CHAPTER 6
MEDICAL TECHNOLOGY AND MEDICAL EQUIPMENT INDUSTRY IN INDIA

We have seen from the review of healthcare in India that there have been several transformations in the policy sphere over the past two decades, and this includes changes in the healthcare sector too. While there is re-structuring of public health services, increasingly there is also talk in terms of the 'Indian healthcare industry'. Provision of healthcare is now being looked upon as a business that should yield profits. This has led to involvement of many kinds of commercial interests in health care, and increasingly aspects such as provision of diagnostic and other health services are being organized along business lines. Another noteworthy feature accompanying the changes is the increased visibility of certain kinds of technologies. This chapter examines an important component of this 'rising healthcare industry' - the medical equipment and devices industry. As we have seen in the review of medical technology, medical devices and equipment have become an indispensable part of modern medicine, like pharmaceuticals. Yet, in contrast to the latter, it has received scant attention in the Indian context. This is so at the level of both, health policy-making and as an area of study.

This chapter presents quantitative and qualitative information on the medical equipment industry in India. Firstly, it examines the policy and planning for medical equipment since Independence; and then presents and analyses information on the medical equipment industry, on their manufacturing and import activities, on the other activities of this industry, such as their involvement in product promotion, in lobbying activities, in research, and education and training of medical professionals. The information in these sections is a documentation of current and/or recent developments in the field, and is based on government reports, business reports and announcements, and scanning of websites of various companies.

6.1.1 Policy and Planning for Medical Technology
As discussed in Chapter 3, in 1946 the Health Survey and Development Committee (Bhore Committee) had recommended the appointment of a technical committee to examine the requirement of drugs and other medical requirements; and to suggest ways by which they should be manufactured and made available in the country. It had also recommended the setting up another committee to look into the matter of setting standards for medical equipment and institutions. In the First Five Year Plan (1951-1955) self-sufficiency in drugs and equipment was laid down as one of the priorities; it mentioned the need to give necessary attention and aid to
production of hospital equipment, surgical instruments, dressings and glassware. However, Bhore Committee’s recommendations to set up a committee to look into requirements and availability of medical equipment and instruments were not implemented. Ten years later another Committee, the Mudaliar Committee made several observations and recommendations regarding manufacture of instruments, hospital appliances and equipment. According to this Committee:

"While some progress has been made by the pharmaceutical industry in many directions, the same is unfortunately not true in case of the indigenous manufacture of instruments, hospital appliances, laboratory equipment, etc. .. The Committee also visited firms manufacturing instruments, glassware, etc. at Jullundur, Bombay, Calcutta, Madras, Lucknow and Masulipatnam. Apart from the manufacture by private firms, the Central Government and the Governments of West Bengal and Punjab are making modest efforts for the manufacture and repair of instruments and appliances. On the whole, however, the effort is sporadic and unorganized with no long-term plan and objectives. The instruments manufactured do not generally follow any definite specifications; there are no standards and the products are generally of a quality which compares very poorly with the imported materials and does not find acceptance with the users in the hospitals and laboratories. Hospital furniture of a fairly good quality is being produced. So also are small-sized sterilizers. These are comparatively easy to produce and are paying items. In general, however, technical know-how is not available, raw material is difficult to obtain and standards that should be adopted and followed in this country are wanting.

In spite of this the import restrictions have certainly given a great fillip to indigenous manufacture, which with suitable assistance and guidance is certainly capable of producing instruments and appliances of a quality equal to the best-imported articles. Some instruments and laboratory equipment of a very high order produced by private firms are examples of what can be achieved by private enterprise. In spite of limitations of foreign exchange, the volume of imports is, however, reported to have risen three times since 1952-1953. It is essential that the country should become self-sufficient as early as possible in the manufacture of a large variety of surgical instruments, especially electronic and optical instruments and appliances. Optical glass should also be included in this list. From the information available to us, it appears doubtful whether the position

1 The Government of India-Ministry of Health set up a Health Survey and Planning Committee, under the chairpersonship of L Mudaliar, in June 1959 to undertake a review of the developments that had taken place since the publication of the Bhore Committee Report in 1946, and to guide the formulation of further health programmes in the Third and subsequent Five-Year Plans.
in regard to the manufacture of electronic instruments, etc. would be much improved
even after the completion of the project of instrument manufacture being undertaken with
Russian aid (at Madras)

The Mudaliar Committee recommended that “it is necessary for a panel to be set up to
study the position with regard to the estimated requirements of such instruments, apparatus and
appliances, particularly optical and electronic, and to work out detailed specifications for each of
these. After the recommendations of the panel are received one of the corporations in the public
sector (like Bharat Electronics) maybe entrusted with the manufacture, or a new factory in the
public sector may be established; or the private sector may be allowed to undertake the
manufacture” (Government of India 1962).

The Committee dwelt at length on the important issue of standardisation of medical
instruments and appliances. According to the Committee “one of the chief difficulties of the
industry is the absence of any standards and specifications. The only organization where
specifications of a sizeable number of instruments and appliances have been worked out is the
Technical Development Establishment Unit of the Ministry of Defence at Kanpur. Specifications
have been laid down for .... items, including surgical, anaesthesia, ENT, Dental, laboratory and
x-ray, appliances and instruments. These pertain only to the requirements of the medical services
of the Defence Forces. The Defence Department has a comprehensive inspecting organization
which undertakes the task of inspection and testing against Defence requirements. There
seems to be no reason why the scope of work of this organization should not be widened to
include civilian needs also and why this organization should not serve as a basis for the
development of a body for the prescription of standards and specifications as well as for the
quality control of instruments and appliances to be manufactured in the country. In order to organise private effort being put in this direction presently and to induce entrepreneurs to
enter this field, it is necessary that a strong technical advisory cell be set up by the government to
provide the necessary guidance and help to those already in the field and to those who may be
interested in entering it.”

Thus, the Mudaliar Committee emphasized the need for standards and specifications for
medical equipment, and the need to extend technical assistance to entrepreneurs in this regard. It
also emphasized the need for self-reliance, as evidenced from this concluding line in the Section,
'It will of course be necessary to restrict and finally stop imports altogether of the items included
in the manufacturing programme (emphasis added)'.

‘It will of course be necessary to restrict and finally stop imports altogether of the items included
in the manufacturing programme (emphasis added)’. 
In the phase of the planned economy adopted since 1951 and the industrial policy subsequently followed by the Government of India, a special role was accorded for small and medium enterprises. Small and Medium Enterprises (SMEs) were established in almost all major sectors in the Indian Industry – such as in engineering, electrical and electronics; chemicals & pharmaceuticals, electro-medical equipment, plastic products, and others. Among the objectives in setting up such enterprises was: contribution to domestic production, import substitution, and setting up of technology oriented industries. In spite of several limitations, such as that of low capital base, SMEs have made significant contribution towards domestic production, technology development and export. They were afforded protection till 1991, when the policy of liberalization and globalization was adopted.

The base for a domestic medical equipment industry was thus laid with setting up of production facilities for routine electro-medical instruments, including x-rays, in the 1950s. Since then many medium and small units have come up. Local manufacturing effort in medical electronic equipment began in the early seventies. Small consumables (syringes, intra-venous sets, gloves, blood-bags, catheters, etc.) and 'low technology' equipment, like conventional ECGs, defibrillators, bedside monitors, diagnostic x-ray equipment, and therapy equipment like diathermy - ultrasound-electrotherapy, surgical diathermy, respiration monitors, ultrasound scanners, analytical equipment for pathological and biochemical analysis (spectrophotometers, colorimeters, blood cell counters, pH meters), incubators, pacemakers and other such instruments and equipment are manufactured in the country by local producers with small capacities. However, the microprocessor-based counterparts of almost all of these, such as of ECG, all kinds of EEGs, infra-red laser therapy equipment, echocardiographs, colour dopplers, CT-scanners, MRI equipment, digital subtraction angiography (DSA) systems, laser and fiber optics-based devices, lithotripsy equipment and linear accelerators are all currently imported (see tables later).

There is no mention of medical equipment and their requirements, availability, etc, in subsequent planning and health policy related documents, till the 1990s. The Report of a Working Group on Electronics Industry for the Eighth Five-Year Plan Period (1992-1997) gives an idea of the developments in the medical equipment sector in the previous decades. According to this Report:

- There was a sufficiently strong indigenous base for meeting the general requirements of diagnostic and therapeutic equipment for a medium sized hospital. Although necessary expertise and a certain amount of infrastructure existed in the country, the local industry had not grown to the required extent;
Local manufacturing effort in medical electronic equipment, which picked up in the early seventies, has had to face a number of problems. While a number of devices and equipment had been developed, they had not progressed to the production stage because funding for batch production required for acceptance trials was not available.

It was expected that the production of high technology equipment like ultrasound scanners and CT scanners, which had commenced in the late 1980s, would rise steadily with increasing requirements and proper support.

Overseas manufacturers, who operated at much higher volume of production, were able to offer comparatively attractive prices, being aware that local manufacturers have to operate at low volume of production. Therefore, there was 'a strong case to review present fiscal and promotional measures so as to promote the local industry and check excessive imports without affecting the healthcare programme of the country'.

Attention had to be paid to the fact that a large number of electronic equipment acquired for healthcare was lying unutilized in various hospitals and health centers due to lack of proper maintenance. Among the recommendations of the Group were: establishment of a quality and safety certification mechanism to promote acceptability of indigenously manufactured equipment among the medical community; and evolving a forum for dialogue on various aspects of medical electronic equipment, such as on local availability, problems of the local industry, fiscal measures, and requirements of healthcare professionals.


In the early 1990s the Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology, undertook a study of the status of manufacture of medical equipment/systems in the country, under its scheme 'Programmes aimed at Technological Self-reliance'. According to the government the indigenous medical equipment manufacturing industry was still in its infancy; and with the national commitment to provide health for all by the year 2000, there was a need to review the performance of the industry. Furthermore, if the then level of indigenous production was to be stepped up to meet the major share of the projected demand vis-à-vis imports, certain measures were necessary to promote the indigenous industry (Government of India 1992). This study of the medical electronics equipment industry was conducted by M/s Mantec Consultants Pvt Ltd, Delhi, and a comprehensive report, based on this study and the proceedings of a meeting held with the Confederation of Indian Industry (CII) and Indian Electricals and Electronics Manufacturers Association (IEEMA), was prepared by the government in 1992 on the Medical Electronic Equipment/Systems Industry. This study came up with several important findings regarding manufacturing and imports of medical equipment,
largely similar to the observations made few years earlier, by the Working Group on Electronics in 1990 (discussed above). It pointed out that:

- Manufacturing capability existed in the country for manufacture of several electro-medical equipment such as: diagnostic x-ray equipment and mobile x-ray equipment for radiography, fluoroscopy and teleradiography, dc defibrillators, ultrasound scanners (including transducers) for cardiac/gynaecological and abdominal applications; ECG machines and monitors; diathermy units; heart rate and respiration monitors; cardiac monitoring systems with central monitoring unit; external pacemakers, foetal monitors and whole body CT scanners.

- While the major manufacturers in the industry were producing state-of-the-art medical electronics equipment, however, indigenous manufacture was still to take off, and their production accounted for less than 1 per cent of the total electronics production in the country.

- There was a need to 'review the present fiscal and promotional measures so as to promote the local industry and check excessive imports, thereby giving a boost to the healthcare programme of the country and save precious foreign exchange' (pp 2-3). According to the study, due to the existing liberalized import policy for electro-medical equipment, most of the technology intensive equipment was being freely imported and marketed in the country. 'The foreign manufacturers with their international operations were not induced to part with the technologies to India due to the inherent strengths of our manufacturing skills, which could result in competition in future. The foreign equipment manufacturers, by and large, were interested only in sales and not a long-term association. Further, the limited domestic demand volumes of certain types of high technology equipment, partly contributed by the inadequacy of financial resources, was not an economically viable proposition for taking up indigenous manufacture. However, with the liberalized policies, quite a few joint ventures had been established to manufacture products meeting international quality standards. The inadequacy of marketing expertise and infrastructure in the industry to effectively tap international markets was also a major limitation to increased production levels and achieving economies of scale.' (p 4).

The other findings of this study were as follows:

➤ **In absence of a strong manufacturing base, a wide variety of sophisticated medical electronics equipment was being imported into the country.**

➤ **The liberal import policy, combined with lack of controls over trading of electro-medical equipment had led to mushrooming of local agencies representing foreign manufacturers.**

➤ **The local agents were generally not equipped to meet the after-sales service requirements and to offer product support (except for the well-established ones).** The necessary
technical documentation of the equipment was not available in some cases with the local agents. Many local agents had entered the business primarily for commission on the purchase orders without the ability to meet the installation, maintenance and service obligations.

- The foreign principals of local agents do not take it as an obligation to provide training nor ensure that necessary infrastructure is available for repair of their equipment that are sold in India. "The direct interaction between the principals and the users to assess the actual needs of equipment is practically non-existent" (p. 5).

- There was no obligation on the part of the trade or the industry to meet safety certification or quality certification before the equipment was marketed. Indian standards were available only for some categories of electro-medical equipment. All this had resulted in continual drain on the foreign exchange reserves of the country and accumulation of sub-standard, un-repaired and uninstalled equipment worth crores of rupees (p. 109).

- Purchase of expensive equipment and partial utilization of its capabilities, due to gap in information among physicians regarding availability of appropriate equipment abroad and within the country.

- The agents/dealers of the indigenous small-scale manufacturers, where applicable, were also not equipped to provide after-sales service, nor did they have the requisite exposure to the specificities of bio-medical applications.

- The reliability of the indigenous equipment, particularly those manufactured in the small-scale sector needed improvement since the investment levels were very low in terms of quality control, assembly and test equipment. Further, safety aspects were by and large ignored.

- There was also lack of skilled manpower for manufacture, operation, repair and maintenance in the medical electronics industry. The role of biomedical engineers in hospitals was yet to be recognized.

- There was limited R & D activity in the country with respect to most of the high cost, sophisticated electro-medical equipment. They were being either imported or local industry entered into collaboration with a foreign manufacturer for local manufacture. In case of latter, the local industry had to incur a high amount of fees and royalty for technical know-how.

- In many cases the foreign manufacturers were not very keen to transfer technology for various reasons including the threat of future competition. Hence, local manufacture was heavily dependent on imported components, technology, designs and spares. It incurred high cost on account of technical know-how fees and royalty.

- As in trading, in local production too there are several joint ventures and collaborations. In fact, in some instances import is the primary activity and there are only token production facilities.
This Report by the DSIR recommended a review of the import policy regarding medical equipment. It recommended a periodic review of the open general license (OGL) arrangement, and that there should be restricted imports for those medical electronic products which were manufactured by more than two manufacturers who have the ability to meet the entire domestic demand and comply with international standards.


- A variety of medical electronic equipment, such as x-ray machines, ultrasound and CT-scanners, pacemakers, etc., were being manufactured in India. However the total import of medical equipment far exceeded their total production. The production level then (Rs 144 crores in 1994) was inadequate, and a major portion of the requirements was being met by imports. However, a substantial part of the requirements could be easily met by the indigenous industry, given proper incentives and growth climate.

- Major imports were in the slightly specialized category and most of the requirement of routine equipment was met through indigenous production. A large number of medical equipment had been classified as life-saving, thereby attracting zero duty by the importing agency.

- Local production in the medical electronic equipment industry was dependent on foreign technology, and operations were generally assembly-oriented. Among the problems faced by the local industry were: high cost of production, inadequate infrastructure, rapid obsolescence and lack of direct promotional and fiscal measures by the government (Section II - Production).

- Additional investments were needed to increase production levels to meet the projected increase in demand in the IX plan period (1997-2002). It was expected that a fairly large portion of this investment requirement might come in the form of equity participation from multinational and other reputed foreign companies (Section VIII).

- While the requirement of majority of medical institutions and health centers was more for the traditional electro-medical equipment, however, an increase in the demand for state-of-the-art electronic equipment was anticipated.

- It was expected that indigenous production would pick up by the end of the IX Plan, and meet more than 50 per cent of the total requirement. However, given the experience, imports were still expected to form a substantial part of the total demand, because of the liberal import policies adopted. It was also economically meaningful to procure state-of-the-art life
saving equipment, whose requirement was small, from abroad, and not invest large sums of money in their production (Section VII).

- There was export of some hi-tech equipment, like ultrasound, and a substantial amount of medical software. Export opportunities were expected to multiply with the opening of the Indian economy. India was also being considered as a sourcing point for the manufacture of economically priced products for the global market (Section II – Exports).

- While the developments in electronics and innovations in diagnostic, therapeutic and communications technologies had been widely utilized in the tertiary and secondary healthcare, the needs of the primary healthcare setup had not been addressed. For example: there was need for light, inexpensive, electronic weighing machines for adults for early detection of under-nutrition; of simple haemoglobinometers that could be used by the ANM to check for anaemia in pregnant women; of light, inexpensive electronic blood pressure monitoring apparatus; of communication links with the CHC/ district hospital. All these instruments were not expensive, but there was reluctance to manufacture them (Section VI).

- As per the estimates of the CII-Medical Equipment Division, more than Rs 8000 crores would be needed to provide basic electronic equipment in the government hospitals (4500 in all) and PHCs (21000) across the country. It was proposed that ‘the provision of these equipment be thrown open to the private sector on a BOO (build own operate) basis. They will charge a predetermined fee for usage of the equipment for tests’ (Section VII – Demand Projections of Medical Electronic Equipment). An expert committee should be constituted to finalize the exact equipment requirement and privatization policy.


The Working Group on Information Technology for the Tenth Plan Period makes no explicit mention of medical electronics equipment (Electronics Information and Planning January 2002, vol 29(4)). It repeats what has been said earlier, and that there was no customs duty on medical electronic equipment, most of which had been placed under the life-saving category. It merely mentions that there was need to develop state-of-the-art medical electronic equipment and to encourage indigenous manufacturers.

For the first time in 1996 the Planning Commission set up a Working Group to review the requirements for supportive and diagnostic services at primary, secondary and tertiary level health services (Government of India 1999). That there was a need for providing these services was an accepted fact. According to this Group:
Medical equipment management and maintenance were of vital importance.

While capital costs were rising, yet medical equipment was a widely mismanaged resource in the government healthcare facilities, and it was an area that needed to be accorded high priority.

This Group estimated that about 30 per cent of the total healthcare budget was spent on equipment. 5-10 per cent of this was spent on high-tech medical engineering systems, such as imaging systems, laboratory analyzers, and linear accelerators.

40-60 per cent equipment was non-operational due to inadequate maintenance service. It was estimated that 80-85 per cent of the faults were simple and could be handled with trained personnel. [According to the DSIR study of the medical electronic equipment industry referred to earlier in this chapter one of the problems was that government hospitals tended to do away with annual service contracts beyond warranty period due to lack of adequate funds. This resulted in dependence on non-specialised, ad hoc service arrangements, made as and when some equipment became non-functional (Government of India 1992 p 87)].

The major problem in management and maintenance was severe shortage of qualified and experienced technical personnel. This, and lack of knowledge contributed directly to breakdown and reduction in operating life of equipment.

There was no policy on manpower requirements as part of overall health manpower strategy.

It proposed the setting up of a separate unit – a Medical Equipment Management Department in the Ministry of Health, as an apex body headed by a competent technologist. This unit could advise the state governments on setting up such facilities at the state level. A Medical Equipment Management Unit would be set up to deal with ascertaining equipment needs, selection, installation, training, maintenance, etc. and would be responsible for maintaining equipment in all government hospitals in the states. A State Advisory Committee, with experts from hospitals, industry and academic institutions should be set up to review facilities, procurement, etc. of the Unit. The Group suggested recommendations for equipment at various levels, including requirements of staff, and space, as well as resource allocations for equipment in the Ninth Plan. The recommendations of this Group, regarding diagnostics and supportive services, equipment and technologies appropriate for each level of care, was to be implemented in the IX Plan period (1997-2002).

Thus one finds that the policies adopted then emphasizing self-sufficiency did lay the foundations for domestic equipment manufacturing capacity. In addition, several useful and far-reaching recommendations and measures were suggested from time-to-time, since the 1950s, by
the government committees regarding medical instruments and equipment. However, these were not fully implemented. Since the 1990s the scenario changed with the policy of liberalization. Time and again several working groups have re-iterated the need to examine fiscal and import policies regarding medical technology and to curb excessive imports in order to support the indigenous capacities, and to standardize requirement of medical equipment. Throughout the 1990s the issues continued to remain the same as far as government policy on manufacturing of medical equipment was concerned.

We also find that the focus of the attention is limited to ways of making available medical technology, and so examined only manufacturing and procurement. There has been no attention to assessing the requirements and utilization of medical technology in the health services. The Planning Commission suggested assessing the requirements of the government health services and formulating a proper policy and mechanism for management of medical equipment. However, no further steps were taken in this direction. The approach of the health ministry itself to medical technology is conspicuous by its absence.

6.1.2 Medical Technology market & industry in India
The size of the medical equipment market was estimated to be about Rs 800 crores in 1994-1995, of which imports accounted for Rs 450 crores. The remaining Rs 350 crore worth of products were obtained from indigenous production. While the demand for medical electronic equipment had registered very high growth rates, 86 per cent of the demand was being met through imports (CMIE, 1999). Estimates by the industry of the market for medical equipment placed it around $280-300 mn in 2000 (Rs 1232-1320 crores in 2000, @ Rs44 to a dollar). The market was estimated to be growing at 10 per cent a year, and was expected then to continue for the next 2-3 years (CEO, Philips Medical Systems Asia-Pacific, in The Economic Times 17 December 2005). The growth was thought to be outpacing that in many other countries in Asia, and even that in Europe and the USA. Industry estimates valued the market at Rs 1500 crore in 2002, and placed its growth at nearly 20 % a year. The market was estimated to be around Rs 9000 crore in 2006 (Business Line August 5 2006). According to a recent study by Ernst & Young, the size of the Indian medical equipment industry was $2.16 billion in 2006 (Rs 9500 crores), and is growing at 15 per cent and is expected to reach $3.2 billion by 2009 (Rs 14,080 crores) and $4.5 billion by 2012 (Rs 19,800 crores) (Business Standard July 13 2007). Table 6.1 below gives these estimates of market size for medical equipment in India since 1994-1995.
Table 6.1: Market size for medical equipment in India

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(Source: Compiled from different business reports)

While we are aware that the above figures have their limitations as they are from different sources, yet they give a rough estimate of the size of the market for medical equipment. More importantly, they indicate that there has been a steady increase in size over the years. According to industry representatives themselves, it is extremely difficult to estimate the actual size of the industry because maximum business in India, especially North India, relies on ‘grey market’ and majority of the products are imported. “The major problem faced is from the grey markets, wherein for instance, blood sugar monitors which are officially marketed for more than Rs 4000 are sold in grey markets at Rs 1400-1600. Further, cheaper imports and dumping of materials in India, high rates of taxes are considered to stifle the local industry” (Express Healthcare Management 1-15 November 2002).

Import and sales of equipment comprise the major segment of the medical equipment industry in India. Manufacturing operations in the country comprise manufacturing by Indian operations of few MNCs, few big Indian manufacturers, and a large number of local companies in the small or unorganized sector. According to industry estimates there were over 3500 manufacturers in India at the beginning of the decade (Express Healthcare Management 1-15 November 2002). Thus the medical equipment industry in India is rather heterogeneous. It can be broadly said to comprise the following segments:

(a) Few multinational corporations, such as Philips, Siemens and GE Healthcare, which dominate the high-technology equipment market, primarily imaging equipment, and which have extensive service networks. The primary activity of these companies is import and sales. They import CKD (COMPLETELY KNOCKED DOWN) units for assembly & sales in the Indian market.

(b) Few big Indian manufacturers, such as Wipro, L & T, BPL Technologies, and Birla Technologies, which are into import, manufacture, and sales of a range of high-tech equipment

(c) Authorized distributors of foreign companies who are into import and sales of a range of equipment, and who look after sales and service aspects of the equipment.

(d) Local manufacturers in small and medium scale sectors who are into manufacture & sales of medium and low-technology equipment, with a limited market reach. Apart from 4-5 major companies, no major company has a distribution or support network in
India, with most of them dependent on local dealers/suppliers for furthering their business interest. Locally made products are reported to carry a reputation for unreliability.

(e) There is also import and sale of used, refurbished imaging equipment such as CT and MRI equipment.

(f) All the manufacturing is in the private sector, with the public sector conspicuous by its absence. There is only one public sector unit, Hindustan Latex Limited, which manufactures low-technology products such as disposables, contraceptives, blood bags, sutures, etc.

6.1.3 Profiles of some companies in the medical equipment sector in India

In this section we describe some of the companies that are in the medical equipment sector in India, which fall in one or more of the above listed categories of manufacturer, importer, distributor.

Indian Manufacturers/Importers in the medical equipment industry

# Larsen & Toubro (L&T)

The medical equipment division of L & T was started around mid-1980s, with technical collaboration with three European manufacturers to make ultrasound machines, patient monitors and surgical diathermy equipment. After five years of partnership, a period long enough to acquire technical know-how from the European companies, the medical equipment division of L&T started designing and manufacturing its own product range of 12 models of patient monitoring systems and four models of diagnostic ultrasound. The division has grown at a compounded annual growth rate (CAGR) of 47 per cent since its inception in 1989-90 growing at 30 per cent annually in the late 1990s. By 2002 L&T Medical had a turnover of Rs 70 crore. According to the company officials L&T is considered the giant in the domestic market, posing a serious threat to the MNCs. It is reported that with its entry into the medical equipment market, MNCs were forced to slash their prices. L&T commands market share ranging from 25-35 per cent in diagnostic ultrasound, patient monitoring and surgical diathermy. L&T has many firsts to its credit. These include multi-parameter monitors, diagnostic ultrasound transducers, and surgical diathermy, complying with international safety and performance standards. Equipment designed and manufactured by L&T is being branded by a reputed European manufacturer for sales worldwide. L & T products reportedly incorporate the needs of Indian doctors and hospitals. The medical products are particularly rugged, because they incorporate power supplies that can withstand wide fluctuations in voltages and frequencies, adverse tropical conditions such as high temperature, humidity, likelihood of fungus growth and entry of vermin. Unlike products
designed in the developed countries, L& T’s products have appropriate intrinsic strength to
withstand such onerous conditions for ensuring good performance. L & T has obtained the CE
mark for medical equipment after getting its manufacturing and services support systems audited
by stringent ISO 9001/ EN 46001 standard authorities. L & T has an alliance agreement with
Johnson and Johnson-India, for selling its surgical diathermies in the country. L&T also has 170
embedded software engineers working in Mysore for R&D purposes. It provides embedded

# Bharat Electronics Limited is a public sector undertaking incorporated in 1954 for electronics
manufacturing. BEL specializes in manufacturing and R & D in defence electronics, and has nine
production units in different parts of the country. BEL has been manufacturing x-ray tubes since
1970, and also markets the conventional x-ray tubes made at its Pune unit. A number of
international companies are using the facilities at BEL for contract manufacturing (www.bel-
india.com/Website/StaticAsp/Corp_jointventure.htm, accessed on 17 November 2005). The
imaging MNC GE Healthcare has a joint venture with BEL (see below).

# Trivitron Medical Systems of the Trivitron Group of Companies, which sells hi-tech medical
diagnostic equipment, entered into joint venture partnerships with three foreign companies for
manufacture of their products in early 2008 (Business Line May 20 2008). These were with
Aloka from Japan (Aloka holding 60 % stakes) for manufacture of ultrasound and colour Doppler
systems; with Biosystems of Spain for manufacture of diagnostic reagents, and with Brandon
Medical of UK for shadowless OT lights. These were to be manufactured at the Medical
Technology Park in suburban Chennai, at a total investment of Rs 230 crores, of which
Trivitron’s share was Rs 170 crore and the rest was of the other partners. Spread over 23 acres in
the Park, Trivitron planned to hand over 10 acres to the joint venture partners, and to use the rest
for manufacturing its products through technology transfer arrangements with them. Trivitron
was planning more such joint ventures in the future. Trivitron has an $11 mn private equity stake
by HSBC Private Equity (Asia) Fund and ePlanet Ventures (Business Line November 07 2007).

# BPL HealthCare Limited

BPL Healthcare, the medical equipment division of BPL Bangalore, manufactures ECG machines
(Single channel and Multi Channel), Bedside Monitors (Single Channel and Multi Channel), DC
Defibrillators, Oxygen Concentrators, Nebulisers, Central Nursing Stations and Portable Ultra
Sound Scanners. BPL was reported to have a significant presence in the Indian market. In
addition, BPL also exported its range of medical products to the SAARC, Middle and Far East
countries (Express HealthCare Management 16-30 November 2003). In 2008 BPL identified its
medical equipment division as one of the focus areas for growth, and planned to target sales of
products such as ECGs and heart-reviving defibrillators at primary health centres, small and mid-
sized hospitals across the country, reported to form 80 per cent of domestic healthcare market.
The division was looking at revenues of over Rs 400 crore by 2013, nearly a five-fold growth (Business Line June 7 2008).

# Wipro BioMed, a unit of the Bangalore-based IT major Wipro, was distributing products of some 20 principal partners in areas of diagnostics, medical systems and life sciences segments. In 2007 it was acquired by RFCL Ltd, an ICICI Ventures company (Business Line July 25 2007). As part of the deal, Wipro transferred its entire BioMed business, about 80-100 employees, assets, liabilities, operations, customers and partnerships included to RFCL ICICI. Wipro BioMed will be integrated with the RFCL’s diagnostic division – Diagnova. (RFCL comprises the allied Animal Healthcare, Fine Chemicals and diagnostic businesses of Ranbaxy Laboratories Ltd, which were acquired by ICICI Ventures. RFCL has partnerships with Alpharma, Biokit, Fisher Scientific, and Mallinckrodt Baker amongst others).

# Perfint Engineering Services Private Ltd has been founded by a team of former GE Healthcare professionals, who are reported to have developed PIGA CT, a standalone mobile needle guidance system that helps in precise diagnosis of tumour, and significantly reducing the risk to the patient (Business Line December 28 2007). This piece of equipment is estimated to cost $25,000, one tenth the cost in the US. IDG Ventures India and Erasmic Venture Fund invested an amount of $3.5 million in this healthcare devices company. Perfint planned to come out with more products for the global market, with a special focus on emerging markets like India and China.

# Godrej Industries Ltd set up a medical diagnostics division in 1992, and distributes products of Becton Dickinson (USA), and of Guilin Medical Electronic Equipment. It distributes blood cell counters, automated hematology analysers, and centrifuges.

# Moola Technologies, Bangalore, is involved in the manufacture and marketing of monitors like pulse oximeters and compressors for ventilators and represents some foreign manufacturers for products like ventilators, surgical diathermies, operation tables etc.

# Opto Circuits (India) Limited has a manufacturing, and R & D facility in Bangalore. It manufactures optical electronic devices such as digital thermometers, pulse oximeters, multi-parameter monitors, cholesterol monitors, fluid warmers, and cardiac stents. It undertakes manufacturing for overseas customers, and has several subsidiaries, in India, US and Germany, for marketing its products (from www.optoindia.com). In 2007 it acquired two Indian medical equipment manufacturers: Deveon Innovations, Bangalore, which manufactured catheters; and Ormed Medical Technology, Chennai, which manufactured orthopaedic prosthesis and surgical disposables.

# Datex-Ohmeda India Instrumentarium Corporation is an international healthcare company concentrating on selected fields of medical technology manufacturing, marketing and distribution. The company’s core business is in the anaesthesia and critical care segment, represented by
Datex-Ohmeda Division. Datex-Ohmeda India provides products and equipment for anaesthesiology, critical care and medical gas pipeline projects, ventilators, pulse oximeters, and supplies and accessories for intensive care units and sub-acute care. Apart from selling, servicing and management of projects involving imported equipment from various factories in Europe and US, it has OEM manufacturing facilities for Boyle’s Apparatus, for anaesthesia (Express Healthcare Management 1-15 November 2002).

# Usha Drager is another supplier of equipment for critical care, operating theatres, emergency care and home care solutions. The company received ISO 9000 certification in year 1998, and since than they are actively catering to not just Indian but also overseas market in neighbouring countries and south east Asia Express Healthcare Management 1-15 November 2002).

#As of 2002 there were about 100 local manufacturers in the syringes and needles industry, which manufactured disposable syringes and needles, and auto-destructible syringes.

Since 2000 some local companies have started developing and/or making certain medical devices such as catheters for neurology, heart valves and stents. Some of these were:

A Bangalore-based medical devices company Vascular Concepts had a manufacturing collaboration with Germany's Eucatech AG, where the former's products are made. Vascular Concepts was trying out an innovation on its stent, with a combination of two drugs — Sirolimus, an immuno-suppressant and Cyclosporine an anti-infective. It was conducting a multi-centre clinical trial of its innovative drug-eluting stent (DES), coated with a combination of two drugs (Business Line 9 February 2005). The novelty of this product was that there were no combination-drug-coated stents available in the global market. Besides targeting the Indian market, the company was preparing for commercial entry into the European market. Vascular Concepts' stents were priced at about 25 per cent less than the imported ones (largely of Johnson and Johnson and Boston Scientific), that cost over Rs 1 lakh.

Relisys Medical Devices, Hyderabad was to commission its catheter and stents manufacturing facility near Hyderabad by December 2005 (Chronicle Pharmabiz 11August 2005). It planned to produce catheters for use in cardiology, neurology and nephrology. Relisys had also formed a consortium with two other local companies for manufacturing low-end products targeted at foreign markets

Hindustan Latex Limited is a public sector company which has 5 manufacturing facilities in the country, for manufacture of a range of contraceptives, blood transfusion bags, surgical sutures, hydrocephalous shunts, and in vitro diagnostic kits. It also has partnerships with Becton Dickinson for marketing their reuse prevention syringes and with Ms Gambro BCT for marketing their blood components (http://hindlatex.com).
Multinational Manufacturers of Medical Equipment in India

Leading multinationals in imaging equipment have set up manufacturing units in India, either through their subsidiaries or through joint ventures, for manufacture of imaging equipment, largely x-ray units, x-ray tubes, ultrasound scanners and component parts of imaging systems. These are as follows:

(i) SIEMENS Ltd proposed to make India as its manufacturing hub for medical equipment, particularly for exports to third world countries: to cater to the mid-segment market in South America, Africa, EU, and Asia. The company planned to invest about $500 million and is manufacturing affordable x-ray machines at Goa for this purpose. The medical equipment plant of Siemens Ltd at Goa had been identified as a Global Competence Center by Siemens AG for mobile X-ray equipment with high frequency generation, which meant the unit had been made the global sourcing point for the Siemens group worldwide. Initially, exports from India would be to Asian countries, though it could be extended to the European countries subsequently. The Medical Solutions Division of the company planned to export high frequency x-ray mobile generators to neighbouring Asian countries. Field trials were being conducted in Europe to ascertain the economics of exporting high frequency generators from India (Business Line Jan 8 2005; Business Line December 16 2002).

Siemens had obtained export registration in five Asian countries including China, and planned to start exporting mobile X-ray machines to China (Business Line February 8 2003). The other four countries where Goa unit products would be exported to were Indonesia, the Philippines, Vietnam and Thailand. The domestic operations of Siemens Ltd in India so far were marked by imports. According to the officials of Siemens, the single-digit export percentage was expected to grow exponentially, and the company hoped to register a double-digit contribution from exports to the sales turnover of the medical solutions business. Incidentally, the contribution of medical solutions division to the total turnover of Siemens Ltd was little over 20 per cent, and it was expected to increase its contribution to the overall turnover of the Indian subsidiary of Siemens AG.

(ii) GE Healthcare has several business units in India relating to import and manufacturing of imaging equipment, delivery of imaging services, and in Life Sciences and Medical Diagnostics. As of 2006 90-95% of its revenues from South Asia were from India (Business Line March 14 2006). In 2006-07 its total sales here (encompassing domestic and exports) was reported to be around Rs 2000 crore ($ 500 mn), and the company was targeting an Indian turnover of around Rs 3200 crore ($ 800 mn) by 2010. GE has set up the John F Welch Technology in Bangalore – a $ 80 mn 'state-of-the-art- facility' with scientists, engineers and researchers to develop...
technologies 'to meet specific Indian needs', and 'to unleash their talent for the benefit of India and GE in India' (Chronicle PharmaBiz 15 June 2006). As of March 2008 GE Healthcare was reported to be moving projects from its USA and Japan centres to the Jack Welch Technology Centre. Staffed by nearly 5000 engineers, about 1000 people in this Centre are reported to be working on healthcare related products. The entire software related work has been transferred here. India is reported to be the second largest engineering base for the global technological operations of GE Healthcare, with about 15% of its manufacturing reported to be from here (Business Line March 13 2008). It is reported to have put in more than $ 100 mn here since it began operations in the early 1990s (Business Line ........). The GE ventures in India in the manufacturing segment are as follows:

(a) Wipro GE Healthcare, is a joint venture between Wipro and GE, and part of GE Medical Systems (GEMS), South Asia ($ 250 mn in 2008, with 51 % stakes with GE – Business Line March 13 2008). Focused on delivering world-class Health Care to South Asia, it is India's largest medical systems sales & service provider and is considered to be the market leader with unmatched distribution and service reach in South Asia. Wipro GE, which manufactures and exports products for global markets, pioneered the manufacture of Ultrasound and CT Scanners systems in India for global markets and regional markets respectively, at its facility in Bangalore. Within 12 months of commencement of manufacturing, the exports of these medical products by Wipro-GE Medical Systems had grown and crossed the Rs 100-crore mark, according to an official statement (Business Line January 9 2002). The facility in India accounted for 15 percent of the total medical diagnostics production for GE (Chronicle Pharmabiz March 22 2007). Its business activities cover: the design and manufacture of Ultrasound scanners; manufacturing of CT Scanners and non-invasive cardiology products like hand-held ECG recorder; Fetal Monitoring systems; Software services and Technology solutions for GE products manufactured worldwide; Sales and service of the full line of medical imaging and information technology products offered by GEMS. In 2005 GE Healthcare reported a 40% growth in sale of medical equipment in the southern Indian state of Kerala. It had installed a total of 100 CT and 30 MRI units in various parts of the state (Business Line August 18 2006).

Over the past two years GE Healthcare has launched several new products targeted at Indian markets, and rural practitioners. Among these are: "Tejas" range of locally manufactured digital x-ray machines, which according to company officials are of lower cost (Rs 15 lakh), and deliver lower radiation dose; 1.5 kg portable ECG machines; and a range of maternal and infant care equipment.

Wipro GE has a satellite-based service logistics network provider with access to the GE Global Systems for parts and service logistics, as well as remote on-line repair facility (InSite) – the first and only such facility in South Asia. Through InSite, Wipro GE is able to continuously
monitor online various parameters of the different GE Diagnostic Imaging Systems, installed in different places. Over 75 customers in South Asia are reported to benefit from this facility. It also provides applications support and customer training at leading centres through Training-in-Partnership (TiP) schools and programmes (www.gemedicalsystems.com).

(b) **GE Healthcare has a tie-up with Chennai-based Phoenix Medical Systems** to manufacture and upgrade the latter's maternal and infant care products for export, such as incubators, etc. In 2007 GE Healthcare launched a new Lullaby light therapy system to treat jaundice in newborns. It expected to sell these in India, apart from exporting to Europe, Latin America, Gulf countries, and the Asia-Pacific (Business Line September 28 2007).

(c) **GEBEL** is a joint venture of GE Medical Systems with Bharat Electronics Limited (BEL). Formed in 1996, this joint venture manufactures at the BEL’s manufacturing site in Bangalore, x-ray tubes for radiology and CT systems, as well as components such as high-voltage tanks and detector modules for CT systems. These tubes are exported worldwide.

Apart from these manufacturing ventures, GE is involved in several activities in the healthcare sector in India, relating to use of its equipment, such as in training and in setting up diagnostic centers in the country. These are described in section 6.1.7.

(iii) **SHIMADZU (India)**, a wholly owned subsidiary of Japanese multinational, Shimadzu Corporation, has established a unit in Chennai to manufacture medical imaging equipment and ultrasound machines (Business Line July 3 2003). According to the Managing Director, Shimadzu (India), the parent company invested about Rs 3 crore in the Chennai facility. The company planned to initially manufacture about 120 to 150 pieces (of both imaging and ultrasound equipment) annually. About 60 per cent of the value of components that go into the equipment were expected to be imported. However, Shimadzu (India) would attempt to gradually phase out imported components.

(iv) **B. Braun Medical India Private Ltd**, subsidiary of B Braun Melsurgen AG, international medical equipment manufacturer, is reported to have set up its production cum R&D facility at Mahindra World City, near Chennai. Over $3 million has been invested in the facility and the company plans to invest in other avenues to expand its operations in India. The facility was to manufacture equipment catering to areas such as anaesthesia, intensive medicine, cardiology, extra corporeal blood treatment and surgery. It will also manufacture the advanced right heart catheters, which until now are being manufactured only in the US (Business Line February 9 2007).

(v) **Philips Medical Systems (PMS) India Limited** was reported to have around 15 per cent of the market share in India in 2002. It has four main branches in the metros and twelve others outside these. However, PMS products are imported, and in few cases some local value addition
is done. As part of the global Philips R&D, Philips has a Philips Design Centre in Pune and a Philips Software Centre in Bangalore (Express HealthCare Management 1-15th November 2002). Apart from sale of its imaging equipment in India, Philips is also involved in several other activities in the healthcare sector in India, like GE. These are described in section 6.1.7.

(vi) **Toshiba Medical Systems Corporation (TMSC), Japanese MNC in medical imaging equipment business, has a partnership with Network Systems and Technologies (NeST), a Kerala based company, for software development. NeST will employ over 300 software professionals, to develop software for the medical imaging equipment manufactured by TMSC (Business Line February 19 2007).**

> It is significant that multinational manufacturing companies such as GE and Philips are making inroads into several aspects of healthcare in India, all along the line from manufacture and supply of advanced, expensive equipment, to accessories, to also setting up centres for the clinical trials and use of such technologies.

(vii) **Eastman Kodak Company** has been making plans to make India a strategic base for its health imaging division. According to the President-Health Imaging and Senior Vice-President, Eastman Kodak Co, the goal was not to be a domestic player alone, but to develop India into a global source for the health imaging division by leveraging the company's existing base in the country (Business Line January 11 2003). As part of this effort, the health imaging division was considering activities in several directions. The ultimate objective was to start manufacturing its health imaging products in India, and the company was in the process of evaluating its options for the manufacture of health imaging hardware in the country. It was planning to ramp up its software engineering operations in the country. On the product front, the current focus was on computer radiography products. It planned to introduce a number of such products in 2003. The company was also working on bringing digital radiography technology into the Indian market in the next couple of years. Web-based imaging systems, tele-radiology and picture archiving and communication system (PACS) were some other imaging technologies the company planned to introduce in the country in the near future (www.kodak.com).

(viii) **Karl Storz India**, a wholly owned subsidiary of Karl Storz group, was established on 2nd February, 1998 at Delhi, to further and meet the business interests and needs of the organisation in the Indian Region. Karl Storz is in the field of endoscopy technology. The main objectives are to provide marketing and technical support, training, practical and feasible solutions in the local context, service support with minimum possible cost and machine down time to the Indian clients. Since July 1st, 1998 Karl Storz India is also responsible for the sale and service in India of products for endoscopy and extra-corporeal shock wave lithotripter (ESWL). The Karl Storz India team includes engineers and qualified support staff. Infrastructure includes service centre
equipped with ultra modern facilities, training centre to meet the needs of medical industry, spacious godown designed to accommodate highly sophisticated equipment/instruments, instrument sterilisation and cleaning rooms (Express HealthCare Management 1-15th November 2002).

(ix) **Fresenius Kabi India Private Limited**, a wholly owned subsidiary of Fresenius Kabi of Germany (see section 5.11.6 for details), was investing (Rs 10 crores) on upgradation of its manufacturing facilities at Pune to meet EU-GMP standards. Fresenius Kabi also has a dedicated contract manufacturing set-up with the Kerala based Gujarat Injectibles Limited. At its Pune manufacturing facility Fresenius Kabi manufactures products for infusion therapy and for parenteral nutrition, such as intravenous fluids, fluids for fluid and blood volume replacement, and anaesthetic agents for general anaesthesia. According to the President, Asia-Pacific Region, India and China had been identified as the two biggest markets in the region; and efforts were to have these countries as an outsourcing base for the exports in the region. The company also planned to increase its domestic market share (Express Pharma Pulse December 23 2004; Chronicle Pharmabiz March 24 2005).

(x) **Becton Dickinson (India) Private Limited**, a wholly owned subsidiary of Becton Dickinson of USA, has a manufacturing facility in the northern Indian state of Haryana, for manufacture of disposable needles, syringes and catheters (www.bd.com/india/).

(xi) **Stryker Corporation**, an American medical technology company that had invested over $300 million for R&D globally in 2006, opened its first Global Technology Centre in Asia Pacific, at Gurgaon (Business Line March 24 2007). The company, which entered India in 2001, planned to expand its sales and service operations to over 15 domestic markets by end of the year. R&D would be in all nine areas that the company operated in, including joint replacement, spine applications, neurological, endoscopic, communications and digital imaging systems. The centre was to work on developing next generation technologies and high-end products in the area of medical devices. The medical device market for Stryker in India was valued at over $160 million and growing rapidly. This made India a key market for Stryker, which was therefore making significant investments in infrastructure, technology and people by way of the Global Technology Centre. The centre would play an important role in 'bringing latest and cost-effective medical devices to the world'.

(xiii) In 2007 **companies from Japan, Brazil, USA, and China set up assembly units in India for manufacture of low or middle level products**, requiring small investments. These were for manufacture of items such as hearing aids and ophthalmic products (Economic Times September 20 2007).
A US-based healthcare IT and technology company, **PekinElmer Inc**, was reported to be looking for partners to develop its products in India. According to the company, 'besides the cost advantage the Indian healthcare industry is a large market and has the right skill set. We plan to make India the centre of our exports to unregulated markets such as the Middle East, Asia and Africa' (Economic Times September 20 2007). However, sophisticated equipment for the regulated markets such as US and UK would be developed from its global centres only.

### 6.1.4 Manufacture and Import of Medical Equipment in India

#### A. Manufacture of Medical Equipment in India

Data regarding production of medical equipment and instruments is rather scattered, and is found in the data base of the Annual Survey of Industries, as well as that of the Department of Electronics. The following section looks at the time-trends in their production and developments relating to their manufacture.

**Manufacture of Medical Electronic Equipment**

*In general there is substantial production by the Indian electronics and Information Technology industry. However, while the software industry is doing well, the same is not the case for production of hardware, and there is not much investment in it. Further, production of medical electronic equipment within this electronics segment is negligible.*

To give an idea - in 2001-2002 production of electronic equipment was of the order of Rs 80,124 crores, an increase of 17 per cent over the previous year (Rs 68,450 crores). There is a large production base of over 3500 units, engaged in electronics production; among which there are 11 public sector units and over 45 state public sector units. The bulk of this production is in the software and consumer electronics sectors (colour television sets), and personal computers. Within the electronic instruments and industrial electronics segment the medical electronic equipment production is considered to be miniscule, comprising not more than 1 percent of the same (Rastogi 2003).

*Hardware production in the electronics segment has become generally erratic, especially after liberalization. Indian manufacturers are finding it extremely difficult to survive against freely importable products at substantially reduced duties. There has been rapid closure of a large number of Indian units in recent years, and growing stature of multinational corporations with increasing market share in India (KrishnaKumar 2003). In the WTO regime the government was committed to reduce tariffs on electronics and IT hardware to 0; physical controls for import have by and large been dispensed with.*
The export-import policy with respect to electronic hardware production has been simplified considerably. The electronics industry as a whole, with the exception of aerospace and defense electronics, has been fully de-licensed. Fiscal, investment and trade policies have also been liberalized; custom and excise duties have been decreased and rationalized in the last few years to promote electronic manufacturing and electronic hardware exports. All components, raw materials and capital goods are freely importable. Sector-specific schemes have been introduced to attract foreign investment and provide a duty-free environment for export of electronic hardware and software under the export-oriented schemes.

While manufacture of medical electronic equipment forms a negligible part of total electronics production, however, there has been a steady increase in value of medical electronic equipment produced over the years, as shown below in Table 6.2. We find that in the 15 year period from 1988 to 2003 the value of medical electronic equipment produced increased 12 fold, from Rs 35 crores to Rs 421.81 crores, at about 18 per cent per annum.

Table 6.2 Production of medical electronic equipment in India (in Rs crores)

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<tr>
<td>Rs crores</td>
<td>15</td>
<td>11</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>35</td>
<td>35</td>
<td>50</td>
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Table 6.2 Production of medical electronic equipment in India (in Rs crores) (continued)

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<tbody>
<tr>
<td>Rs crores</td>
<td>60</td>
<td>77.58</td>
<td>76.55</td>
<td>144.13</td>
<td>121.58</td>
<td>120.51</td>
<td>179.89</td>
<td>165.21</td>
<td>209.35</td>
</tr>
</tbody>
</table>

(Source: from Electronics Information and Planning August 1996, 23 (11), p 631; for 1995-2001 different issues of Electronics Information and Planning)

Table 6.2 Production of medical electronic equipment in India (in Rs crores) (continued…)

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2003</th>
<th>2004</th>
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<td>Rs crores</td>
<td>356.80</td>
<td>388.19</td>
<td>421.81</td>
<td>851.57</td>
</tr>
</tbody>
</table>

(Source: Electronics Information and Planning different issues)

All figures available also on www.mit.gov.in/dbid - LIPS Information System)
The following section examines the manufacture of some of the equipment categorized under medical electronic equipment.

**Production of some specific medical electronic equipment**

There has been a steady increase in manufacture of some imaging equipment, namely medical x-ray and ultrasound equipment. This can be attributed to the manufacture/assembly of these by some multinationals such as GE and Siemens, for sale in India and other neighbouring countries.

Apart from increasing numbers of x-ray machines and ultrasound scanners, significant numbers of defibrillators (~1000 in 2003 and 2004), ECGs (~9500 in 2004); electronic thermometers (~29,660 in 2004) and diathermy equipment are being manufactured indigenously.

In addition, analytical instruments such as spectrophotometers, pH meter, electron microscopes, colorimeters, gas analysers are also being manufactured. The values of some medical electronic equipment that are manufactured are shown in the following table, Table 6.3. These figures are meant to give an idea of the nature of medical electronic equipment that is being manufactured in the country – it is not our intention to make any definitive analyses regarding trends over time.
Table 6.3: Production of some medical electronic equipment (value in Rs crores)

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<tbody>
<tr>
<td>2200</td>
<td>76.55</td>
<td>129.5</td>
<td>121.5</td>
<td>120.5</td>
<td>179.8</td>
<td>209.3</td>
<td>356.8</td>
<td>388.19</td>
<td>421.8</td>
<td>851.5</td>
</tr>
<tr>
<td>2210</td>
<td>3.63</td>
<td>4.2</td>
<td>4.5</td>
<td>5.3</td>
<td>3.9</td>
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<td>7.7</td>
<td>9.5</td>
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<td>2220</td>
<td>0.3</td>
<td>0.7</td>
<td>0.4</td>
<td>0.3</td>
<td>0.7</td>
<td>1.05</td>
<td>0.7</td>
<td>1.0</td>
<td>1.2</td>
<td>4.9</td>
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<td>6.9</td>
<td>7.9</td>
<td>10.2</td>
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</tr>
<tr>
<td>2240</td>
<td>10.7</td>
<td>12.2</td>
<td>13.8</td>
<td>16.3</td>
<td>19.0</td>
<td>29.5</td>
<td>33.2</td>
<td>40.9</td>
<td>74.1</td>
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<td>2250</td>
<td>8.23</td>
<td>0.5</td>
<td>0.4</td>
<td>1.2</td>
<td>1.8</td>
<td>2.0</td>
<td>1.9</td>
<td>1.8</td>
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<tr>
<td>2260</td>
<td>49.4</td>
<td>102.5</td>
<td>93.0</td>
<td>84.3</td>
<td>141.9</td>
<td>157.1</td>
<td>298.6</td>
<td>318.0</td>
<td>298.8</td>
<td>741.8</td>
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<td>2261</td>
<td>31.7</td>
<td>35.8</td>
<td>29.8(7)</td>
<td>32.2(777)</td>
<td>35.2(844)</td>
<td>19.6(793)</td>
<td>26.6(1220)</td>
<td>25.0(1179)</td>
<td>16.94(1398)</td>
<td>396.4(35,167)</td>
</tr>
<tr>
<td>2262</td>
<td>17.1</td>
<td>65.2</td>
<td>--------</td>
<td>33.0(2466)</td>
<td>23.2(2113)</td>
<td>22.6(3355)</td>
<td>24.4(4521)</td>
<td>260.5</td>
<td>244.2</td>
<td>314.3</td>
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<tr>
<td>2263</td>
<td>0.58</td>
<td>1.49</td>
<td>18.9</td>
<td>83.4</td>
<td>114.7</td>
<td>247.4</td>
<td>260.5</td>
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<td>2269</td>
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<td>2280</td>
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<td>0.1</td>
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<tr>
<td>2290</td>
<td>8.64</td>
<td>4.0</td>
<td>5.4</td>
<td>4.9</td>
<td>6.4</td>
<td>11.9</td>
<td>9.5</td>
<td>11.0</td>
<td>26.4</td>
<td>28.7</td>
</tr>
</tbody>
</table>

(figures in brackets are numbers of that equipment)
2200: Medical Electronic Equipment Total
2210: Electronic Artificial Aids, bulk of them being hearing aids
2220: Pathology Equipment, such as flame photometers and analysers
2230: Patient Care Equipment (pacemakers, defibrillators, ICU systems, baby incubators and others)
2240: Patient Monitoring Equipment (ECGs, EEGs, cardioscopes, BP monitors, electronic thermometers, etc)
2250: Therapy Equipment (diathermy equipment, radiation lamps, and such other equipment)
2260: Diagnostic Equipment
2261: x-ray machines (medical)
2262: x-ray machines (dental)
2263: ultrasound scanners
2269: Diagnostic equipment
2280: Surgical Equipment (ophthalmic lasers)
2290: Medical Electronic Equipment (audiometers, transducers for medical equipment, others)
Production of other medical equipment and appliances

We find that availability of data regarding manufacture of medical instruments and equipment is not very systematic. The present classification under the category of medical equipment by the Annual Survey of Industries (ASI) is not available regularly beyond the three-digit classification. So it is difficult to arrive at any definite conclusions regarding the time trends in their manufacture.

We find that manufacture of items such as x-ray and ultrasound equipment is compiled by both ASI and Department of Electronics. But the figures from the two departments do not match.

However, to a limited extent the ASI data gives some idea of the kind of medical equipment manufactured in the country.

Table 6.4: Production of Medical & Surgical Instruments & syringes (of all kinds) (in Rs crores)

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<tbody>
<tr>
<td>Med. &amp; surg. Instruments</td>
<td>75.09</td>
<td>52.12</td>
<td>42.88</td>
<td>69.21</td>
<td>191.41</td>
<td>165.10</td>
</tr>
<tr>
<td>Syringes</td>
<td>35.40</td>
<td>42.43</td>
<td>40.46</td>
<td>46.81</td>
<td>62.44</td>
<td>83.44</td>
</tr>
</tbody>
</table>

(Source: Monthly Abstract of Statistics (various months), Central Statistical Organisation, Ministry of Statistical Planning and Implementation)
Some of the components that are manufactured are as shown in Table 6.5.

**Table 6.5: Manufacture of some medical appliances at all-India level**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>quantity (nos.)</td>
<td>Value (Rs 000)</td>
<td>quantity (nos.)</td>
<td>Value (Rs 000)</td>
<td>quantity (nos.)</td>
</tr>
<tr>
<td>42606 disposable syringe plastic</td>
<td>...</td>
<td>........</td>
<td>...</td>
<td>........</td>
<td>6,46,53,584</td>
</tr>
<tr>
<td>77131+ x-ray eqpt</td>
<td>........</td>
<td>........</td>
<td>454</td>
<td>2265</td>
<td>1682</td>
</tr>
<tr>
<td>79512 ECG machines</td>
<td>........</td>
<td>........</td>
<td>........</td>
<td>........</td>
<td>62</td>
</tr>
<tr>
<td>79513 EEG machines</td>
<td>89</td>
<td>15,039</td>
<td>........</td>
<td>........</td>
<td>53</td>
</tr>
<tr>
<td>79517 hearing aids</td>
<td>........</td>
<td>........</td>
<td>........</td>
<td>........</td>
<td>........</td>
</tr>
<tr>
<td>79518 Hospital furniture</td>
<td>2029</td>
<td>14,463</td>
<td>........</td>
<td>........</td>
<td>71</td>
</tr>
<tr>
<td>79521 IR eqpt</td>
<td>51,62,050</td>
<td>55,144</td>
<td>........</td>
<td>........</td>
<td>........</td>
</tr>
<tr>
<td>79522 Microscopes</td>
<td>5123</td>
<td>74,767</td>
<td>9649</td>
<td>8292</td>
<td>913</td>
</tr>
<tr>
<td>79523 Needle-holders</td>
<td>12,493</td>
<td>3970</td>
<td>........</td>
<td>........</td>
<td>1,62,11,296</td>
</tr>
<tr>
<td>79524 O &amp; E tables</td>
<td>4166</td>
<td>13,044</td>
<td>21</td>
<td>971</td>
<td>11</td>
</tr>
<tr>
<td>79533 Sterilizers</td>
<td>2141</td>
<td>1285</td>
<td>14,870</td>
<td>50,647</td>
<td>24,64,850</td>
</tr>
<tr>
<td>79537 syringes</td>
<td>3,36,13,077</td>
<td>3,83,485</td>
<td>87,04,99,093</td>
<td>9,75,521</td>
<td>147,98,99,370</td>
</tr>
</tbody>
</table>

-312-
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>79543 ultra-sound scanners</td>
<td>2252</td>
<td>6,06,814</td>
<td>2638</td>
<td>7,63,188</td>
<td>3435</td>
<td>9,02,982</td>
<td>3435</td>
</tr>
<tr>
<td>79589 medical/biomedical/lab machines n.e.c</td>
<td>..........</td>
<td>9,04,091</td>
<td>2,24,463</td>
<td>9,30,070</td>
<td>31,22,738</td>
<td>31,22,738</td>
<td></td>
</tr>
<tr>
<td>91102 intra-ocular lenses</td>
<td>558</td>
<td>2,68,824</td>
<td>61</td>
<td>26,696</td>
<td>848</td>
<td>1,61,065</td>
<td>848</td>
</tr>
<tr>
<td>91103 ophthalmic lenses</td>
<td></td>
<td></td>
<td>11,220</td>
<td>7,57,858</td>
<td>11,220</td>
<td>7,57,858</td>
<td></td>
</tr>
<tr>
<td>79522 microscopes</td>
<td>4550</td>
<td>5,81,40</td>
<td>21402</td>
<td>7,16,03</td>
<td>21402</td>
<td>7,16,03</td>
<td></td>
</tr>
</tbody>
</table>


+ - It is not clear whether all the x-ray equipment are solely for medical purposes, since this category includes appliances for checking, testing, etc.
@ - Item 79522 – microscopes – figures under two Industry Groups in the ASI: namely 331-Medical appliances, appliances for measuring, checking, testing, navigating; and 332 Manufacture of optical instruments and photographic equipment.
n.e.c – not elsewhere classified
* - number of lenses in thousands pairs

Tables 6.3 and 6.5 indicate that a variety of medical instruments, equipment and appliances are being manufactured in the country. This ranges from disposable syringes, to microscopes, to defibrillators, ECG and EEG machines, to devices such as intra-ocular lenses, hearing aids, and pacemakers; to x-ray equipment, ultrasound scanners, and other kinds of medical equipment.

The state-wise data gives an idea of the states where the manufacture of some of the above items is concentrated.

a. Manufacture of disposable plastic syringes is concentrated at Uttaranchal.
b. Manufacture of ECG and EEG machines is located at Chandigarh. That of ECG machines takes place in MP too.
c. Manufacture of microscopes is concentrated in Haryana.
d. Manufacture of ultrasound scanners is located in Karnataka (2568 units were reported manufactured in Karnataka out of the 2638 in 1999-2000), and to a smaller extent in Goa and MP.
e. Manufacture of x-ray equipment is concentrated in Goa, Maharasthra, Daman & Diu.
f. Manufacture of intra-ocular lenses is located in Tamil Nadu, Haryana, Karnataka and West Bengal.
g. Manufacture of ophthalmic lenses takes place in several places – AP, Goa, W Bengal, Daman & Diu, Tamil Nadu, Delhi, Haryana.
h. Apart from the above manufacture of medical/biomedical/lab machines is reported from several states: Haryana, Karnataka, Rajasthan, W Bengal, Rajasthan, Chandigarh, Puducherry.
FDI in medical technology in India

In terms of Foreign Direct Investment Inflows (FDI) between August 1991-December 2005 the total FDI in medical and surgical appliances sector has been of the order of Rs 4471.73 mn (US$ 101.63 mn). In comparison that in drugs and pharmaceuticals was Rs 40,505.55 mn (US$ 948.55) (Government of India 2005). This is far lower than that in sectors such as services sector, consultancy, food processing, telecommunication, transportation, etc.

Outsourcing to Asia – India and China

Overall we find that manufacturing appears to be picking up in the country. However, it seems to be more in the form of subsidiaries, as joint ventures, and as part of contract manufacturing.

We find that, increasingly, several multinationals and other medical device companies from US are outsourcing several of their activities to India. This is seen as a way of reducing costs in manufacturing, in R&D, in clinical trials and other medical services. India is considered to have several advantages – lesser labour costs, a large English-speaking and skilled labour force, the government providing conducive conditions by setting up SEZs as in China, and an increasing middle-class population seeking better healthcare.

The activities that are being shifted here comprise the following: making India the base for business operations in the south Asian region; making use of Indian companies for contract manufacturing components for global markets; exploiting the software skills for developing software for the advanced imaging equipment manufactured by them; undertaking R & D, and clinical research and trials for their products. For this they are entering into partnership arrangements with big and small local companies, and with local corporate sector hospitals.

The net effect of all these activities is that there is manufacturing of products that are of use at the secondary and tertiary levels of healthcare, and/or for export, for international markets: such as cardiac stents, catheters, ultrasound scanners, etc.

6.1.4

B. Import of medical equipment

Import of technology per se is not a recent phenomenon. However, since the 1980s and in the 1990s there has been a steep increase in the variety and quantum of import of medical equipment into the country. According to industry estimates currently almost 90 per cent of devices and disposables are being imported at international prices (Pharmabiz Hospital Review 31 May 2004). Only a few low-end products, such as fluid administration sets, blood bags and contraceptive devices (condoms and copper-T), are manufactured indigenously, mainly in the unorganized sector.
Up to 1984-1985 the foreign trade statistics of India had only three categories covering trade in medical equipment – electric apparatus for medical purposes and radiological apparatus, optical instruments and appliances, and medical instruments and appliances, respectively. Over the past two decades there has been a tremendous increase in the range of appliances and instruments imported. Newer categories (and sub-categories) concerning medical equipment have been added/created in the foreign trade statistics, as the quantity of goods imported became significant.

Imports are made under different descriptive names in category of life-saving equipment, even when the concerned equipment is manufactured indigenously. Duties range from 0 to 40 per cent, depending on the user, which in view of dealers is still very high and needs to be reduced further. In case of life-saving equipment it is zero. There are concessions for different categories of hospitals. For instance: public hospitals and related public R & D institutions are allowed duty-free imports. Charitable and other hospitals that provide free treatment to at least 40 per cent of their outpatients and 10 per cent of their inpatients are granted exemption from import duty on equipment. However, there is no regulation or monitoring in this regard, and this stipulation is not always observed by the private hospitals.

Table 6.6: Medical equipment imports over the 1990s (in Rs crores)

<table>
<thead>
<tr>
<th>Year</th>
<th>Medical Equipment Imports (in Rs. crores)</th>
<th>Constant Prices (in Rs crores 1993-94 base)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987-1988</td>
<td>96.68</td>
<td></td>
</tr>
<tr>
<td>1988-1989</td>
<td>156.95</td>
<td></td>
</tr>
<tr>
<td>1989-1990</td>
<td>212.23</td>
<td></td>
</tr>
<tr>
<td>1990-1991</td>
<td>257.31</td>
<td>316.4997</td>
</tr>
<tr>
<td>1991-1992</td>
<td>216.4</td>
<td>234.196</td>
</tr>
<tr>
<td>1992-1993</td>
<td>388.23</td>
<td>381.7425</td>
</tr>
<tr>
<td>1993-1994</td>
<td>361.4</td>
<td>361.394</td>
</tr>
<tr>
<td>1994-1995</td>
<td>554.9</td>
<td>492.8182</td>
</tr>
<tr>
<td>1995-1996</td>
<td>754.17</td>
<td>620.2041</td>
</tr>
<tr>
<td>1996-1997</td>
<td>599.46</td>
<td>471.2772</td>
</tr>
<tr>
<td>1997-1998</td>
<td>982.68</td>
<td>739.9755</td>
</tr>
<tr>
<td>1998-1999</td>
<td>1244.02</td>
<td>884.1652</td>
</tr>
<tr>
<td>1999-2000</td>
<td>1401.11</td>
<td>964.2871</td>
</tr>
<tr>
<td>2000-2001</td>
<td>1717.89</td>
<td>1103.334</td>
</tr>
<tr>
<td>2001-2002</td>
<td>2195.82</td>
<td>1361.327</td>
</tr>
<tr>
<td>2002-2003</td>
<td>2382.26</td>
<td>1436.831</td>
</tr>
</tbody>
</table>

(Compiled from: Monthly Statistics of Foreign Trade of India, DGCIS, Ministry of Commerce, Government of India, various years)
Figure 6.1: Import of medical equipment since the 1990s (in Rs crores)
Table 6.6 (contd): Medical equipment imports since 2000 (in Rs crores)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999-2000</td>
<td>1401.10</td>
</tr>
<tr>
<td>2000-2001</td>
<td>1717.88</td>
</tr>
<tr>
<td>2001-2002</td>
<td>2195.80</td>
</tr>
<tr>
<td>2002-2003</td>
<td>2382.26</td>
</tr>
<tr>
<td>2003-2004</td>
<td>2518.61</td>
</tr>
<tr>
<td>2004-2005</td>
<td>2934.63</td>
</tr>
<tr>
<td>2005-2006</td>
<td>3789.87</td>
</tr>
<tr>
<td>2006-2007</td>
<td>4728.27</td>
</tr>
</tbody>
</table>

Table 6.6 and Figure 6.1 above show that imports increased from 1988 to 1997 from Rs 96.7 crores to Rs 599.9 crores, an average increase of Rs 56 crores per annum. From 1997 to 2003 it increased to Rs 2382.26 crores, an increase of Rs 297 crores per annum. This is more than 5 times the increase in the previous period. From 2003 to 2007 the value of imports has nearly doubled. Overall, in the 15 year period from 1988 to 2003 there has been a huge increase in imports by 25 times, at a rate of 24 per cent per annum.

A comparison of Tables 6.3, 6.4 and 6.5 (production of medical electronic equipment and instruments) with Table 6.6 (imports) indicates that imports are several fold higher than local production. For instance in 2002-03 imports were around 3.5 times higher.

The items imported range from:
- small consumable items such as surgical gloves and various types of syringes, needles, cannulae and catheters, to
- all kinds of surgical appliances, to
- a wide range of implantable and other devices such as heart valves, pacemakers, orthopaedic appliances, dental fixtures and hearing aids, etc., to
- stethoscopes and thermometers, and blood transfusion apparatus, to
- ozone, oxygen and aerosol therapy apparatus, artificial respiration apparatus, breathing appliances, psychological aptitude testing apparatus, to
- special dental chairs and drills, and eye and ENT precision instruments, and lasers, etc., to
- the currently highly visible electro-medical instruments used for diagnosis and therapy - a range of instruments and equipment for clinical and pathology laboratory, imaging equipment (x-rays, ultrasound, CT-scanners and MRI equipment, autoanalyzers), anaesthetic equipment, ECGs and EEGs, to
- linear accelerators used in cancer therapy, to
-318-

- haemodialysis machines, endoscopes, laparoscopes, baby incubators, heart-lung machines, defibrillators, UV/IR apparatus, to
- x-ray generators, tubes, parts and accessories of CT-scanners and other equipment.

These trends are shown and discussed in the following tables and paragraphs.

Table 6.7: Import of various items of medical equipment in (Rs crores)

<table>
<thead>
<tr>
<th>Items→</th>
<th>9018</th>
<th>9019</th>
<th>9021</th>
<th>9022</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year↓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1987-1988</td>
<td>60.34</td>
<td>1.19</td>
<td>15.55</td>
<td>19.57</td>
<td>96.67</td>
</tr>
<tr>
<td>1988-1989</td>
<td>111.46</td>
<td>1.98</td>
<td>18.42</td>
<td>25.07</td>
<td>156.94</td>
</tr>
<tr>
<td>1989-1990</td>
<td>141.83</td>
<td>6.40</td>
<td>21.48</td>
<td>42.50</td>
<td>212.23</td>
</tr>
<tr>
<td>1990-1991</td>
<td>180.77</td>
<td>4.31</td>
<td>38.98</td>
<td>33.24</td>
<td>257.31</td>
</tr>
<tr>
<td>1991-1992</td>
<td>149.99</td>
<td>2.81</td>
<td>20.63</td>
<td>42.95</td>
<td>216.39</td>
</tr>
<tr>
<td>1992-1993</td>
<td>303.51</td>
<td>6.50</td>
<td>33.49</td>
<td>44.70</td>
<td>388.23</td>
</tr>
<tr>
<td>1993-1994</td>
<td>277.84</td>
<td>6.58</td>
<td>31.46</td>
<td>45.50</td>
<td>361.39</td>
</tr>
<tr>
<td>1994-1995</td>
<td>390.08</td>
<td>15.60</td>
<td>40.77</td>
<td>108.44</td>
<td>554.91</td>
</tr>
<tr>
<td>1995-1996</td>
<td>551.33</td>
<td>17.83</td>
<td>40.40</td>
<td>144.58</td>
<td>754.16</td>
</tr>
<tr>
<td>1996-1997</td>
<td>455.36</td>
<td>17.46</td>
<td>35.26</td>
<td>91.7</td>
<td>599.46</td>
</tr>
<tr>
<td>1997-1998</td>
<td>772.11</td>
<td>28.47</td>
<td>60.88</td>
<td>121.00</td>
<td>982.68</td>
</tr>
<tr>
<td>1998-1999</td>
<td>926.64</td>
<td>43.86</td>
<td>73.57</td>
<td>199.93</td>
<td>1244.02</td>
</tr>
<tr>
<td>1999-2000</td>
<td>975.11</td>
<td>78.39</td>
<td>84.11</td>
<td>263.48</td>
<td>1401.10</td>
</tr>
<tr>
<td>2000-2001</td>
<td>1296.49</td>
<td>80.75</td>
<td>90.99</td>
<td>249.64</td>
<td>1717.89</td>
</tr>
<tr>
<td>2001-2002</td>
<td>1604.72</td>
<td>135.31</td>
<td>141.19</td>
<td>314.58</td>
<td>2195.82</td>
</tr>
<tr>
<td>2002-2003</td>
<td>1659.17</td>
<td>69.09</td>
<td>133.81</td>
<td>520.17</td>
<td>2382.26</td>
</tr>
<tr>
<td>2003-2004</td>
<td>1682.53</td>
<td>48.59</td>
<td>206.90</td>
<td>580.59</td>
<td>2518.61</td>
</tr>
<tr>
<td>2004-2005</td>
<td>2044.67</td>
<td>44.68</td>
<td>225.91</td>
<td>619.37</td>
<td>2934.63</td>
</tr>
<tr>
<td>2005-2006</td>
<td>2665.08</td>
<td>67.44</td>
<td>302.30</td>
<td>755.05</td>
<td>3789.87</td>
</tr>
<tr>
<td>2006-2007</td>
<td>3272.59</td>
<td>90.18</td>
<td>447.11</td>
<td>918.39</td>
<td>4728.27</td>
</tr>
</tbody>
</table>

(Source: compiled from Monthly Statistics of Foreign Trade of India, DGCIS, Ministry of Commerce, Government of India, various years. All these figures relate to imports through all the recognized seaports, airports and land customs stations, and inland container depots all over the country, and are based on declarations made by importers in bills of entry).

9018 - a category encompassing a wide range of electric apparatus and instruments for medical purposes, electro-diagnostic apparatus, syringes, various kinds of needles and catheters, all kinds of surgical instruments and appliances, stethoscopes, blood pressure measuring instruments, haemocytometers, instruments for dental, ophthalmic and ENT purposes. Some of the important sub-categories under 9018 are shown in other Tables.

9019 - covers machino-therapy appliances, artificial respiration apparatus, oxygen therapy apparatus, massage apparatus, psychological aptitude testing apparatus, etc.

9021 - covers orthopaedic appliances, artificial body parts and/or devices worn or implanted in the body to compensate defect, like hearing aids, artificial teeth, joints, pacemakers, etc.

9022 - covers apparatus based on use of α, β and γ radiation, x-ray generators and tubes, parts of x-ray apparatus, x-ray examination table, etc.
Table 6.7 shows that the major imports are those under the code 9018 – electro-diagnostic apparatus and instruments for medical purposes: a category encompassing a large range of instruments: sophisticated electronic and electric apparatus, such as linear ultrasound scanners, MRI apparatus, head and whole body CT scanners, echocardiograph, defibrillators, echocardiographs, biochemical analysis instruments, as well as a range of instruments, encompassing anesthetic, lithotripsy, dialysis, dental and ophthalmic equipment, surgical instruments, syringes and needles, catheters and other disposables, stents, pacemakers and heart valves, and others. Apart from these we find an increase in the imports of orthopedic appliances, artificial body parts/implants, joints, etc (code 9021). It is significant that majority of these items being imported are for use at the secondary and tertiary level of healthcare.

The trends in the items covered under category 9018 are as shown in the following tables. One finds that over the years there has been an overall increase in the imports of many of the items. There have been some striking increases as well as decrease in the rate of growth of imports of some items. For instance:

- An entire range of so-called 'high-tech' instruments – namely a range of ultrasonography equipment, CT-scanners, MRIs, angiographs, heart-lung machines, anaesthetic equipment and biochemical analysis instruments, etc. – is being imported since early and mid-1990s. Their value runs from a few crores to hundreds of crores of rupees.
- There has been a significant increase also in import of the simple consumable items, such as syringes with needles, catheters, pacemakers, and the like (See Table 6.11). The value of their imports also runs into crores of rupees, and is at times equivalent to or even more than that of the sophisticated machines and instruments. For instance: there is a steady increase in value and amount of needles (Item 21 in Table 6.11), from about Rs 2 crore to Rs 35 crore. So it is for catheters, especially cardiac catheters (Items 22 and 22A, respectively in Table 6.11). Their imports runs into nearly hundred crore rupees.

- Import of linear ultrasound scanners (code 90181210) increased by 94.8 % between 2004 and 2005, from Rs 12.29 crores to Rs 23.95 crores (Table 6.12). However it decreased between 2005 and 2006. Import of items such as ECGs and lithotripsy equipment also fell in this period (Table 6.8 and 6.9).

- Import of MRI scanners increased by 11.6 % between 2004 and 2005 (Rs 77.17 crores to Rs 86.11 crores), and by 23 % between 2006 and 2007 (139.42 crores to 172.79 crores) (Table 6.8).

- Import of defibrillators decreased by 53% from 2004 to 2005, from Rs 647 crores to Rs 300.95 crores, but increased by 112 % between 2006 and 2007, from Rs 241.71 crores to Rs 513.52 crores (Table 6.9).
Similarly, import of cardiac catheters decreased between 2004 and 2005, from Rs 118.73 crores to Rs 102.15 crores, but increased by 39% between 2005 and 2006 from Rs 120.65 crores to Rs 168.59 crores (Table 6.11).

Import of syringes (with needles) increased by 122.7% between 2004 and 2005 (Rs 17.25 crores to Rs 38.42 crores); and by 69% between 2006 and 2007 (Rs 81.72 crores to Rs 138.43 crores) (Table 6.11).
<table>
<thead>
<tr>
<th>Items/Year</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987-1988</td>
<td>23/ 0.26</td>
<td>NA</td>
<td>2/ 0.01</td>
<td>NA</td>
<td>38/ 0.07</td>
<td>NA</td>
</tr>
<tr>
<td>1988-1989</td>
<td>91/ 0.89</td>
<td>NA</td>
<td>8/ 0.17</td>
<td>NA</td>
<td>235/ 0.64</td>
<td>NA</td>
</tr>
<tr>
<td>1989-1990</td>
<td>41/ 1.49</td>
<td>NA</td>
<td>4/ 0.04</td>
<td>NA</td>
<td>296/ 0.48</td>
<td>NA</td>
</tr>
<tr>
<td>1990-1991</td>
<td>41/ 2.69</td>
<td>NA</td>
<td>3/ 0.03</td>
<td>NA</td>
<td>33/ 0.16</td>
<td>NA</td>
</tr>
<tr>
<td>1991-1992</td>
<td>36/ 0.7</td>
<td>NA</td>
<td>5/ 0.30</td>
<td>NA</td>
<td>69/ 0.97</td>
<td>NA</td>
</tr>
<tr>
<td>1992-1993</td>
<td>84/ 3.91</td>
<td>NA</td>
<td>9/ 0.16</td>
<td>NA</td>
<td>248/ 0.84</td>
<td>19/</td>
</tr>
<tr>
<td>1993-1994</td>
<td>51/ 5.05</td>
<td>NA</td>
<td>2/ 0.17</td>
<td>NA</td>
<td>303/ 1.49</td>
<td>6/</td>
</tr>
<tr>
<td>1994-1995</td>
<td>87/ 5.19</td>
<td>NA</td>
<td>5/ 0.35</td>
<td>NA</td>
<td>118/ 0.99</td>
<td>72/</td>
</tr>
<tr>
<td>1995-1996</td>
<td>74/ 2.3</td>
<td>22/ 25.26</td>
<td>11/ 0.14</td>
<td>NA</td>
<td>204/ 1.96</td>
<td>279/</td>
</tr>
<tr>
<td>1996-1997</td>
<td>70/ 3.48</td>
<td>30/ 11.94</td>
<td>2/ 0.05</td>
<td>14/ 26.49</td>
<td>365/ 3.76</td>
<td>290/</td>
</tr>
<tr>
<td>1997-1998</td>
<td>710/ 2.15</td>
<td>41/ 26.63</td>
<td>2/ 0.26</td>
<td>30/ 13.08</td>
<td>3471/ 8.76</td>
<td>519/</td>
</tr>
<tr>
<td>1998-1999</td>
<td>461/ 7.45</td>
<td>33/ 12.87</td>
<td>17/ 0.86</td>
<td>22/ 24.18</td>
<td>13,375/ 24.91</td>
<td>504/</td>
</tr>
<tr>
<td>1999-2000</td>
<td>2542/ 19.32</td>
<td>39/ 31.89</td>
<td>8/ 0.11</td>
<td>20/ 19.47</td>
<td>67,863/ 75.83</td>
<td>683/</td>
</tr>
<tr>
<td>2001-2002</td>
<td>642/ 3.52</td>
<td>227/ 104.59</td>
<td>18/ 0.25</td>
<td>54/ 33.18</td>
<td>1,79,500/ 165.76</td>
<td>27/</td>
</tr>
<tr>
<td>2002-2003</td>
<td>7759/ 5.10</td>
<td>413/ 96.31</td>
<td>13/ 0.44</td>
<td>91/ 22.25</td>
<td>2,15,768/ 165.20</td>
<td>369/</td>
</tr>
</tbody>
</table>

1 - ECGs; 2 - MRI apparatus; 3 - EEGs; 4 - angiographs; 5 - anaesthetic equipment; 6 - (hematology) biochemical analysis instrument/blood cell counters.
Table 6.8 indicates that several crores worth of equipment get imported annually. Such as: ECGs (~Rs 5 crore in 2002-03), of MRI apparatus (~Rs 96 crores in 2002-03), of angiography equipment (~Rs 22 crores in 2002-03), equipment for anaesthesia (Rs 164 crores in 2002-03), and biochemical analysis instruments (~Rs 3 crores).

One finds few hundred MRI scanners, and a very large number of equipment for anaesthesia being imported since 2000. Similarly, a large number of biochemical analysis instruments were also imported between 1995 and 2000.
Table 6.9 Imports of various medical equipment

<table>
<thead>
<tr>
<th>Items/year</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987-1988</td>
<td>209/0.64</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>1988-1989</td>
<td>555/1.42</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>1989-1990</td>
<td>163/1.48</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>1990-1991</td>
<td>100/1.03</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>1991-1992</td>
<td>11/0.43</td>
<td>42/0.49</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>116/1.04</td>
</tr>
<tr>
<td>1992-1993</td>
<td>18/3.41</td>
<td>244/2.35</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>641/3.98</td>
</tr>
<tr>
<td>1993-1994</td>
<td>12/0.47</td>
<td>65/1.29</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>1105/4.06</td>
</tr>
<tr>
<td>1995-1996</td>
<td>9/0.86</td>
<td>6689/2.73</td>
<td>62/3.31</td>
<td>NA</td>
<td>257/2.18</td>
<td>695/4.25</td>
<td>10/0.28</td>
</tr>
<tr>
<td>1996-1997</td>
<td>75/2.29</td>
<td>218/3.44</td>
<td>86/0.42</td>
<td>282/0.48</td>
<td>228/1.11</td>
<td>61/0.28</td>
<td>69/0.19</td>
</tr>
<tr>
<td>1997-1998</td>
<td>618/15.93</td>
<td>347/8.76</td>
<td>46/2.41</td>
<td>58/0.83</td>
<td>452/5.95</td>
<td>1239/3.33</td>
<td>14/0.24</td>
</tr>
<tr>
<td>1998-1999</td>
<td>656/19.08</td>
<td>193/5.06</td>
<td>44/3.44</td>
<td>70/0.59</td>
<td>767/3.63</td>
<td>468/3.62</td>
<td>21/0.37</td>
</tr>
<tr>
<td>1999-2000</td>
<td>8679/26.66</td>
<td>6174/8.76</td>
<td>365/2.53</td>
<td>689/1.68</td>
<td>1054/26.32</td>
<td>819/3.92</td>
<td>124/0.72</td>
</tr>
<tr>
<td>2000-2001</td>
<td>27,234/120.66</td>
<td>376/5.07</td>
<td>95/3.90</td>
<td>13/0.18</td>
<td>309/1.73</td>
<td>-------</td>
<td>20/0.28</td>
</tr>
<tr>
<td>2001-2002</td>
<td>57,151/126.44</td>
<td>636/12.49</td>
<td>837/0.56</td>
<td>477/3.82</td>
<td>4223/15.45</td>
<td>56/0.52</td>
<td></td>
</tr>
<tr>
<td>2002-2003</td>
<td>18,500/106.02</td>
<td>20,958/9.86</td>
<td>24/5.38</td>
<td>42/1.72</td>
<td>46/1.05</td>
<td>4062/20.04</td>
<td>64/2.39</td>
</tr>
</tbody>
</table>

7 - Defibrillators & heart pacers; 8 - artificial dialysis apparatus & haemodialyser (portable & non-portable); 9 - heart-lung machine; 10 - lithotripsy instruments; 11 - laparoscopes; 12 - endoscopes; 13 - baby incubators
Like the previous table, Table 6.9 also indicates import of crores of rupees worth of equipment like defibrillators and heart pacers, endoscopes, of dialysis equipment, and lithotripsy equipment are being imported. Since 2000 more than Rs 100 crores worth of defibrillators and heart pacers have been imported.
Table 6.10: Quantity (n-number & kg - kilograms) and value (ruppes) of imports of medical devices

<table>
<thead>
<tr>
<th>Items/year</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987-1988</td>
<td>NA</td>
<td>NA</td>
<td>133/ 4.16</td>
<td>NA</td>
<td>NA</td>
<td>87 (n)/ 0.67</td>
</tr>
<tr>
<td>1988-1989</td>
<td>NA</td>
<td>NA</td>
<td>181/ 3.46</td>
<td>NA</td>
<td>NA</td>
<td>353 (n)/ 1.46</td>
</tr>
<tr>
<td>1989-1990</td>
<td>NA</td>
<td>NA</td>
<td>17/ 0.66</td>
<td>NA</td>
<td>NA</td>
<td>61 (n)/ 1.16</td>
</tr>
<tr>
<td>1990-1991</td>
<td>NA</td>
<td>NA</td>
<td>119/ 3.61</td>
<td>NA</td>
<td>NA</td>
<td>35 (n)/ 0.32</td>
</tr>
<tr>
<td>1991-1992</td>
<td>12/ 11.5</td>
<td>26/ 3.96</td>
<td>19/ 4.58</td>
<td>57/ 6.08</td>
<td>NA</td>
<td>99 (n)/ 2.01</td>
</tr>
<tr>
<td>1992-1993</td>
<td>24/ 18.17</td>
<td>39/ 12.39</td>
<td>21/ 5.36</td>
<td>42/ 6.02</td>
<td>NA</td>
<td>11 (n)/ 0.84</td>
</tr>
<tr>
<td>1993-1994</td>
<td>32/ 8.45</td>
<td>48/ 17.29</td>
<td>33/ 8.81</td>
<td>33/ 0.21</td>
<td>NA</td>
<td>5 (n)/ 0.94</td>
</tr>
<tr>
<td>1995-1996</td>
<td>10/ 7.50</td>
<td>12/ 1.12</td>
<td>145/ 13.40</td>
<td>169/ 2.33</td>
<td>NA</td>
<td>181 (n)/ 1.13</td>
</tr>
<tr>
<td>1996-1997</td>
<td>4/ 3.02</td>
<td>128/ 7.51</td>
<td>9/ 0.93</td>
<td>2/ 0.28</td>
<td>73/ 5.38</td>
<td>39,116 kg/ 10,759,630</td>
</tr>
<tr>
<td>1997-1998</td>
<td>20/ 19.55</td>
<td>51/ 11.91</td>
<td>39/ 2.57</td>
<td>96/ 0.43</td>
<td>74/ 18.21</td>
<td>17,297 kg/ 3.62</td>
</tr>
<tr>
<td>1998-1999</td>
<td>10/ 7.34</td>
<td>29/ 3.76</td>
<td>32/ 1.78</td>
<td>73/ 0.25</td>
<td>56/ 18.43</td>
<td>33,582 kg/ 7.31</td>
</tr>
<tr>
<td>1999-2000</td>
<td>19/ 4.35</td>
<td>101/ 7.80</td>
<td>91/ 2.99</td>
<td>24/ 0.05</td>
<td>76/ 17.78</td>
<td>17,148 kg/ 6.75</td>
</tr>
<tr>
<td>2000-2001</td>
<td>42/ 12.53</td>
<td>40/ 14.64</td>
<td>137/ 62.44</td>
<td>16/ 0.81</td>
<td>544/ 41.64</td>
<td>43,637 kg/ 6.17</td>
</tr>
<tr>
<td>2001-2002</td>
<td>27/ 16.8</td>
<td>29/ 17.55</td>
<td>872/ 59.24</td>
<td>2/ 0.29</td>
<td>286/ 59.20</td>
<td>14,843 kg/ 5.29</td>
</tr>
<tr>
<td>2002-2003</td>
<td>47/ 14.32</td>
<td>107/ 14.26</td>
<td>781/ 33.5</td>
<td>1/ 0.32</td>
<td>980/ 68.91</td>
<td>7298 kg/ 3.46</td>
</tr>
</tbody>
</table>

14 - whole body CT-scanners; 15 - CT-scanners; 16 - X-ray generators and apparatus; 17 - portable x-ray machines; 18 - CT-apparatus; 19 - UV/IR apparatus

This Table shows that since 1999-2000 there has been an increase in the value of CT equipment imports (items 14, 15 and 18 together). Nearly Rs 90 crores worth of CT-scanners and CT-apparatus was imported in 2002-03.
### Table 6.11: Quantity (n-number & kg-kilograms) and value (crore rupees) of imports of medical devices

<table>
<thead>
<tr>
<th>Items/Year</th>
<th>20</th>
<th>21 (crore Rs)</th>
<th>22</th>
<th>22A</th>
<th>24</th>
<th>25</th>
<th>26</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987-1988</td>
<td>1,10,482/0.39</td>
<td>2.06</td>
<td>38,24,872/2.16</td>
<td>NA</td>
<td>NA</td>
<td>1925/2.22</td>
<td>NA</td>
</tr>
<tr>
<td>1988-1989</td>
<td>38,96,323/0.89</td>
<td>3.77</td>
<td>24,98,191/2.96</td>
<td>NA</td>
<td>NA</td>
<td>2430/2.79</td>
<td>NA</td>
</tr>
<tr>
<td>1989-1990</td>
<td>43,39,184/1.05</td>
<td>1.05</td>
<td>52,80,419/5.71</td>
<td>NA</td>
<td>NA</td>
<td>2461/2.91</td>
<td>NA</td>
</tr>
<tr>
<td>1990-1991</td>
<td>34,08,110/1.75</td>
<td>4.02</td>
<td>..............</td>
<td>9.95 crore Rs</td>
<td>NA</td>
<td>NA</td>
<td>4351/4.82</td>
</tr>
<tr>
<td>1991-1992</td>
<td>27,32,556/1.52</td>
<td>6.77</td>
<td>1.06,53,884/22.27</td>
<td>NA</td>
<td>4935/8.45</td>
<td>1894 (n)/3.03</td>
<td></td>
</tr>
<tr>
<td>1992-1993</td>
<td>32,54,833/1.54</td>
<td>8.67</td>
<td>1,20,78,244/32.25</td>
<td>3,77,904/17.88</td>
<td>NA</td>
<td>9032/17.26</td>
<td>3823 (n)/6.75</td>
</tr>
<tr>
<td>1993-1994</td>
<td>37,32,335/1.03</td>
<td>11.56</td>
<td>78,37,693/32.73</td>
<td>4,04,877/16.77</td>
<td>13,35,841/1.42</td>
<td>7193/13.38</td>
<td>3148 (n)/7.01</td>
</tr>
<tr>
<td>1994-1995</td>
<td>2,47,72,795/3.57</td>
<td>13.48</td>
<td>1,40,15,847/33.89</td>
<td>1,48,900/9.57</td>
<td>3,04,970/1.17</td>
<td>8683/17.4</td>
<td>3843 (n)/6.73</td>
</tr>
<tr>
<td>1995-1996</td>
<td>2,19,37,000/5.06</td>
<td>..............</td>
<td>2,25,72,671/53.83</td>
<td>5,78,593/15.33</td>
<td>7,91,253/4.56</td>
<td>6908/14.44</td>
<td>2501 (n)/5.68</td>
</tr>
<tr>
<td>1996-1997</td>
<td>5,00,69,100/13.75</td>
<td>19.23</td>
<td>91,34,800/54.76</td>
<td>2,72,832/22.45</td>
<td>9,55,473/3.33</td>
<td>3769/10.21</td>
<td>3936 kg/5.66</td>
</tr>
<tr>
<td>1997-1998</td>
<td>7,97,07,000/21.67</td>
<td>25.84</td>
<td>1,50,62,214/96.79</td>
<td>3,01,298/40.15</td>
<td>1,28,727/86.31</td>
<td>7590/17.13</td>
<td>5244 kg/7.66</td>
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<tr>
<td>1998-1999</td>
<td>15,37,85,509/33.91</td>
<td>31.20</td>
<td>3,15,64,300/128.01</td>
<td>4,45,705/58.78</td>
<td>3,41,851/1.65</td>
<td>7809/20.53</td>
<td>4264 kg/10.22</td>
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<td>5,27,02,000/24.18</td>
<td>24.21</td>
<td>1,19,67,350/148.65</td>
<td>4,24,104/63.24</td>
<td>9,86,400/2.80</td>
<td>8007/23.13</td>
<td>4139 kg/14.00</td>
</tr>
<tr>
<td>2000-2001</td>
<td>7,48,02,517/18.02</td>
<td>23.47</td>
<td>7,42,93,750/156.88</td>
<td>6,37,422/48.33</td>
<td>9,37,713/1.03</td>
<td>8617/23.91</td>
<td>35,676 kg/17.13</td>
</tr>
<tr>
<td>2001-2002</td>
<td>5,16,22,845/31.6</td>
<td>37.58</td>
<td>4,28,37,800/42.0</td>
<td>5,29,603/82.01</td>
<td>51,840/0.17</td>
<td>16,634/41.23</td>
<td>43,242 kg/23.87</td>
</tr>
<tr>
<td>2002-2003</td>
<td>3,60,99,670/22.16</td>
<td>35.04</td>
<td>7,97,09,129/208.48</td>
<td>6,07,901/106.08</td>
<td>2,33,388/1.46</td>
<td>11,381/30.75</td>
<td>32,667 kg/31.34</td>
</tr>
<tr>
<td>2003</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

20: syringes with needles; 21: suture needles, tubular hollow needles, needles for injection, hilerio-venus fistula needles; 22: catheters & the like; other needles; 22A: cardiac catheters; 23: blood transfusion apparatus (incl. bags and containers); 24: pacemakers; 25: artificial valves for heart.
Table 6.11 covers small items such as syringes, catheters and other implantable devices such as heart valves and pacemakers. It indicates that several crores of rupees worth of such items get imported every year. Note that in 2002-2003 Rs 200 crores worth of catheters were imported (Item 22), of which half comprised cardiac catheters (Item 22A). Similarly, several crores of rupees worth of pacemakers and heart valves are also being imported.
Table 6.12: Quantity (n-number & kg-kilograms) and value (rupees) of imports of medical devices

<table>
<thead>
<tr>
<th>Items/year</th>
<th>26</th>
<th>27</th>
<th>28</th>
<th>29</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987-1988</td>
<td>50/6.90</td>
<td>NA</td>
<td>NA</td>
<td>949 (n)/1.54</td>
<td>331 (n)/1.01</td>
</tr>
<tr>
<td>1988-1989</td>
<td>134/18.51</td>
<td>NA</td>
<td>NA</td>
<td>1054 (n)/0.97</td>
<td>2451 (n)/6.1</td>
</tr>
<tr>
<td>1989-1990</td>
<td>356/21.87</td>
<td>NA</td>
<td>NA</td>
<td>2664 (n)/2.33</td>
<td>2321 (n)/9.04</td>
</tr>
<tr>
<td>1990-1991</td>
<td>186/20.66</td>
<td>NA</td>
<td>NA</td>
<td>2265 (n)/2.51</td>
<td>1351 (n)/7.43</td>
</tr>
<tr>
<td>1991-1992</td>
<td>233/8.38</td>
<td>NA</td>
<td>21/0.36</td>
<td>2111 (n)/3.38</td>
<td>1078 (n)/4.00</td>
</tr>
<tr>
<td>1992-1993</td>
<td>311/18.65</td>
<td>NA</td>
<td>39/1.61</td>
<td>4500 (n)/2.46</td>
<td>1826 (n)/11.95</td>
</tr>
<tr>
<td>1993-1994</td>
<td>198/8.23</td>
<td>NA</td>
<td>235/1.37</td>
<td>950 (n)/1.80</td>
<td>1833 (n)/13.08</td>
</tr>
<tr>
<td>1994-1995</td>
<td>104/10.9</td>
<td>NA</td>
<td>69/3.15</td>
<td>3964 (n)/4.17</td>
<td>2505 (n)/23.8</td>
</tr>
<tr>
<td>1995-1996</td>
<td>401/27.34</td>
<td>23/0.89</td>
<td>NA</td>
<td>2759 (n)/2.31</td>
<td>22,50,77,600(Rs)</td>
</tr>
<tr>
<td>1996-1997</td>
<td>271/14.99</td>
<td>20/0.19</td>
<td>NA</td>
<td>49,575kg/7.38</td>
<td>83,725kg/34.57</td>
</tr>
<tr>
<td>1997-1998</td>
<td>531/17.56</td>
<td>9/1.55</td>
<td>NA</td>
<td>96,636kg/25.5</td>
<td>85,641kg/52.49</td>
</tr>
<tr>
<td>1998-1999</td>
<td>723/34.37</td>
<td>60/0.57</td>
<td>NA</td>
<td>78,219kg/20.59</td>
<td>97,219kg/63.52</td>
</tr>
<tr>
<td>1999-2000</td>
<td>483/29.70</td>
<td>53/0.63</td>
<td>NA</td>
<td>81,014kg/23.86</td>
<td>91,558kg/70.85</td>
</tr>
<tr>
<td>2000-2001</td>
<td>878/36.23</td>
<td>130/1.37</td>
<td>NA</td>
<td>2,54,121kg/23.73</td>
<td>1,74,350kg/93.39</td>
</tr>
<tr>
<td>2001-2002</td>
<td>2030/90.96</td>
<td>473/3.05</td>
<td>NA</td>
<td>1,38,950kg/28.46</td>
<td>1,80,084kg/132.54</td>
</tr>
<tr>
<td>2002-2003</td>
<td>1825/120.58</td>
<td>1364/5.06</td>
<td>NA</td>
<td>2,08,303kg/27.35</td>
<td>1,36,254kg/125.78</td>
</tr>
</tbody>
</table>

26: linear ultrasound scanner; 27: echocardiographs; 28: ultrasonographic apparatus; 29: dental drills and others for dental purposes. 30: equipment and appliances for ophthalmic purposes - lasers, surgical instruments, etc.
Table 6.12 indicates that around Rs 100 crores worth of ultrasound scanners and lasers, etc were imported in 2002-03. In that year we find that Rs 37 crore worth of ultrasound scanners was produced in the country (Table 6.3), whereas Rs 120 crores was imported (around four times more).
Thus the above figures give an idea of the variety and magnitude of medical equipment and devices that are imported every year. It is a wide spectrum, ranging from import of the simplest to the so-called high-tech; from stethoscopes, thermometers, blood pressure instruments, needles, syringes, catheters, etc., to stents, heart valves, etc., to the most sophisticated digital x-rays, ultrasonography equipment such as Doppler and echocardiographs and other imaging equipment such as CT-scanners, to linear accelerators for cancer therapy, etc..

In this context it is important to mention that: the Indian syringes and needles manufacturing industry is reported to be facing stiff competition since 2002 from cheap imports from China and Korea. The market for Indian products was growing in the previous years due to certain government incentives for brand promotion abroad. However, these incentives were taken back in 2001, leading to adverse impact on the local manufacturers. According to the All India Syringes and Needles Manufacturers' Association, due to adverse government policies the import of finished syringes and needles had become very cheap; as a result most of the manufacturers had started trading in cheap imported needles and syringes, repackaging and selling them under any name (Express Healthcare Management June 30 2002; Business Line May 22 2002). The import of syringes with needles over these years is as shown in the following Table 6.13

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2000-01</td>
<td>18.02</td>
<td>31.59</td>
<td>22.15</td>
<td>17.25</td>
<td>38.42</td>
<td>81.72</td>
<td>138.43</td>
</tr>
</tbody>
</table>

As mentioned earlier, import of syringes (with needles) increased by 122.7 % between 2004 and 2005 (Rs 17.25 crores to Rs 38.42 crores); and by 69 % between 2006 and 2007 (Rs 81.72 crores to Rs 138.43 crores). The import of other kinds of needles also show an increase (Table 6.10)
6.1.4

C. Import and sales of refurbished equipment

There is import and sale of refurbished equipment, especially of CT-scanners and MRI equipment. That it does take place is acknowledged by the official machinery, as well as is evident from talks with some agents/dealers. However, there are no estimates as to what proportion of the imported equipment is reconditioned. Current regulations permit import of used or refurbished medical equipment provided it has a minimum residual life of five years. Some trade associations, such as the IEEMA (Indian Electrical and Electronic Equipment Manufacturers' Association) and users feel that it should be banned to protect indigenous users, in view of its obsolescence, non-availability of spares, accessories and upgrades, after-sales support and warranty problems (Government of India 1992). Not to mention the importance of safety, proper calibration and reliability, etc., since the measurements made will form the basis for therapeutic decisions. Whereas, some sections of the industry feel that there should be no ban on import of reconditioned equipment. That it is as much the responsibility of the buyer to ensure that they buy equipment from reputed and reliable dealers, who have adequate back-up support (interview with Head-CII Medical Equipment Division, 2001). After all the advantages that could be gained from buying equipment at reduced rates need to be weighed against not having it at all (this would be the case if the cost was prohibitively high).

6.1.4

D. Agencies for Import/Marketing of medical equipment

Imported medical electronic equipment is supplied through an Indian agent representing a foreign manufacturer. A large number of firms, big and small, supply medically related products and devices. Well-known multinationals such as Philips Medical Systems, General Electric, Siemens, Hitachi, and other foreign manufacturers either have their agents or subsidiaries here, who undertake procurement, installation, maintenance, etc. Indian big business too is into procurement of imported equipment, either singly or through collaborations with the multinationals/foreign manufacturers. Examples are Blue Star, Wipro-GE Medical Systems, HCL-Picker, Wipro-Biomed, Larsen & Toubro Medical Systems, etc. At present the local agent does not have to meet any eligibility criteria except a letter from the foreign company nominating him/her as the sole agent and a certification from hospitals that after-sales-service arrangements are available. In actual practice, majority of the foreign principals are interested in sales and not in a long-term association. This was thought to be related to the fact that the sales in India, of several reputed foreign manufacturers, represented a fraction of their worldwide sales (Government of India 1992). Majority of the local agents enter into this business primarily for commission on the purchase orders, with limited ability to meet the installation, maintenance and service obligations.
The marketing of indigenously manufactured products is taken up by the respective manufacturers either through direct sales or through local dealers/branches, without the necessary infrastructure for product support. It appears that problems such as poor after-sales service, inadequate expertise, non-availability of spare parts, etc., exist for new equipment too, as they exist for refurbished equipment. A large number of the local dealers lack adequate manpower and expertise to maintain and service the imported equipment. In several cases the local agents have neither been trained by the foreign principals, not do they have necessary documentation. There are delays in installation and commissioning of equipment. Equipment is dispatched without the accessories, and so on. In absence of any regulatory mechanism, there remain opportunities for substandard or even obsolete equipment to be imported into the country. Perusal of the minutes of a healthcare industry committee meeting of the Indian Radiology and Imaging Association, and their Trade Grievances Committee, gives an idea of the problems faced by the equipment users with the respective companies. For instance there were several complaints against such companies as Wipro-GE, Philips, Blue Star, and JDS Medison regarding issues such as AMC, servicing problems, for not supplying product promised during demonstration (Minutes of the Healthcare Industry Committee Meeting of IRIA July 14 2007, accessed from www.iria.in/pdfs/oct04.pdf).

6.15 Cost of medical equipment

We find that many of the advanced high-technology equipment are very exorbitantly priced.

- CT-scanners and MRI equipment cost upto Rs 1 crore or more. In 2002 Siemens installed a 16-slice spiral CT scanner for Rs 5 crore. In addition there are installation charges and construction of special buildings to house the MRI/CT/PET scanner.
- Cardiac catheterization labs (cath labs) also cost upto Rs 1 crore or more. Siemens installed a flat-panel detector cardiac cath lab in a Hyderabad-based hospital at a cost of Rs 3.5 crores.
- So are the radiotherapy equipment such as linear accelerators used in cancer therapy.
- The other x-ray based equipment such as the C-arm image intensifier, and laparoscopic unit, and photo-coagulation unit used in ophthalmology can each cost about Rs 15 lakhs. Siemens installed a mobile C-arm image intensifier at a hospital in Nagercoil (Tamil Nadu) for Rs 85 lakhs.
- The relatively simpler ultrasound based whole body colour doppler system can cost upto Rs 50 lakhs.

Prices of medical equipment are negotiable, and therefore it is difficult to ascertain the actual price that a hospital eventually pays. According to the Director of a large Delhi-based private hospital, while ‘manufacturers may cut corners while selling the machine, they make a killing in the AMC (annual maintenance contract’. In case of expensive equipment, sellers and buyers enter into arrangements such as leasing by the manufacturer to hospitals with large output. The hospital also has to purchase the
accessories and required reagents and chemicals from the same manufacturer. In case of equipment like automated laboratory analyzers (used in biochemical analysis of body fluids), the users do not know what exactly happens inside the machine, as everything including reagents, is patented (Interview, Director, St Stephens’ Hospital, Delhi, March 2004).

Some indicative prices are as shown below:

**X-ray systems**
- 300 mA machine: Rs 8 lakhs
- 500 mA machine: Rs 15 lakhs
- Portable/mobile machine: Rs 2 lakhs
- Digital machines: Rs 1.5-2.5 crore
- GE’s Tejas range of digital machines: Rs 60 lakhs

**Ultrasound scanners**
- Portable ultrasound machine: Rs 5 lakhs
- Black and white Doppler machine: Rs 15 lakhs
- Colour Doppler: Rs 20-50 lakhs

**CT Scanners**
- CT Scanner: Rs 1 crore
- Spiral CT Scanner: Rs 2-4 crore

**MRI Systems:** a few crore rupees; upto Rs 5 crore

**Gamma-camera:** Rs 1-1.5 crore

**Linear Accelerator:** Rs 4 crores

**Cardiac Catheterization Lab (Cath Lab):** Rs 4 crores

**Angiography Lab:** Rs 3 crores

**Endoscopy Equipment:** Rs 50 lakhs

**Laser surgery equipment:** Rs 70 lakhs

*Given these exorbitant costs it is not surprising that the medical equipment companies and suppliers themselves also arrange for leasing medical equipment, or financing their acquisition. Several banks and state financial institutions now offer loans to doctors for purchase of equipment. Such as HDFC Bank, Bank of India, Bank of Baroda, Corporation Bank, Uttar Pradesh Financial Corporation (UPFC), and Karnataka Finance Corporation. For instance: ICICI Bank offers loans that are ‘quick as a scan’ for a range of medical equipment, to self-employed doctors, diagnostic centers, nursing homes, hospitals, for purchase of new and refurbished equipment, takeover of existing loans, and top up. Such financing was subject to approved brands as per their policy*
(www.sme.icicibank.com/Business_MedicalLoans.aspx?pid=U©I·. accessed on 8 October 2007). (see Annexure I for some advertisements). Similarly, State Bank of India (SBI) and Siemens had reached an understanding for financing purchasing of medical equipment sold by Siemens. SBI had introduced the Doctor Plus scheme for doctors with clinics, nursing homes, medium size and corporate hospitals, whereby they could avail of loans for amount varying from Rs 20 lakhs to Rs 5 crore for purchase of equipment on easy terms and conditions (Business Line March 4 2004).

6.1.6 Regulations for Medical Equipment and Devices

Despite consistent recommendations by several government committees regarding standards for medical technology, we find that India still does not have a comprehensive set of rules for manufacture and marketing of medical equipment and devices, for new or existing technologies, with the exception of x-ray equipment. Although there are some standards laid down by Bureau of Indian Standards (BIS) for some Medical Equipment & Systems, according to industry itself in absence of mandatory regulations they are hardly adhered to. There is no inventory of the various medical devices and equipment that are available in the market, and no quality standards have been set so far.

Diagnostic x-ray equipment in India is regulated by the Atomic Energy Regulatory Board. The Atomic Energy Regulatory Board is the Competent Authority in the country for enforcing rules and regulations in respect of safe use of ionizing radiation. The primary responsibilities of the AERB in this regard are: Licensing, Radiological Surveillance and Safety Review of installations using Radiation sources in Medicine, Industry & Research; and Enforcement of Rules & Notifications on Radiological Safety promulgated under the Atomic Energy Act. 1962. AERB has published a Safety Code on Medical Diagnostic x-ray equipment and installation. Manufacturers of x-ray equipment are required to get their equipment type approved by the AERB; and suppliers of imported x-ray equipment are required to get a No Objection Certificate (NOC) from the AERB before marketing their equipment. AERB may issue type approval/NOC only if the x-ray unit satisfies the safety specifications prescribed by AERB. The manufacturers have to make available to the user detailed procedures for quality assurance tests, exposure charts, operating manuals and copies of AERB safety documents issued by it from time to time; and the manufacturer and supplier have to provide appropriate servicing and maintenance facilities during the useful lifetime of the x-ray machine. In case of CT the manufacturer has to provide the required phantoms for dosimetry and image quality checks. Hospitals and other buyers should buy only x-ray units type approved by the AERB, and ensure that the equipment satisfies all the safety requirements specified by it (www.aerb.gov.in). Medical x-ray installations are subjected to periodic inspection by authorized personnel; and non-compliance could result in closure of the defaulting x-ray installations.
As of 2002 AERB had certified nearly 520 combinations of x-ray tubes, generators and couches manufactured by 19 companies. In 2002 during surprise inspections by AERB it was found that four companies located in four locations in the country were "manufacturing" (emphasis in original) x-ray units and selling them without getting their equipment type approved by the AERB. AERB issued show cause notices to them; and suspended the marketing by one company of medical x-ray machines in the country (www.aerb.gov.in/prsrel/prsrel.asp?Mode=Prev&Istart=29, accessed on 13 September 2007).

Leading companies in the field feel that accreditation and standardization are extremely necessary to monitor the quality of the mushrooming of small time equipment manufacturers in India. According to a Vice President of L&T, who was also head of the CII-Medical Equipment Division, "Anybody can start manufacturing equipment, like any other small business, without any permission or license. By the same norm, the quality of equipment sold by the MNCs needs to be filtered also. India should not become a dumping ground for other countries' (Express Healthcare Management, special issue on medical technology, 1-15 November 2002).

In October 2005 ten medical devices (such as cardiac stents, catheters, IOLs, heart valves, IV cannulae, scalp vein sets, orthopedic implants) were brought under the purview of the Drug Control Authority, whereby all manufacturers and importers of these devices are required to apply for licenses and to file product registrations with the Drug Controller General of India (DGCI). However, at that time there was opposition to its implementation from the industry. According to the CII-Medical Equipment Division the guidelines might create obstacles to import of medical devices (Chronicle PharmaBiz May 4 2006. In mid-2007 the government announced that it planned to bring a bill to regulate the manufacture of medical devices in the country.

This newfound interest among policy makers and the industry for regulating medical equipment and devices needs to be viewed in the scenario of: increasing corporate and multinational interest in the healthcare sector — in both provision of healthcare services and in supply of medical technology; the increasing interest in medical tourism; the interest of foreign manufacturers to shift certain aspects of manufacturing to India; and lastly, the perceived requirement for accreditation of hospitals by insurance providers.
Significant Findings and Issues pertaining to Medical equipment production and imports

The following issues emerge from the data so far regarding manufacture and import of medical technology:

(i) There is indigenous manufacturing capacity for a range of medical equipment, appliances and devices in the country, from low technology to the medium technology, developed in the early years of planning and support to local industry to build self-reliance and reduce imports.

(ii) To a large extent production by this sector has been meeting local demands for routine hospital supplies, furniture, instruments and equipment.

(iii) At the same time there have also been imports of electro-medical equipment and appliances.

(iv) Since the 1990s the manufacturing base has been adversely affected by liberalized imports of all kinds of medical technology, ranging from low to high technology equipment and devices. This includes items from needles and syringes, to catheters, to implantable cardiac devices, to digital x-rays and ultrasound equipment, to linear accelerators for cancer therapy, and multi-slice CT scanners.

(v) There has been a steady increase in such imports since the mid-1990s. Despite several recommendations by government committees to review the fiscal and import policy, the government has not taken steps to support local manufacturing, and to reduce import of finished medical equipment.

(vi) The period of growth of imports has seen also the entry of several local corporate entities into the medical equipment business through joint ventures with multinational manufacturers, as well as entry of subsidiaries of multinationals.

(vii) Since early 2000 local, multinational and other foreign manufacturers have begun setting up assembly, manufacturing operations in India through joint ventures, largely as part of contract manufacturing/outsourcing arrangements, or as a base for the Indian sub-continent and Asian region.

(viii) The operations of the multinational manufacturers GE, Philips and Siemens are particularly prominent.

(ix) Indian manufacturers are now lobbying for support to local manufacturing through concessions and setting up of SEZs, as in China. Indian industry now wants to produce medical equipment and devices for international markets.

(x) While there has been a lot of activity by the industry since the 1990s in terms of increased imports and interest in manufacturing certain kinds of medical equipment, the government has still not devised a system of regulations and standards for manufacture and import. There is also no initiative by the health ministry to monitor and regulate such large-scale diffusion of medical equipment in the country, and to lay down guidelines and standards for the same.
Lastly, we see that much of the high technology equipment and devices are exorbitantly priced, the imaging equipment costing no less than Rs 1 crore.

In the following section we look at the activities of the medical equipment industry other than manufacturing and trading, at how the industry is promoting 'consumerism' of technologies in the name of providing 'quality healthcare'.

6.1.7 Activities of the Industry other than manufacturing and/or import

As has been done in the case of the activities of the global medical equipment industry (sec 5.II.4) this part looks at some of the direct market-related activities, as well as promotional activities of the medical technology industry in India.

Medical equipment companies are expecting to benefit from the current expansion in the healthcare sector. The multinational manufacturers of medical imaging equipment, Siemens, GE, Philips and Kodak have started networking with healthcare companies, which were planning to expand. According to the Vice President, Siemens Medical Solutions, 'The granting of industry status and opening up of medical insurance business is just the beginning. The greater picture will emerge later since the government is taking special efforts to promote India as a global healthcare destination. There is enough room for equipment manufacturers like us to grow' (Economic Times 28 January 2004). Other foreign manufacturers are also setting up marketing operations in India, and organizing and promoting sales and marketing activities.

Marketing is accorded high priority by the multinational/its subsidiary and the Indian big companies that supply imported equipment. Repeated and personal interactions with doctors are given importance. Some of them claim to offer not medical products, but 'healthcare solutions'. Wipro-GE had more than 100 marketing personnel in 23 states and spent nearly Rs 1 crore a year in training dealers and sales people. The stress was on 'effective sales presentations, and successful penetration of the market', and employing 'marketing professionals/products sales specialists to work closely with physicians to provide quality time-tested products and value added services to patients and to develop lasting relationships'.

Many of these suppliers also offer related services, such as medical equipment consultancy too, which covers activities such as planning, selection, procurement, installation (which may include remodelling, power-supply, temperature and dust control), upgradation, etc, and training and upgrading of doctors and assistants, and financing as well. Such as L & T Finance, Wipro Finance, and so on, which offer financing for hospital projects and purchase of equipment. Other finance companies use avenues like tapping doctors who have already availed of car financing from them, for financing technological
upgradation, etc. Procurement and supply of equipment is also undertaken by hospital consultancy organisations, like Indian Hospitals Corporation (of the Apollo group), Usha-Drager, L&T Medical Systems, etc.

According to officials of Siemens Medical Solutions Division, India and China were two main markets that Siemens AG was focusing on. It planned to introduce one or two products from the medical division every year (Business Line ). The division launched a multi-slice spiral CT scanner in 2002, Somatom Sensation 16. Priced at Rs 5 crore each, the company aimed to sell 10 units in the first year. According to the company officials, fifty-one per cent of the price constituted the import duty, and hoped that the component would decrease with rationalisation of the duty structure. The company has extended its marketing network for medical equipment to district levels. Through a gradual effort, Siemens' countrywide network had been put in place by the end of September 2002, and was extending its marketing network up to the district level. The company has begun to market six ultrasound radiology equipment targeted at individual doctors, small clinics and hospitals throughout the length and breadth of the country. Siemens Ltd had also tied up with three banks to offer financial solutions to customers for medical equipment (Business Line February 8 2003).

The Siemens Medical Solutions sales force will also sell medical imaging systems from Kodak's Health Imaging Group, according to a new three-year global agreement, itself an expansion of previous regional agreements between the two companies (Business Line August 8 2003). Under the worldwide original equipment manufacturer agreement (OEM), Siemens Medical Solutions will begin selling Kodak computed radiography and digital laser printing systems directly to Siemens' customers. Kodak's previous contracts established OEM sales agreements with Siemens in the US and Europe, the new agreement between Eastman Kodak company and Siemens Medical Solutions being worldwide in scope. (OEMs serve as an important source for sales of equipment from Kodak's Health Imaging Group. When Siemens sells a CT or an MRI unit to a customer, s/he may also want to purchase a laser imaging or computed radiography system, which Siemens does not manufacture. Then, Siemens would order the system from Kodak to meet the customer's specific requirements and fulfill the order. Siemens has already begun selling Kodak medical imaging products in India, among other countries.)

For Eastman Kodak, globally the health imaging division, which had a turnover of $2.3 billion in 2002, had been identified as a "growth engine" for the company, according to its officials. In addition to India, China and Eastern Europe were other significant markets for the division (Business Line January 11 2003). Eastman Kodak's Health Imaging Division was focusing on after-sales support and on growing its network of service partners. It planned to focus its marketing efforts in India on educational activities for health imaging professionals. The Kodak Radiology Education Services, a joint body of the Health
- Imaging Division of Kodak India Limited and a panel of expert radiologists in the country, was facilitating this process, by conducting workshops on radiology and imaging for radiologists and radiology students not just in India, but in neighbouring countries as well. For instance: A workshop on radiology and imaging was organized by Kodak Radiology Education Services in Amritsar in December 2001 (The Tribune December 12 2001). Other initiatives of this unit included the publication of The Radiograph, a magazine for the radiology industry, and orientation programmes for radiographers (Business Line January 11 2003).

- Having partnered a tele-medicine project in Tamil Nadu in 2004-2005, Philips India planned to use this avenue of healthcare delivery to become popular as a local healthcare company, and to push healthcare from accounting for about 9 percent of its local sales, up to about 14 per cent in about five to seven years (Business Line July 7 2005). And the company had a three-pronged strategy to do this. While it will continue to bring in hi-performance medical equipment, the company was now looking at the mid-tier segment as well. It planned to bring medical equipment at affordable costs into the country. That would not, however, translate into the manufacture of the equipment in India. The feasibility of such an initiative was still being looked at. Meanwhile, Philips planned to import its equipment from the joint-venture company that it has in China, where it partners with a local company. The third avenue to grow in the local healthcare market was through tele-medicine and the company recently partnered with the Apollo Hospitals group, the Indian Space Research Organisation and the Dhan Foundation to establish its first project in Tamil Nadu. Successful implementation of the project would result in replicating the model in other parts of the country, besides facilitating similar ventures in China (see later section on Tele-medicine). Given its significant shares in the Indian market, Philips Medical Systems, Asia-Pacific, was planning to become a HLT company (Healthcare Lifestyle Technology), especially in India.

- THE $400 million Swedish medical equipment company Elekta was focusing on India, Bangladesh and Sri Lanka for marketing its modern radiotherapy and radio surgery units (Business Line October 14 2004). According to the Managing Director of Elekta Instrument (India) Pvt Ltd, radiotherapy technology had undergone a sea change in the last couple of decades; the nations in the subcontinent needed to catch up with the latest to provide safer and precise radiation therapy and radio surgery. The Rs 30-crore Elekta's Indian arm hoped to double its turnover in 2004. Based on its book orders, it expected an exponential growth in equipment sales in the region of 100 per cent in the next few years. According to this company's estimates, India alone would need roughly 500 linear accelerators as the country's health care system phased out 250 odd cobalt units. The company had taken up a "customisation" of radiation dose protocol project for the subcontinent at Amrita Institute of Medical Sciences at Kochi, which entailed modification of the x-ray beam quality and intensity from intensity modulated radio therapy units suitable for the people of the continent (Business Line October 14 2004).
Nidek, a leading Japanese company in manufacture of equipment and products for ophthalmic purposes, such as ophthalmic lasers, phacoemulsification equipment, equipment for diagnosis, and IOLs, was planning to strengthen its business in India; and to grow especially in the IOLs market. It was already selling phacoemulsification equipment throughout the country through its distribution partner in Delhi (Chronicle Pharmabiz September 22 2005).

- Advanced Medical Optics India Pvt. Ltd, the Indian arm of the US-based global ophthalmic medical device leader, Advanced Medical Optics Inc. (AMO), was expanding its market presence in India by launching new products and by setting up an extensive marketing and sales network. Advanced Medical Optics India Pvt. Ltd would directly market in India AMO products such as their range of intraocular lenses (IOLs), laser vision correction systems, contact lens care solution, and others. So far AMO products were marketed in India through Allergan, which had dissociated from AMO. AMO was planning an investment of over US$10 million in India, mainly to set up direct sales and marketing teams, education programmes for ophthalmologists and eye care specialists, with product launches in India. The current immediate plan of AMO was to expand its sales and marketing strength in India. AMO India planned to focus on a direct sales model and was investing heavily in the recruitment and training of the Indian team, besides offering training to their customers (Chronicle Pharmabiz September 8 2005)

V Lobbying and policy influencing by industry

Manufacturers of medical equipment and devices are calling for close synergy between the industry and the government. According to industry associations and representatives, with sufficient government support an organized Indian medical devices and disposables industry could supply 50 per cent of the domestic market, as well as cater to international markets (Pharmabiz Hospital Review 31 May 2004).

The industry feels that the government should: grant infrastructure industry status to healthcare as it is a key driver for the growth and development of the country; rationalize import duties across all medical equipment at a standard rate of 5 per cent bringing it in line with other ASEAN countries and doing away with multiple rates for different equipment; encourage indigenous manufacture of medical equipment to reduce the end cost of the product and thereby benefit the patient in form of lower cost of treatment, by allowing import of raw materials, components and spares for manufacturing of medical equipments at zero per cent import duty; service tax should to be completely removed on medical equipment, or reduced to 4 per cent lowering the burden on the patients (Business Line February 28 2008). A section of medical equipment manufacturers feel there is a need to encourage local manufacturing of such equipment. One way to achieve this would be to set up a special economic zone (SEZ) in the country for medical equipment manufacturing, according to industry representatives.
As many as four major industry associations have been formed within the past decade to achieve this synergy. Given below are some industry associations that have been formed in recent years in the 'healthcare industry'.

1. The Indian HealthCare Federation

In the mid-1990s owners of the erstwhile leading corporate hospitals (such as Apollo Hospitals, CDR Hospitals Hyderabad), manufacturers of advanced medical equipment, like Philips Medical Systems-India, and the Confederation of Indian Industry (CII) started working together for the establishment of an active industry association, an 'organized private sector' in India, for provision of healthcare, as against the prevailing unorganized, fragmented and unregulated sector comprising largely of small hospitals and nursing homes. These efforts culminated in the formation of the Indian Healthcare Federation, an association of big private hospitals, diagnostic centers, medical equipment manufacturers and pharmaceutical companies. According to the IHF an active industry association could play an important role in the development of the healthcare sector. 'To boost the overall growth and development of healthcare in India, the sector needs a vibrant industry association, which will have to present a united front to key stakeholders, such as government insurers, policy institutions and industry players' (www.indianhealthcarefederation.org). In the overall objective of 'globalisation of Indian healthcare in the development plan of the nation', the priority areas for the IHF were:

- driving the creation and adoption of accreditation standards for healthcare infrastructure and delivery.
- Working with insurers to accelerate the penetration of health insurance
- Collaborate with the government on policy issues.

It planned to have a full-time team of professionals to be effective in its activities.

The IHF commissioned a report on healthcare market in India, prepared for it by CII-McKinsey and Company, and released in October 2002. The preparation of the Report was supported by several corporate hospitals: Escorts, Apollo, Max, Wockhardt, Fortis, Lilavati and Mallya Hospitals, and the equipment multinationals: Siemens, Wipro-GE Medical Systems, and Larsen & Toubro (medical equipment and systems division). According to this Report healthcare infrastructure in India is underdeveloped; particularly poor in case of tertiary beds and specialist physicians. This Report forecasts a shift over the ten year-period from 2002-2012, from acute infectious to life-style diseases (such as cardiac diseases and cancer), and hence a huge increase in demand for healthcare infrastructure. The Report is meant to provide a roadmap for the creation of this infrastructure by the organised private players, in a viable and cost-efficient manner. They need to plan for this increased demand for high-quality,
specialized, tertiary care. The Report concludes with clear recommendations for industry and government on how to increase levels of investment in the sector and create opportunities for public-private partnerships in healthcare. If the investments are made by the organized private providers (corporate and charitable, excluding small hospitals and private nursing homes), then they could increase their share significantly in healthcare delivery. The Report recommends that concessions from government on land and equipment could improve economics of tertiary care facilities - concessions such as reduction in cost of equipment, for say cardiac care units, through purchasing and supply chain management and elimination of superfluous equipment (The CII-IHF McKinsey HealthCare Study, 2002). The IHF and the CII National Committee Healthcare jointly prepared and handed over a list of 50 hospitals spread across the country to the Indian Government as potential centers for medical tourism. The government had requested the list, and was to publicize it internationally to boost health tourism in the country (Chronicle Pharmabiz November 25 2004).

2. CII Medical Equipment Division

The CII Medical Equipment Division, formed in the mid-1990s, is a national industry forum for representing the interests of the medical equipment manufacturers in the country. It consists largely of the leading corporate companies/subsidiaries of multinationals in India engaged in manufacture and/or import of sophisticated medical equipment, either alone or as joint ventures with established global manufacturers. The division meets quarterly every year to discuss upon the vital issues of the medical equipment industry. The division provides recommendation to the Government not only on the custom and excise tariff duty structure but also on regulatory and other policy related matters. Focus areas of the Committee are: Value Added Tax: Reduction of VAT Rates for the medical equipment devices from 12.5% to 4%; Medical Device Regulation: Recommendation has been provided to the Government for regulating the standards for the medical devices; and Duty Tariff Recommendation for Medical Equipment: The division provides the pre and the post budget duty tariff recommendation for the medical equipment industry.

Some of the members of the Division were:

Blue Star Limited which was importing diagnostic imaging and other systems;
GE-Elpro Medical Systems, a joint venture of GE Medical Systems (USA) and Elpro of Pune, which was into manufacturing X-ray systems of GE as well as importing;
Philips Medical Systems India
Siemens Ltd, which were into importing sophisticated imaging equipment; Siemens also manufactures x-ray systems;
Torrent Pharmaceuticals Ltd., which was manufacturing ultrasound systems and import; TransAsia BioMedicaiis Ltd, which is reported to be the only Indian manufacturer of automated biochemistry and haemotology analysers; it also imports these from Japan; Wipro-Biomed, business unit of Wipro representing various international manufacturers, and was importing a range of equipment for cardiology, patient monitoring, laparoscopy, endoscopy, orthopaedics, neurosurgery and laboratory diagnostic systems; Larsen and Toubro Ltd., which has a technical collaboration with Shimadzu Corporation, Japan, and some European manufacturers to manufacture their equipment; also manufactures own indigenously designed products; also represents for sales and service some foreign manufacturers for India and Nepal; and Wipro-GE Medical Systems, a joint venture between GE Medical Systems, USA and Wipro, India. It is reported to be the largest medical imaging equipment provider and manufacturer in South Asia. (Confederation of Indian Industry 1997).

The stated aim of the medical equipment industry was 'to carve a role for itself in the improvement and expansion of the healthcare system, to work towards better equipping government health care system' (Confederation of Indian Industry 1997). It began taking up issues such as making the Indian healthcare industry more competitive and vibrant, formulation of regulations regarding use of medical equipment, modifying the list of life-saving equipment, and so on. The industry was of the view that the government should increase the health sector allocation. The passing of the Insurance Bill was viewed positively by the industry, as it expected a growth in the healthcare sector, and hence an increase in the demand for medical technology.

It associates with the medical profession by regularly organising and sponsoring exhibitions at medical seminars and conferences, by also organising and sponsoring seminars, symposia, CME programmes, etc., interacting with the various associations in the medical field, and creating awareness through articles in various medical journals. They lobby with the government, put out information to create awareness, and sponsor initiatives, advertise on behalf of their members' common interests (CII Medical Equipment Division undated document). For example: CII helps organize training sessions in radiology at the sidelines of the IRIA Annual Conferences (CII-IRIA College of Radiology). It organized the MEDEQUIP 2006 in Tamil Nadu, an exposition of medical equipment, along with a conference on excellence in hospital management at the exposition. Since 2003 CII has been organizing the India Health Summit annually in Delhi. The Summit in 2004 was organized in association with the Asian Hospital Federation and the International Health Summit Group USA, on 'Emerging Healthcare opportunities in India. This was attended by over 300 CEOs from India and from UK, USA, ASEAN and
the Middle East countries. The fourth one in November 2007 was inaugurated by the Union Health Minister, and had extensive participation by state ministers and industry leaders.

The Confederation of Indian Industry is urging for industry participation in formulation and passing of the Clinical Establishments (Registration and Regulation) Bill 2007\(^2\) (Business Line January 5 2008). According to CII, it was necessary to conduct wide ranging deliberations with all stakeholders including industry, professionals, Quality Council of India, and medical bodies before passing the Bill. It said the basic foundation and framework such as setting of minimum acceptable standards of quality be first put in place and consensus reached before the Bill is passed. According to CII, the proposed composition of the National Council must include representation from the industry since the private sector is one of the largest stakeholders in providing healthcare in the country. The Bill suggests a “consultative process for determining standards and for classification of clinical establishments,” making it pertinent to involve the private sector in these consultations. It also pointed out that some of the provisions of the Bill needed to be reconsidered since they would augment the scope for increased paperwork, bureaucracy and delays. It also recommended reconsideration of provisions relating to power to enter for inspection or inquiry. CII suggested that the power of the authorities to issue such directions, including furnishing returns, statistics and other information needed reconsideration since many of the statistics and data, which the authorities might seek, could be privileged and confidential information and might not be divulged for business reasons being covered under confidentiality clause(s) and code of conduct regulations of companies/corporations in healthcare.

The Confederation of Indian Industry (CII) was also mediating between private hospital chains and the Union government over the fresh tariffs for the Central Government Health Scheme (CGHS) and the Ex-Servicemen Contributory Health Scheme (ECHS) for retired defence personnel. After the government slashed the rates it pays private hospitals for treating beneficiaries of these two key schemes, specialty and super-specialty hospitals like Apollo had begun refusing CGHS patients (The Financial Express March 30 2008). Apollo, Calcutta Medical Research Institute, Yashoda and Global had not signed a fresh memorandum of understanding with the CGHS over the revised tariffs that were announced in October 2007.

3. Association of Medical Devices and Suppliers of India

In mid-2004 the Association of Medical Devices and Suppliers of India (AMDSI) was formed to represent suppliers and manufacturers of medical technology. According to the President of the Association, the CII wing of medical equipment manufacturers had the ‘medical technology majors’.

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\(^2\) The Bill aims to provide for the registration and regulation of clinical establishments in the country, and to prescribe minimum standards of facilities and services which may be provided by them.
AMDSI has been formed mainly to represent the interests of the distributors and importers, and the small and upcoming medical technology companies. He points out that 'while some multinational medical technology companies have set-up joint ventures and some have direct operations, predominantly all are running only trading operations in India, and prefer tapping the market through Indian companies. There are very few manufacturing units in India set up by foreign or Indian companies to manufacture diagnostic equipment. Indigenous production is almost non-existent and is nowhere on the horizon. We are importing over . . . 90 per cent of the instruments' (www.expresspharmapulse.com/20040909/healthnews03.shtml; Business Line September 3 2006).

According to this association, "No progress has been achieved over the last 20 years in indigenisation of medical technology initiatives in India". The lack of sops or tax holidays was a deterrent to companies that wished to set up manufacturing units in India; the anomaly in import duty tax made components costlier than finished products. This forced companies to import equipment as opposed to components. In view of all this the AMDSI had submitted a memorandum to the Ministry of Health to consider setting up a Special Economic Zone (SEZ) in Chennai to encourage indigenous manufacturing, and R & D. An SEZ will help reduce dependence of imports (Business Line August 5 2006). Manufacturing equipment in India could cut costs by up to 50 per cent, and result in wider reach of facilities and cheaper cost of medical testing. This Association wants the government to support the Medical Technology industry as it did the pharma sector when it was in its infancy fifteen years ago; to extend support for manufacturing. With sufficient support the industry can become 'a huge foreign exchange earner' by exporting the indigenously manufactured products, as well as services such as providing biomedical engineers, software, outsourcing of equipment care, etc. It recommends that the Government should promote setting up medical technology parks in the country and give income tax and other benefits so that Indian companies can start manufacturing. In addition, the AMDSI also recommends that the government should also make it mandatory for MNCs to set up manufacturing units in the country rather than just engage in trading in India (Chronicle Pharmabiz February 15 2007).

4. FICCI (Federation of Indian Chambers of Commerce and Industry) Medical Electronics Forum

The FICCI (Federation of Indian Chambers of Commerce and Industry) Medical Electronics Forum was launched in October 2007, with the following leading national and multinational companies as core group members – BPL, WIPRO-GE Medical Systems India, Philips, Texas Instruments, Medtronic, Johnson and Johnson, GE, Boston Scientific, and Abbott Vascular (www.ficccimef.biz/). The previous year, in October 2006, FICCI had organized an international conference in Delhi, on Medical Electronics to generate awareness about advancements in the area, to explore business opportunities and opportunities for joint research in the area, to share information about technical and policy issues and rules and
regulations, to highlight the advantages in India as a healthcare destination. This conference focused on
the imaging technologies, on technologies for cardiology, on telemedicine, on patient monitoring systems
and critical care systems. It was supported by the Ministry of Health & Family Welfare, Government of
India and the WHO, and brought together academics in these areas, doctors and diagnostic professionals,
key decision makers from government, directors and key decision makers from hospitals and diagnostic
laboratories, and those from frontline companies, and professionals and consultants from biomedical
electronics, telecommunications, precision engineering, involved in development, marketing and
operation. Texas Instruments, Philips and Siemens were key partners and sponsors.

Publicity to equipment installation and product launches

The multinationals and their corporate partners in India give wide publicity each time any of their
'advanced equipment'/breakthrough technology'/revolutionary technology' is installed in any healthcare
facility in the country. For instance: GE announced prominently the installation of its light-speed volume
CT scanner (VCT) at Jaslok Hospital in Mumbai in October 2005, and in Batra Hospital in New Delhi in
March 2006 (at a cost of Rs 5.5 crore) (Business Line March 14 2006). It also announced the installation
of its Positron Emission Tomography (PET) scanner with a 16-slice CT scanner, as 'the first such system
in India', at Tata Memorial Hospital in Mumbai in December 2004. Similarly, the Medical Systems
Division of Philips Electronics India, announced the installation of its 64-slice CT scanner - 'North
India's first' - at Max Devi Devki Heart and Vascular Institute, Delhi, in September 2005. The Finance
Minister and Health Minister of Delhi State inaugurated this facility. Vijaya Diagnostics Hyderabad also
announced the launch of its PET imaging system as the 'first of its kind in south India' (Business Line
October 14 2003).

Alternatively, the acquisition of high-tech equipment is prominently announced by the concerned
hospital/diagnostic center. Such as the acquisition of, say, the latest cath lab, or scanner, or equipment for
minimally invasive surgery, and so on. For instance: Trinity Hospital, Bangalore, announced the
acquisition of a cardiac CT scanning equipment in 2006 (Business Line March 31 2006); Vita
Diagnostics, Kochi (Kerala) announced the installation of a 1.5& HDMR (high density MR equipment),
as the only centre in Kerala to have this facility (Business Line December 2 2006); Sunrise Hospital,
Kochi, announced acquisition of a light speed volume CT (Business Line October 6 2005). The
Hyderabad-based Yashoda group of super speciality hospitals announced the installation of a new
generation Flat Panel Detector Cath Lab at a cost of Rs 3.5 crore. The hospital claimed that it was the first
corporate hospital in South India to be equipped with the new instrument, produced by Siemens (Business
Line December 16 2003). DCA Imaging, Delhi, announced its acquisition of a whole body MRI in June
2006, and installation of a PET-CT scanning system at its imaging centre in a Delhi hospital at a cost of
about Rs 8 crore; and that 1500 patients had been scanned on this in a year's time (www.dcaimaging.org accessed on June 4, 2008).

The acquisition of the first unit of Unicel Dxl 600 (automated blood analyzer) in the world by St John's National Academy of Health Sciences (SJNAHS) at Bangalore from Beckman Coulter was announced through an article written by none other than the Professor and Head Department of Biochemistry & In charge of Clinical Chemistry (Express Healthcare December 2007).

**Setting up of diagnostic centres by multinational equipment manufacturers**

(a) A *radio pharmacy centre was set up by GE Healthcare* in New Delhi in early 2007 to provide nuclear medicine products for hospitals around the capital (Business Line June 22 2006). The radio pharmacy centre, said to be the first of its kind in the country, will offer isotopes and radioactive pharmaceuticals in ready doses. It will label and produce radiopharmaceutical imaging tracers and radioisotopes that are required for diagnoses using nuclear imaging, single photon emission tomography (SPECT), positron emission tomography (PET) imaging and PET/CT systems. At present, hospitals using nuclear medicines import the isotopes, which have to be administered within the decay period of 6-72 hours or even shorter. GE Healthcare will import bulk quantities of the cold kits through its arm, Amersham Health Private Ltd, with permission from the Atomic Energy Regulatory Board. The kits would be labelled with technetium-99m to make a ready-to-use form for the user departments. According to GE officials these radionuclear pharmacies would address the timely supply of the medicine, and also provide a viable solution to the nuclear medicine departments currently facing logistics and manpower shortage. Owners of diagnostic imaging centres feel that radio pharmacies would make isotopes available in India at a significantly lower cost and reduce the problems of timely delivery and logistics. They would also ensure same-day delivery, lower radiation exposure in hospitals and lower cost to patients and hospitals. The N-medicine procedures are also expected to grow at a rate of more than 15 per cent annually against the present 10-12 per cent. Similar centres were to be set up at Mumbai, Bangalore and Hyderabad (Business Line June 22 2006).

(b) An *advanced imaging centre has been set up by GE Healthcare* in Bangalore, in partnership with HealthCare Global (HCG), a chain of cancer hospitals (Business Line June 15 2007). This imaging centre is equipped with molecular imaging systems supplied by GE Healthcare. It plans to set up similar centres across the country.

(c) An *Integrated Development Centre (IDC) has been set up by GE Healthcare* in a tie-up with Manipal Health Systems for conducting trials of imaging agents at Manipal Hospital, Bangalore (Chronicle Pharmabiz March 22 2007). The IDC is equipped with GE systems. Initially contracted for three years, *the doctors at Manipal Hospital will conduct 1000 scans a year, and return the raw data from these imaging to GE.*

(d) In mid-2007 Philips was 'contemplating undertaking clinical trials for medical equipment in India' according to a company official (The Economic Times June 11 2007). The company was already
conducting software trials for medical equipment in India to validate their efficacy. In line with such plans, in 2007 Philips Medical Systems entered into $7-million R&D collaboration in the area of imaging and monitoring with Artemis Health Institute, promoted by Apollo Tyres. The 500-bed tertiary care hospital of Artemis Health Institute at Gurgaon, in the National Capital Region of Delhi, will buy 60 per cent of medical equipment from Philips. It will be the first in the country to have the latest high-end imaging technologies from Philips. Philips in turn is to use the data generated from the research to enhance the value of its equipment, and make imaging part of predictive and preventive therapy. According to officials of Philips Medical Systems this partnership was one of only 30 such alliances that the Netherlands-based company had globally, and the only research collaboration with a corporate group-run hospital (Business Line February 16 2007).

(e) Philips was also part of a telemedicine project in the southern Indian state of Tamil Nadu, with Apollo Hospitals and a non-governmental organization (NGO) (see section 7.11.3).

V Training and Education for users by industry

* As discussed in Section 5.11.3, Philips has set up an online Medical Learning Centre at Singapore, and in January 2008 announced the International Access to Learning (IAL) program, in collaboration with the International Society of Radiographers and Radiological Technologists (ISRRT) to simplify access to healthcare education in Europe, Asia and the South Pacific. According to the Company its objective is to improve the quality of radiographic and radiation therapy practice globally through access to education, sharing of best practices and improved collaboration between clinicians. The first phase of this IAL program is being piloted in three countries: Estonia, Fiji and India. Participants will be able to select from Philips' catalog of more than 300 accredited, clinical and business courses. Philips will provide these courses free of cost to the members of ISRRT Societies, who can access program guidelines and registration via the ISRRT web site. In India this programme is being executed through the Indian Association of Radiological Technologists, and being offered free of cost to its members (www.iart.org.in, accessed on 10 May 2008).

* To create awareness among GE-users regarding latest development in CT & MRI GE organized a one-day users’ meet at a five-star hotel in Kochi (Kerala), targeted at specialists from radiology and neurology. The meet was addressed by doctors from several private diagnostic centers in the state (Business Line June 15 2007). It also organized Early Health Summit in Delhi. GE launched its Tejas range of x-rays at the annual conference of the Indian Radiological and Imaging Association; and its new ultrasound system at the annual conference of the Cardiology Society of India. GE Healthcare also sponsored a two day Education Programme of the Indian College of Radiology and Imaging (of Indian Radiology and Imaging Association) in June 2007, on colour Doppler and obstetric and fetal imaging.
The workshop held in Mumbai was attended by over 200 practicing radiologists and resident radiologists from Maharashtra and Gujarat.

* Siemens Medical Solutions (SMS) had joined hands with the 200-bed Jupiter hospital in Thane (Mumbai suburb) to set up a 6,000 square feet training center on its premises (Express Healthcare Management November 2006). This training center was to offer tailor-made training programmes for doctors and paramedics, conducted under the expertise of renowned practitioners from the industry. A special syllabus was to be designed jointly by SMS and Jupiter Hospital to train the doctors in the latest aspects of technology and clinical applications. The training center was reported to be the first such facility in Asia to provide classroom training, practical clinical demonstrations and residential facilities all under the same roof. The duration of the programmes was to be custom-made depending on the technology application and keeping in mind the busy schedule of medical practitioners. To provide practical examples to the theoretical training, a live patient environment was to be provided, wherein the practitioners undergoing training could view the diagnostic and therapeutic applications while sitting in a classroom. They would also be provided with practical training on the latest equipment.

Apart from the agreement for training, Siemens Medical Solutions was to also equip Jupiter Hospital with its latest equipment like Somatom Definition-World's first Dual Source CT, Magnetom Avanto enabled with TIM Technology- a revolutionary MR equipment. MVision with IGRT for cancer care and flat-detector cathlab. With these installations, Jupiter Hospital would join the league of a select group of state-of-the-art medical facilities in India to offer the best in diagnostics and treatment. According to SMS officials, 'In the era of rapidly evolving technology, there (was) a crying need for training from the users of technology to keep pace with this evolution. However, the medical educational and bio-medical engineering institutions (were) finding it difficult to deal with this challenge, which was leading to knowledge gap and the patients were not getting benefit of the technological evolution. Hence, as leaders in the healthcare industry, it was a natural step for (Siemens) to meet this social obligation for education and training, which we hope will set a new direction in the healthcare industry'. For Jupiter Hospitals, such partnering with Siemens on the two fronts of training and offering advanced healthcare embodied their commitment to deliver the very best in healthcare services, and also took forward their dream of bringing India on par with the world in the area of healthcare services driven by technology.

* Stryker Corporation, an American medical technology company, was making significant investments in infrastructure, technology and people by way of the Global Technology Centre in Asia Pacific at Gurgaon (Business Line March 24 2007). The Centre was to operate as the company's global talent hub, where Indian surgeons and engineers would be trained. Stryker Corporation would also invest in the process of 'knowledge transfer', facilitating visits of internationally acclaimed surgeons to India. It had set up a mock modern operating theatre at the Gurgaon centre to all data sharing and interactive visual learning with partners around the world.
*As discussed above Eastman Kodak’s Health Imaging Division has focused its marketing efforts in India on educational activities for health imaging professionals. Towards this end it has set up the Kodak Radiology Education Services, a joint body of the Health Imaging Division of Kodak India Limited and a panel of expert radiologists in the country, and conducts workshops on radiology and imaging for radiologists and radiology students not just in India, but in neighbouring countries as well (www.kodak.com).

* Medtronic India, subsidiary of USA-based Medtronic Incorporated, opened a ‘centre of excellence’ at CARE Hospital, Hyderabad, to train cardiologists in various aspects of implanting pacemakers. The hospital had designed a training course for this purpose in two modules (Business Line April 22 2008).

* USA-based Sonosite Incorporated, makers of hand-held ultrasonography equipment, had set up a training and education centre in Hyderabad to provide training for customers and create awareness. It organized a two-day workshop in association with Axon Anaesthesia Associates on advanced anaesthesia and ultrasound at CARE Hospital; and was planning to workshops across the country on a regular basis (Chronicle PharmaBiz August 24 2006; Business Line April 14 2007, Business Line March 14 2008).

* The $1.7-billion US-based Dade Behring, a major player in the global clinical diagnostics segment, planned to increase its market share in India with a series of initiatives such as seminars, research grants and work flow management resources (Business Line February 4 2007). India is considered to be one of the fastest growing diagnostics markets in the world, and the company was reported to be having 12 per cent of the Indian market. The company hosted an international colloquium on ‘Managing the contemporary clinical laboratory’ in Chennai, where quality experts from the College of American Pathologists were present to discuss the latest developments in healthcare initiatives.

* In October 2007, the so-called three Big B’s of the diagnostic industry, Beckman Coulter (associated with diagnostics); BioRad (associated with quality control), Becton Dickenson (associated with vacutainers sample collection) and sample handling together conducted a CME on Quality Improvement in Immuno Diagnostics at St John’s National Academy of Health Sciences, Bangalore (Express Healthcare December 2007).

* USA-based Texas Instruments recently signed a collaborative research agreement with the School of Medical Science and Technology (SMST), Indian Institute of Technology, Kharagpur, to develop semiconductor technologies that are expected 'to lay the foundation of a new generation of cancer diagnostic systems and healthcare monitoring’. Texas Instruments Inc is reported to have set aside a corpus of $15 million to fund medical technical research at select universities across the world with a focus on quality, accessibility and affordability (Business Line April 3 2008).
Individual medical suppliers too undertake promotional activities. For instance, Eagle Medical Systems, Delhi, sponsors CME programmes and medical workshops all over the country. Similarly, Hewlett-Packard, a leading manufacturer of imaging equipment, and the Madras Medical Mission collaborated and introduced the MMM-HP School of Echocardiography, to impart training in basics of echocardiography for physicians and cardiologists. Another leading US healthcare company - Becton Dickinson (BD) - that manufactures syringes and needles in India since 1995 through its subsidiary, organised a regular series of seminars across the country on 'Clinical management of coagulation and sample collection'. In these the vacutainer system pioneered by a BD doctor was projected as the safe and correct method for blood collection. BD planned to introduce these devices for improvement of laboratory services and was looking to the government for subsidies (The Hindu April 2 1999).

Companies undertake other such activities for awareness raising among doctors about latest developments in medical technology, similar to that by medical representatives of pharmaceutical companies. SHANTHA Biotechnics, a Hyderabad-based company, launched ‘Shanpiotien’ — recombinant DNA erythropoietin — at the Second Asian Chapter Meeting of the International Society for Peritoneal Dialysis, the three-day meeting at the medical equipment exhibition HITEX, in Hyderabad. During the conference a large industrial exhibition showcasing the latest developments and equipment in peritoneal dialysis was also held (Business Line January 21 2005).

**Industry organized trade events - Medical Equipment Exhibitions, Seminars and Conferences, business research**

International and national exhibitions and trade fairs of medical technology have become regular events, with at least one being held every year in some of the states. These are targeted at business in the South Asian region. Some of the regular ones are;

**Hospi Medica** is the oldest running medical exhibition, in India. HOSPIMedica is now India’s largest medical exhibition & conference, which was first held in India, in the year 1992. It covers the full range of medical equipment (except dental) and diagnostics. This event is organized annually by the Indian subsidiary CIDEX Trade Fairs Pvt Ltd (which is a joint venture between Messe Dusseldorf and Koelnmesser International of Germany). Messe Dusseldorf is a leading international trade fair organizing company and organized, among other events, MEDICA in Germany, the biggest trade event in the world devoted to medical technology. HospiMedica exhibition serves as a meeting ground for medical professionals and the industry, to ‘look at viable medical solutions’, and has participation of manufacturers and traders from India and other countries. It is reported to be the only truly multi-faculty event in India. According to the organizers of this event, there are various medical associations in
India (catering to various disciplines like cardiology, orthopaedics, physicians, radiology, surgery, neurology etc) which conduct individual conferences. Unfortunately, all these events are only restricted to that specific discipline only. But there are a large number of medical equipment and healthcare organizations having a wide range of products, covering several disciplines / faculties. To attend many such conferences, all over the country becomes highly inconvenient and uneconomical for them. For such organizations, a practical solution is to participate in HOSPIMedica INDIA, which is the only available business platform (www.hospimedica-india.com).

Infra Medica, Medi Tech International, CLINICA, HITEX, International Medical and Health Care Trade Fair, Medi Tec, Medifest, Medical Expo, Medical Technology India 2009, these are some regular exhibitions that are held in the different parts of the country, largely in the metropolitan and other big cities. Usually, seminars and conferences are held at the sidelines or as part of such exhibitions.

Mahavadi Management and Technical Services offered consulting services for German companies wanting to enter Indian healthcare markets, or to get technology and R & D services from the Indian sub-continent (www.mahavadi.com).

Several multinational business consultancy firms are also doing market surveys of sectors in the 'Indian healthcare industry'. Prominent among these are: McKinsey and Company, and Frost and Sullivan. Ernst & Young also conducted a survey, in collaboration with Business World, on the healthcare industry in India. Frost & Sullivan planned to hold conferences across several cities in India on issues plaguing healthcare industry in India (Express Healthcare July 2007). CRISIL Research, a leading business rating, research, risk and policy advisory company in India, also did a study on the Indian Healthcare Delivery Sector in 2007 (Chronicle Pharmabiz March 22 2007). All these firms talk in terms of 'growing' and 'booming' healthcare industry in India, and the increasing opportunities in the healthcare sector.

Significant Findings and Issues pertaining to activities of medical equipment industry other than manufacture and import

One finds that medical equipment manufacturers now are getting into several activities other than simply manufacturing and trading. These are:

- Since the mid-1990s the industry has got organized and is undertaking several kinds of lobbying activities with the government. In this regard we find that there are two kinds of associations – one representing the corporate entities and multinationals in equipment manufacture as well as the corporate hospitals; and the other representing the smaller manufacturers and traders, who are demanding support/concessions for local manufacture.
The industry is organizing awareness raising programmes among doctors on the 'latest' technology in various ways – holding seminars, having product launches at medical conferences, and prominently announcing installation of their technologies.

The industry is also organizing advice/consultancy on ways to procure equipment, to organize financing, etc.

The MNCs and foreign manufacturers are getting into education and training in a big way – several companies now organize/sponsor CME, seminars, and training programmes during conferences for use of their equipment. Some are entering into arrangements with local hospitals to organize training for their products.

MNCs like GE and Philips are entering into partnerships with private corporate hospitals (and diagnostic centers, as discussed in following section) for clinical trials of equipment, software and imaging agents.

The medical equipment market is being looked upon as a big marketing opportunity – and several market research companies are putting out projections of size, growth, etc. Medical technology is also being promoted through frequent and regular trade exhibitions and events in metropolises and bigger towns across the country.

REFERENCES


The paradigms of medical sciences are constantly changing with the evolution of new technologies. With our Medical Equipment Loans you can now purchase the latest technologically advanced equipment to provide your patients with efficient and contemporary treatment.

We will send our sales specialist to understand your loan requirements and help you with the purchase of the right medical equipment. At ICICI Bank, our endeavor is to partner you in your growth.

**Salient Features of Medical Equipment Loans are:**

- Easy documentation & quick approval.
- Widest coverage – More than 250 locations.
- Personalized service delivered at door step.
- Attractive interest rates.
- Flexible repayment structure.

**Following categories are eligible for Medical Equipment Loans:**

- Self employed doctors.
- Diagnostic centers.
- Nursing homes.
- Hospitals.

**Our comprehensive basket of products includes:**

- Loan for purchase of new equipment / refurbished equipment.
- Takeover of existing loans.
- Top Up.

**We also designed the following additional features:**

- Loan amounts beginning from Rs 50000 / -.
- Loans upto 85% of the invoice value.
- Repayment period of 12 – 60 months.
- Repayment through PDC / Direct Account Debit.
- Equipment to be hypothecated to ICICI Bank.
The eligibility criteria for availing the loans are:
- Minimum age at the time of applying-21 years.
- Minimum experience in business – 3 years in existing business.
- Funding not for domestic purpose- assets funded to be used for commercial purpose only.

Asset Type financed:

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<tr>
<th>Asset Type</th>
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<td>X Ray</td>
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<td>Dental Workstation</td>
<td>Gamma Camera</td>
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Financing of products is subject to approved brands as per the policy

Loan Application Process:
Loan application process is divided in 3 steps, namely sourcing, appraisal and disbursal stage.

Sourcing
1. Contact ICICI Bank Medical Equipment Loans
2. Medical Equipment Loan representative will visit the customer
3. Representative will collect filled up application form and all the relevant pre-sanction documents

Appraisal
Internal credit team will appraise the application and application status will be given within 3 days from submitting all pre-sanction documentation.

Disbursal
1. On approval of the loan our representative will collect post sanction documents and post dated cheques for equated monthly installments
2. The loan will be disbursed in favor of the supplier of office equipment
3. The product will be hypothecated to ICICI Bank till the loan is repaid

Documents required:

Pre-Sanction Documents
1. Latest 6 months banking statements (From where PDC would be issued)
2. Last 2 to 3 years audited financial and ITR of individual/Partner/Director as per the case.
3. Statement of Loan Accounts (All previous loans taken in the last 2-3 years).
4. Proof of Identification, Proof of Address and Proof of Signature.
5. Duly filled and signed application form with a photograph of
the client.

6. Proof of establishment (for Proprietorship Firm) or Partnership deed or MOA/AOA/Certificate of Incorporation or Trust Deed/By Law as per borrowers category.

7. Ownership proof of residence and office (Electricity Bill or Municipal Tax Bill or Property Tax Bill or Title Deed or Share Certificate from the Society).


9. Proforma invoice of the proposed assets.

10. Profile of the customer (including the reason for purchase of proposed equipments).

**Post Sanction Documents**

1. Post dated cheques with EMI amount duly filled in.

2. Duly filled and signed loan agreement.


5. Insurance Cover Note of the proposed asset.

6. ROC Charge – Only required in case of Private Limited/Limited Company or Trust if aggregate exposure exceeds Rs. 5.0 lacs.

7. Specific formats – Partnership Authority Letter for Partnership Firms and Board Resolution/Trust Resolution in case of Private Limited/Limited Company/Trusts.

Want our representative to get in touch