultrasonic Therapy Unit complete, maximum output 21 watts pulsed & 15 watts continuous Ultrasonic Frequency 1 MHZ with Digital output Display 230 volts 50 cycles AC	14	3	-	1	6	4
280004	App short wave Diathermy Therapeutic (27.12 Mega cycles 11.05 meters) valve type complete HF output 400 watts 230 volts 50 cycles AC.	6	1	1	1	15	4

280604	Bed Side monitor, double channel high/low alarm and digital heart rate display with standard accessories operable on 220 V, 50Hz and rechargeable Ni-cd battery	8	14	1	-	1	4
280608	DC Defibrillator Cum Monitor complete	8	15	2	1	2	-
040162A	Nebuliser Electric	9	14	2	1	2	-
040111	ICU Volume cycled ventilator TV 50 ml-2 ltr IMV, SIMV, assist control PEEP, BIPAP, Pressure support volume cycled with Humidifier and data display screen and battery backup	8	3	2	1	10	4
250206	Box viewing negative with a pair of straight fluorescent tube complete	20	-	1	4	3	-
250117	Medical image intensifier television system with automatic dose rate control facility, dual field, 2 nos monitor to be coupled with high powered x-ray generator with communication facility	21	-	-	-	-	7
250120	Portable ultrasound unit with built in 7" Monitor and with convex sector 3.5 MHz transducer/probe and patient examination table with CVT operable on 220 V AC, 50Hz.	16	6	-	1	5	-
250201	Apron lead vinyl rubber with heavy duty nylon reinforced seams and padded shoulder, minimum 0.5 mm lead equivalent.	28	-	-	-	-	-
251101	Ultrasound Colour Doppler with thermal printer automatic multi format camera	13	1	-	1	2	11
280052	Lamp infra red small, complete 600 watts 230 volts AC/DC	20	3	1	-	4	-

Source of data: Data compiled from information furnished by hospitals in proforma indicating holding of equipment against authorisation.

AH R&R, 6 AF Hospital and INHS Jeevanthi were excluded from the above analysis as equipment held by them were reported as not in vocabulary. This was despite the fact that ME Scale also indicated authorisation in their favour. The results of examination at other hospitals are discussed below:

- ❖ Information on holding of equipment as per ME Scale sought from hospitals covered in the Performance Audit revealed authorisations lower than those prescribed by the ME Scale implying that many of the hospitals were not aware of their entitlement of different equipment. This also implied that the indents raised by them would not represent the true picture of the equipment deficiency on ground;
- ❖ 100 per cent deficiency was noticed in 3 to 28 hospitals. Most hospitals were alarmingly deficient of equipment required for patient care, such as portable multi channel ECG (7)¹⁷, bedside monitor heart rate display (8), DC

¹⁷ The figures in bracket indicate the number of hospitals where deficiency was found. These are out of the 28 hospitals that were audited.

defibrillator (8), Nebuliser electric (9), Portable ultrasound unit (16), Lamp infra red (20). The deficiency in diagnostics equipment was noticed in relation to Mobile X-ray of 60 MA (20), automatic film processor (13), box viewing negative (20), Medical image intensifier television system (21), Ultrasound colour Doppler (13). A basic equipment such as Operating Lamp (shadowless) was not available in 11 hospitals;

- ❖ Between 50 *per cent* and 99 *per cent* deficiency existed for 17 equipment in one hospital to 19 hospitals;
- ❖ Less than 50 *per cent* deficiency existed for 12 equipment in one hospital to seven hospitals;
- ❖ Surplus holdings in respect of certain equipment were also noticed and were a consequence of procurements made in the period preceding the introduction of the revised ME scale; and
- ❖ Maximum deficiencies were noticed at Command Hospitals at WC Chandimandir, NC Udhampur, SC Pune and (AF) Bengaluru, MH Ambala, MH CTC Pune, MH Jabalpur, MH Agra and 404 & 4015 Field Hospitals.

Thus, despite the procurement of equipment valuing ₹ 601 crore during 2006-07 to 2010-11, the hospitals were seriously handicapped on account of 100 *per cent* deficiency in certain equipment. AFMSD Pune also informed that of the nine equipment required in varying quantities for accurate repair and checking/calibration of electro medical equipment, only one was functional.

Non-submission of equipment census report

Equipment Census Report on electro-medical equipment is required to be rendered by the dependent units to AFMSD Pune. The report details all the equipment held, their vintage and status of serviceability. The purpose of the report is to arrive at deficiencies of equipment held, conduct their ageing analysis and plan central procurements for replacement of equipment that had completed their shelf life.

The status of receipt of electro-medical equipment census report from various units/hospitals at AFMSD Pune was as under:

Table- 25: Position of receipt of equipment census report

Services	No of units/hospitals	No of units/hospitals submitted their Electro Medical Equipment Census Report during					
		2008		2009		2010	
		No.	Compliance (Percentage)	No.	Compliance (Percentage)	No.	Compliance (Percentage)
Army	358	146	41	136	38	172	48
Navy	209	27	13	21	10	10	5
Air Force	133	36	27	18	14	85	64
Other Services	74	02	3	01	1	02	3
Total	774	211	27	176	23	269	35

As 65 to 77 *per cent* of units/hospitals had not complied with the requirement of rendering the report, this important management tool was not available to the DGAFMS to plan supply against authorisation or replacement of electro-medical equipment based on ageing analysis.

Non provision of basic entitled scaled items to new units

Five new medical units, raised between September 2009 and July 2011, were to be issued with medical equipment as per scales applicable to them. As of June 2011 the compliance in issue of scaled equipment was as under:

Table- 26: Compliance rate of supply of equipment

Unit	Raising Date	Date by which items as per scale to be provided	Type of items authorised	Type of items issued	Percentage of compliance	Type of items not yet issued
M H Gopalpur	31.7.2010	31.12.2010	735	207	28	528
356 F H	12.9.2009	12.3.2010	666	451	68	215
371 F H	01.6.2010	30.11.2010	693	330	48	363
456 F H	01.4.2011	30.9.2011	429	171	40	258
471 F H	01.7.2011	31.12.2011	429	170	40	259

Recommendation No 4

There is need to comprehensively review the availability of equipment in all hospitals and take immediate action to fill the gaps which are substantial. Suitable fast tracking procedures may be adopted and resources made available to make the military hospitals capable of providing quality medical services to the serving soldiers.

The Ministry replied that during the last one-and-a-half years there has been significant increase in procurement of stores to overcome the deficiencies.

The reply ought to be considered in the light of the fact that large scale deficiencies existed in rendition of 'dues out' and 'equipment census report' by several units and also in the light of the discontinuance of the procurements based on provision review.

4.3 Modernisation of hospitals

Deficiency in modernisation

To cope with rapid changes in various fields of medicine as well as the need to modernise AFMS in a planned and phased manner, the system of formulation of Annual Acquisition Plan (AAP) was introduced from 2006-07. The objectives of AAP were to modernise AFMS to achieve standardisation for manning and maintenance and to ensure balanced infusion of technology in various hospitals.

As would be evident from the following table, very little procurement both under capital and revenue had materialised in time. By the end of 2010-11, only 73 per cent of the equipment projected in the AAP for 2006-07 could be procured.

Table 27 below indicates procurement in terms of value as projected in the AAP and actual procurement done in these years. Table 28 indicates procurement in terms of number of equipment.

Table- 27: Compliance to the AAP (₹ in crore)

Year	A A P		2006-07		2007-08		2008-09		2009-10		2010-11		Total procured	
	Cap	Rev	Cap	Rev	Cap	Rev	Cap	Rev	Cap	Rev	Cap	Rev	Cap	Rev
2006-07	247.34	206.37	18.38	13.41	26.98	32.93	29.90	12.59	51.74	15.13	16.88	7.35	143.88	81.41
2007-08	88.06	72.31	-	-	0.27	1.07	7.25	0.55	5.05	41.53	-	6.37	12.57	49.52
2008-09	180.70	39.71	-	-	-	-	2.31	0.50	3.06	0.49	20.57	3.17	25.94	4.16
2009-10	278.91	64.34	-	-	-	-	-	-	0.96	-	35.06	2.20	36.02	2.20
2010-11	367.01	73.48	-	-	-	-	-	-	-	-	0.20	0.10	0.20	0.10
Total	1162.02	456.21	18.38	13.41	27.25	34.00	39.46	13.64	60.81	57.15	72.71	19.19	218.61	137.39

Source of data: Compiled from information furnished by DGAFMS.

Table- 28: Procurement of equipment against AAP

(Figure in bracket indicates the quantity of equipment)

Year	Type & qty. of eqpt planned during the year	Type & quantity of equipment procured in subsequent years relating to the AAP (either in full or part)					Total type of eqpt & qty procured	Total type of eqpt not procured (in Part/ Full)	Percentage of non procurement (qty)
		06-07	07-08	08-09	09-10	10-11			
2006-07	149 (12111)	39 (2803)	33 (3239)	23 (708)	18 (1952)	07 (109)	120 (8811)	58 (3300)	27
2007-08	51 (2878)	-	01 (60)	02 (23)	04 (110)	01 (48)	8 (241)	43 (2637)	92
2008-09	33 (2551)	-	-	01 (19)	01 (103)	03 (320)	5 (442)	28 (2109)	83
2009-10	51 (1953)	-	-	-	01 (03)	12 (401)	13 (404)	38 (1549)	79
2010-11	62 (2588)	-	-	-	-	03 (02)	03 (02)	62 (2586)	100
Total	346 (22081)	39 (2803)	34 (3299)	26 (750)	24 (2168)	26 (880)	149 (9900)	(12181)	

Source of data: Compiled from information furnished by DGAFMS.

The equipment planned in AAP for 2006-07 but not procured till March 2011 was critical equipment such as CT Scan, EEG Analyser, Fibre Optic Nysopharyngo Laryngoscope, Cardiotocograph, Mobile OT Light, Neonatal Ventilator, Fibre Optic Bronchoscope, Digital Flouro Radiography system, etc. As of March 2011, the backlog in completing the AAP for the years 2006-07 to 2010-11 was significant being 27, 92, 83, 79 and nearly 100 per cent, respectively. At the current rate of progress another four to six years would be required to complete the procurements

planned for these years. In other words, unless budgetary outlays are significantly increased and procurement process is made more efficient, there will always remain an inordinate time lag of four to six years to implement the AAP.

Availability of funds against requirement for AAP

The allotment of funds under capital head and the requirement worked out under AAP for the year 2006-07 to 2010-11 was as follows:

Table- 29: Demand of funds against requirement under capital head

(₹ in crore)

Year	Funds required as per AAP			Allotment under capital head	Difference under capital head	Percentage of demand met under capital head
	Capital Head	Revenue Head	Total			
(1)	(2)	(3)	(4)	(5)	(6) (2-5)	(7) (5/2)
2006-07	247.34*	206.37*	453.71	93	154.34	37.60
2007-08	88.06	72.31	160.37	70	18.06	79.49
2008-09	180.70*	39.72*	220.42	60	120.70	33.20
2009-10	278.91*	64.34*	343.25	70	208.91	25.10
2010-11	367.01*	73.48*	440.49	100	267.01	27.25

*Requirement of funds was not bifurcated into Capital & Revenue separately. However, based on benchmark of more than ₹ 10 lakh for Capital and ₹ 10 lakh and less for Revenue the cost of equipment under AAP has been worked out in audit.

Although the DGAFMS contended that funds under capital head was not a constraint, the allotment of funds under capital head was not commensurate with the funds required for procurement of equipment in AAP.

Recommendation No 5

The pace of procurements planned under Annual Acquisition Plans needs to be accelerated for modernisation to remain relevant. This would be possible only if budgetary outlays are significantly increased and procurement process is made more efficient. A serious study may be undertaken to identify and remove the bottlenecks, be it in the nature of financial delegation and empowerments or procedural constraints.

The Ministry stated that a proposal to increase the delegation of financial powers was under consideration.

4.4 Delays in procurement

Framing of Qualitative Requirement (QR)

Proposals for equipment which are not in vocabulary are raised on DGMS by hospitals, which after vetting are forwarded to DGAFMS. The DGAFMS examines

the proposal as regards necessity, availability of vendors/manufacturers in market, approximate cost involved and performance of the equipment supplied by the vendor. The Qualitative Requirements (QRs) of the equipment is finalised by Senior Consultants at the DGAFMS. As per DPM the QRs must be sufficiently broad based to enhance wider competition and avoid single vendor situation and procurement delays.

During 2007-11, 128 contracts were concluded for procurement of medical equipment under capital head 42 of these were beyond the powers of DGAFMS as these contracts were for more than ₹ 2 crore each. We examined 11 of these 42 contracts, concurred by the Ministry, as regards internal lead time i.e. formulation of QRs, evaluation by the Technical Evaluation Committee and re-tendering and finalisation of contract.

QR for equipment is intended to elicit competitive response and avoid frequent re-tendering which contribute to delay in procurement. Four of the eleven cases involving procurement over ₹ 25 crore revealed non-formulation of broad based qualitative requirement (QR) and frequent tendering resulting into delays in the planned procurement of over 24 months.

Out of these 11 cases, in at least four cases, re-tendering had to be resorted to with revised QRs. In one case, the time taken from Indent to Contract was as high as 77 months.

Long internal lead time

DPM provides a detailed time frame governing each stage of acquisition under 'Single bid' system (commercial bid) and 'Two bid' system (technical and commercial bid). The time frame suggested therein is up to 22 weeks for single-bid and 26 weeks under two-bid commencing from the activity of vetting and registration of indent to conclusion of contract so as to ensure that the bids are finalised within the validity period. The DGAFMS in formulating SOP in this regard also provided the same time frame and included therein the stages preceding the indent. This involved scrutiny of statement of case and their submission to MOD for need approval by the DG (2 weeks), Approval by MOD/MOD (Fin) (6 weeks), Raising of Indent (1 week) followed by subsequent activities. However, there were delays at each stage of procurement activity as explained in the succeeding paragraphs.

Delay in submission of cases to MOD for AON

Two weeks' time was adopted by the DGAFMS for sending the cases to the Ministry for obtaining 'AON'. The time actually taken by DGAFMS is shown below:

Table- 30: Time taken for submitting proposals to Ministry

Year	AAP approved	Proposal due for AON	Cases proposed	Proposals submitted within time and that delayed by weeks							
				Within time	2-4	5-8	9-12	13-16	17-20	21-24	Above 24
2008-09	03.7.08	17.7.08	25	25	-	-	-	-	-	-	-
2009-10	20.2.09	06.3.09	37	06	12	9	3	3	3	-	1
2010-11	13.3.10	27.3.10	36	Nil	9	11	8	4	3	1	-
Total			98	31	21	20	11	7	6	1	1
			<i>Per cent</i>	32	22	20	11	7	6	1	1

Source of data: Data compiled from information furnished by DGAFMS.

It can be seen that there was a delay in submission of the proposals to the Ministry in 68 per cent of the cases. In 26 per cent cases the delay was beyond 8 weeks.

Time taken for accord of AON by the Ministry

With reference to the six-week time frame for according the AON indicated in the SOP the position was as under:

Table- 31: Time taken by Ministry for according AON

AAP Year	Total no. of approvals accorded	Within six weeks (per cent)	Time taken in weeks for according AON by MOD beyond the limit of six weeks. (percent)			
			7 to 12	13 to 25	26 to 50	Above 50
2008-09	25	NIL	4 (16)	18 (72)	3 (12)	0
2009-10	37	1 (2)	14 (38)	15 (41)	5 (14)	2 (5)
2010-11	36	-	14 (39)	21 (58)	1 (3)	0
Total	98	1 (1)	32 (33)	54 (55)	9 (9)	2 (2)

Source of data: Data compiled from information furnished by DGAFMS.

Time taken for conversion of indent into contract

Time taken for conversion of 63 indents into contracts as of March 2011 against the prescribed time frame of 26 weeks as shown below:

Table-32: Period of conversion from Indent to Contract

AAP Year	Total No. of indents	No. of indents converted into contract within prescribed time of 26 weeks and that delayed by weeks						
		Within time	1-6	7-14	15-26	27-42	Above 42	Still in process*
2008-09	27	-	-	2	3	4	5	13
2009-10	36	-	-	1	3	2	8	22
Total	63	-	-	3	6	6	13	35

Source of data: Data compiled from information furnished by DGAFMS.

Of the 63 indents raised, 35 were still under process as of March 2011 constituting nearly 56 per cent.

The DGAFMS attributed the delay in procurement to strict adherence to the laid down procedures.

The abnormal delay at each stage of procurement has adversely affected the equipping of the hospitals with modern diagnostic equipment for providing improved patient care. The delays have occurred despite existence of an approved AAP.

4.5 Post contract management

The post contract activities involve acceptance in inspection, installation, utilisation, timely repairs on breakdown and maintenance under the AMCs during the life cycle of equipment and its final disposal.

We analysed the status of medical equipment as regards installation, availability and downtime in the hospitals covered under Performance Audit. Considering the huge number of equipment the sample was restricted to items of equipment individually valuing ₹ 5 lakh and above.

We noticed that there were cases of delays in installation, non-utilisation of equipment for want of reagents/consumables, and supply of equipment different from the ones offered as explained below:

Delays in installation

- i) In respect of Microwaves (Model Sintion) valuing ₹7.62 crore (47 Nos) procured in September 2002 there were delays in installation ranging from 18 to 39 months due to non-availability of site and/ or firms' engineers not reporting for installation.
- ii) Multi Slice Spiral CT Scanner contracted in November 2009 valuing ₹ 4.14 crore was to be installed by December 2010. As the related civil work was completed only in June 2011 the equipment was yet to be installed as of July 2011.
- iii) Against the order of June 2006, placed on a private firm by DGAFMS, for supply of 67 Automatic Film Processors valuing ₹ 1.11 crore to ECHS polyclinics, there was delay in installations at 35 sites ranging from three to 26 months. At Kancheepuram, the equipment delivered could not be installed for want of space in the hired building and at Kakinada some parts of the equipment were eaten by rodents due to improper storage conditions.

Non-utilisation of machines for want of reagents/consumables

- i) Fully Automatic Blood Gas Analyser installed at MH Jodhpur in May 2005 was not utilised since last five years due to non-availability of reagents.

- ii) Gama Guidance System for Tissue Localisation valuing ₹2.83 crore was received at AH R&R Delhi Cantt in September 2002 along with required Isotopes for treating 500 patients. Non-availability of Isotopes since 2006 resulted in idling of the equipment.
- iii) MAS Analyser valuing ₹19.85 lakh received in March 2006 at CH WC Chandimandir was not put to use between February 2006 and November 2008 and between December 2009 and January 2011 for want of kits required for testing.

Acceptance of supply of defective equipment

In the procurement of 123 Apparatus Anesthesia Basic (PVMS No.040006) valuing ₹ 7.07 crore from L&T Delhi in March 2007, we observed that several hospitals reported defects in the equipment supplied. It was further noticed that the equipment was procured despite its limitations pointed out by the technical boards.

4.6 AMC of medical equipment

In 1999, a policy was framed to govern engineering support to medical equipment. The policy divided the repair responsibilities of sophisticated equipment, electro medical equipment and non electro medical equipment between the DGAFMS and DGEME.

As per the division, the repairs to 44 sophisticated equipment would be carried out through AMC under DGAFMS. The AMC clause for complete life cycle of equipment would be incorporated in the contracts at the time of procurement of such equipment. The equipment would be repaired and maintained by service engineers of the firm. The EME would not undertake any repairs to these equipment during their entire life cycle.

Thirty two non electro-medical equipment (revised to 37 in May 2010) (inclusive of various models thereunder) listed in the policy would be solely repaired by the EME Workshops. The repair responsibility of 34 electro medical equipment (revised to 50 in May 2010) was divided between EME workshops and Command Repair Cells (CRCs) where the latter would also undertake repairs that are beyond the capability of EME Workshops. The CRCs would be responsible for repairs of electro medical equipment of RR, BHDC, CH EC Kolkata, CH (AF) Bangalore, INHS Ashwini and MH (CTC) Pune. There are 43 EME workshops and seven CRCs providing engineering support.

In September 1999, the Ministry also envisaged repair/maintenance of equipment through civil firms as per the financial powers delegated whenever the repair was

beyond the capability of EME workshops or repairs were urgently required or involved import of equipment or sophisticated equipment.

Coverage of equipment under AMC

Considering the huge number of equipment held by hospitals, we restricted our sample to equipment, individually valuing ₹ 5 lakh and above, for analysing the status of AMC.

The data furnished by MH Allahabad, Gaya and 170 MH was not considered as these hospitals did not report any equipment on their inventory as being due for AMC during the period 2007-08 to 2009-10. INHS Ashwini while reporting equipment covered under AMC did not furnish data relating to equipment due for AMC. As such information provided being incomplete was not considered.

The coverage of equipment under AMC across the hospitals sampled in audit was noticed to be quite inadequate between 28 and 36 per cent as shown in Table 33:

Table – 33: Coverage of equipment valuing more than ₹ 5 lakh under AMC

Particulars	2007-08		2008-09		2009-10		2010-11	
	No.	Percentage	No.	Percentage	No.	Percentage	No.	Percentage
Equipment due for AMC	408	-	453	-	420	-	364	-
Equipment covered under AMC	145	36	175	39	133	32	101	28
Equipment not covered under AMC	263	64	278	61	287	68	263	72

Details of the coverage of equipment under AMC at the sampled hospitals were as follows (wherever complete data was furnished).

Table – 34: Hospital-wise coverage of equipment under AMC

Hospitals	2007-08 Equipment			2008-09 Equipment			2009-10 Equipment		
	Due for AMC	Covered	Percent age not covered	Due for AMC	Covered	Percent age not covered	Due for AMC	Covered	Percent age not covered
CH SC	16	4	75	22	5	77	22	7	68
CH NC	24	9	63	27	5	81	29	8	72
CHAF	83	58	30	88	80	9	50	21	58
AH R&R	71	13	82	74	15	80	78	21	73
BH Delhi	72	29	60	84	32	62	85	33	61
BH Srinagar	24	3	88	24	4	83	22	1	95
MH Jodhpur	27	4	85	29	11	62	29	3	90
MH Kirkee	5	0	100	6	0	100	6	0	100
MH Jabalpur	31	1	97	32	1	97	32	11	66

#Source of data: Data compiled from information furnished by hospitals in proforma indicating equipment due for AMC and that covered under AMC.

Considering that about 133 hospitals are functioning under AFMS it cannot be ruled out that the number of equipment not covered under AMC would be much larger than the population of equipment revealed in the sample study.

Reasons for low coverage of equipment under AMC are explained in the succeeding paragraphs.

Non maintenance of log books by hospitals

DGAFMS Medical Memorandum issued in 2002, requires wards/departments to maintain log books for all equipment costing more than ₹ 10,000/- and for all life saving equipment. The log books record nomenclature and source of supply, date of acquisition, the cost, warranty clause, name of supplier, date of defect/cessation of function, nature of defect, date of call for repair, date of completion of repair and are signed by the MO/IC of ward/Department.

It was seen in the hospitals covered under Performance Audit that log books were either not maintained or maintained deficiently as regards details prescribed in the DGAFMS Medical Memorandum. The unsatisfactory status on maintenance of log books would explain as to why hospitals were unable to arrive at the status of equipment that are within and outside the period of warranty.

Delay in according sanction for AMC

The Ministry in July 2006 delegated financial powers to DGAFMS and other functionaries in the AFMS for sanction of expenditure for repairs/servicing of equipment/vehicles through trade as under:

Table- 35: Powers delegated for AMC/repairs

Hospitals Commanded by	Without IFAs concurrence (₹)	With IFAs concurrence (₹)
Col / below	5,000	15,000
Brig and above	25,000	1,00,000
Comdt AFMSDs	25,000	1,00,000
AFMSD Pune, AMSDs etc	25,000	50,000
Addl. DGAFMS	-	5,00,000
DGAFMS	1,00,000	10,00,000

Sanctions involving expenditure beyond the above delegated powers continued to be issued by the Ministry. During 2007 to 2010 (calendar years), 468 sanctions were accorded by the Ministry and the DGAFMS for AMC of equipment. Our analysis of the AMC sanctions accorded by the Ministry revealed the following:

Table- 36: AMC sanctions accorded by Ministry

Year	Sanctions accorded		Time taken for sanction (Percentage)				Range of AMC Cost (₹ in lakh)
	Nos	Value (₹ in lakh)	Within 30 days	31-120 days	121 -360 days	> 360 days	
2007	13	241.43	10 (77)	2 (15)	1(8)	-	9.41 to 36.24
2008	6	119.94	01 (17)	1 (17)	4 (66)	-	10.82 to 44.59
2009	17	363.13	12 (71)	-	2 (12)	3 (17)	10.47 to 49.05
2010	19	499.27	13 (68)	5 (26)	-	1 (6)	10.46 to 50.57
Total	55	1223.77	36 (65)	8 (15)	7 (13)	4 (7)	

Source of data: Data compiled from information furnished by DGAFMS.

On an average 65 per cent of cases were cleared by the Ministry within a month, 15 per cent were cleared in four months whereas in 20 per cent cases the Ministry took almost one year. The approval process needs to be expedited to avoid delays as very few cases of AMC require sanction by the Ministry.

Table- 37: AMC sanctions accorded by DGAFMS

Year	Sanctions accorded (i.e. equipment)	Time taken in days (percentage)				
		Up to 15 days	16 – 30 days	31 – 60 days	61 – 120 days	Beyond 120 days
2007	89	80 (90)	7 (8)	2 (2)	-	-
2008	95	48 (51)	24 (26)	17 (18)	4 (4)	1 (1)
2009	124	69 (56)	43 (35)	9 (7)	3 (2)	-
2010	105	37 (35)	31 (30)	22 (21)	13 (12)	2 (2)
Total	413	234 (57)	105 (25)	50 (12)	20 (5)	3 (1)

Source of data: Data compiled from information furnished by DGAFMS.

Delay in conclusion of contracts

In regard to the timeliness in conclusion of AMCs, we observed that only in 35 per cent of the cases contracts were concluded immediately after sanction. In 38 per cent of the cases the time taken was beyond one month from the date of sanction as shown below:

Table- 38: Time taken for concluding AMC

Sl No.	No. of Cases	Time taken for conclusion of AMC after sanction
1	42	Immediately after sanction
2	33	Within one month
3	33	One to six months
4	5	Seven to 12 months
5	7	Beyond 12 months
Total	120	

Source of data: Data compiled from information furnished by hospitals in proforma indicating equipment due for AMC and that covered under AMC.

The cumulative delays involved in AMC finalisation carried a risk of denial of equipment for patient care in the event of break-down of the equipment.

4.7 Downtime of medical equipment

Downtime of medical equipment arises from the date of being non functional/defective till these are repaired and made functional. We could collect information regarding downtime of machines from 10 hospitals out of 26 hospitals covered in this audit. The downtime due to delay in repair was noticed in respect of 51 equipment (Equipment costing more than ₹ 5 lakh valuing ₹ 16.35 crore reported by 10 hospitals). This ranged from one month to 12 months. Considering that log books to record the downtime of equipment were not maintained properly and the data was limited to 10 hospitals only, actual downtime of equipment in all the hospitals could be much higher.

We examined the reason for delay in repair in two units responsible for repair of equipment, viz. CRC Lucknow and AFMSD Pune.

Position at CRC Lucknow

During 2008 to 2010, the CRC received 592 work orders for repairs to medical equipment. In 33 out of 40 cases examined, it was seen that the time taken for repair ranged from 37 days to almost three years. The equipment with more downtime included Oxygen Concentrator, ECG Machine and Defibrillators, etc. The delay was attributed by the CRC to non-availability of spare parts in market in time particularly in respect of old equipment phased out of market. As delayed repairs would adversely impact patient care, this matter needs effective redressal.

Position at AFMSD Pune

AFMSD Pune alone has a workshop to carry out repairs to X-ray and electro medical equipment of the three services. The status of medical equipment received at AFMSD for carrying out repairs was as under:

Table- 39: Repair position at AFMSD Pune

Year	Equipment received	Repaired by the Depot	Declared as BER	Repaired through trade	Awaiting repair
2006-07	1278	936	219	41	82
2007-08	1102	819	195	14	74
2008-09	822	593	196	08	25
2009-10	739	559	158	19	03
2010-11	703	408	179	51	65
Total	4644				249

In respect of 53 of the 559 equipment repaired in 2009-10 it was seen that the time taken for repairs ranged from 54 days to 379 days. AFMSD Pune cited acute shortage of technical manpower as one of the reasons for such delay. The position of technical manpower in the Depot was as follows:

Table- 40: Position of Technical Manpower at AFMSD Pune

Position of staff against authorisation	As on 31.3.2008			31.3.2009			31.3.2010			31.3.2011		
	A	P	Deficiency in percentage	A	P	Deficiency in percentage	A	P	Deficiency in percentage	A	P	Deficiency in percentage
ATEO	3	0	<u>100</u>	3	0	<u>100</u>	3	0	<u>100</u>	3	0	<u>100</u>
SO (Civ)	1	1	<u>0</u>	1	1	<u>0</u>	1	1	<u>0</u>	1	0	<u>100</u>
Chargeman	1	1	<u>0</u>	1	1	<u>0</u>	1	0	<u>100</u>	1	0	<u>100</u>
SKS	7	7	<u>0</u>	7	7	<u>0</u>	7	7	<u>0</u>	7	4	<u>43</u>
LHF	3	2	<u>33</u>	3	2	<u>33</u>	3	2	<u>33</u>	3	2	<u>33</u>
FED	4	2	<u>50</u>	4	2	<u>50</u>	4	2	<u>50</u>	4	2	<u>50</u>
FM-I	7	5	<u>29</u>	7	5	<u>29</u>	7	5	<u>29</u>	7	5	<u>29</u>
HS X Ray Electrician	5	2	<u>60</u>	5	2	<u>60</u>	5	4	<u>20</u>	5	3	<u>40</u>
Fitter	2	1	<u>50</u>	2	1	<u>50</u>	2	1	<u>50</u>	2	1	<u>50</u>
Machinist	2	1	<u>50</u>	2	1	<u>50</u>	2	1	<u>50</u>	2	1	<u>50</u>
Labourer	16	10	<u>38</u>	16	11	<u>31</u>	16	11	<u>31</u>	16	11	<u>31</u>
TCM (EME) OR	10	8	<u>20</u>	10	10	<u>0</u>	10	4	<u>60</u>	10	7	<u>30</u>

A = Authorisation, P= Posted

The Depot also indicated that the men in position were inadequately trained to handle the maintenance of new equipment and were able to provide repair cover only by hit and trial. AFMSD Pune also indicated absence of policy for stocking of spares.

The Ministry clarified that all major procurements subsequently done had five-year warranty + five years' comprehensive annual maintenance contract (CAMC) clause and the vendors had contractual liability to undertake maintenance for ensuring serviceability of the equipment. Penal clauses are invoked in case of any default.

While we appreciate the steps taken for maintenance of costly capital equipment, it is equally necessary that the existing equipment is put under AMC to ensure availability of such equipment for patient services.

Recommendation No 6

We recommend that effective steps be taken to streamline the maintenance and repairs of costly equipment. The deficiency in technical manpower at CRCs and AFMSD Pune may be made good together with up-gradation in their skills to carry out emergency/minor repairs and reduce the downtime of costly equipment. Similarly, availability of kits/consumables in hospitals may be ensured for optimum utilisation of equipment.