The Medical Device Business in India

A Snapshot and Trends

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Introduction

As with many other things, India is a study in stark contrasts when it comes to the healthcare industry. With the second largest population in the world, and a booming healthcare sector, one would expect that healthcare is accessible to most if not all of the population. However, the reality is that while most of India (over 60%) lives in the hinterlands, most of the healthcare facilities are concentrated in the urban areas. India boasts of some of the world-class healthcare facilities in its tier-1 and 2 cities, while many in the rural areas do not have access even to primary healthcare.

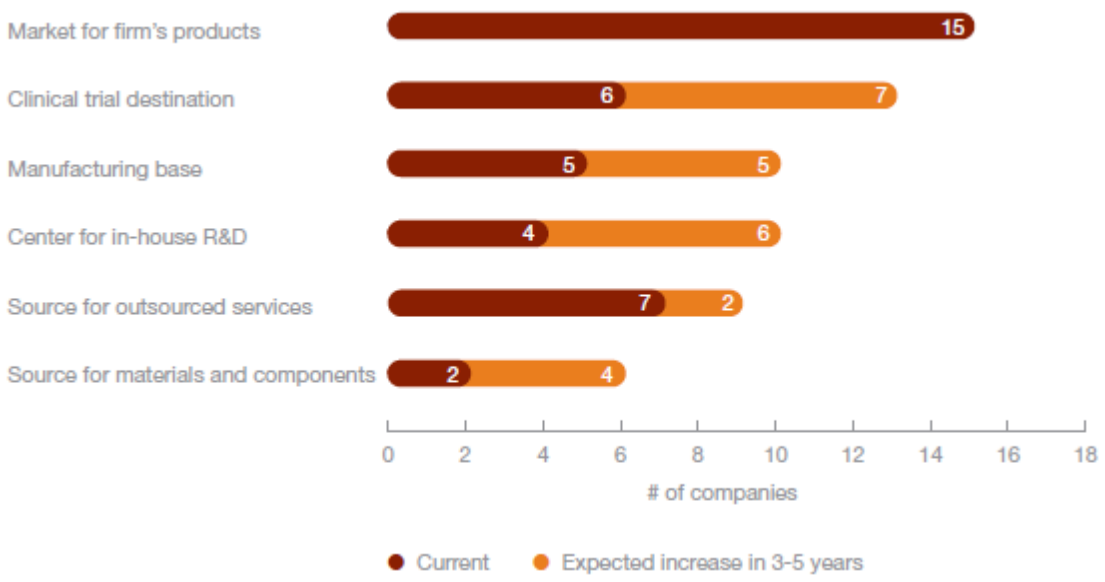
Along with adequate healthcare professionals and infrastructure, medical devices – devices and technology used directly or indirectly for prevention, diagnosis, monitoring, treatment and alleviation of disease, injury or for sustaining life - play an increasingly critical role in meeting this huge demand and filling the unmet needs of India's billions.

India's medical device market is significant – some reports put it at $2.75 billion back in 2008[i] and $3 billion in 2010[ii]- and is experiencing double digit growth rates (5 year CAGR expected to be 16%). Some reports indicate the market size could reach $11 billion by 2023[iii]. Key segments of this market include medical instruments and appliances (25.1%), and orthopedic and prosthetic goods (20%). About 65% of all medical devices and technology are imported, while domestic players have the cards stacked against them in terms of government support and infrastructure.

Domestic manufacturers rely on "frugal innovation": releasing high-quality medical devices that cost a fraction of what their foreign competitors charge to make inroads in the market. Yet, the market is expected to be dominated by foreign players such as GE, Philips, Siemens, Braun and others for the near to medium-term future: domestic players do not yet have the scale or range of products (especially at the higher end) to meet the exploding demand.

Going forward, India is expected to become a global hub for clinical trials, research and development and manufacturing of medical devices, taking advantage of low costs in engineering and manufacturing, as well as the availability of large number of skilled workers.

Significant challenges remain, chiefly the lack of hospital infrastructure, resources and workers, and the very low doctor: patient ratios in the country – there are six doctors for every 10,000 people, as against 14 in China and 24 in the US[iv]. The lack of a regulatory framework is felt by local and global manufacturers, importers and healthcare professionals in the field. Efforts are being made to rectify the regulatory limitations but the process is taking more time than anyone anticipated. Infrastructure to support hospitals, clinics and field work is slowly but surely improving.



Source: PwC India MedTech Survey 2011

Graph: India as an R&D, clinical trial and manufacturing base for world companies

Growth Factors Driving the Medical Device Business in India

What are factors driving the market for medical device development for the India market?

- ***Sheer numbers:*** Currently India is the second most populous country with a population of 1.15 Billion people. This is slated to grow to 1.3 Billion in 2015, and 1.7 Billion by 2050[v]. India is set to become the most populous country in the world by 2050, leaving China behind. At present, most of this population cannot afford to benefit from most medical devices.

- ***Significant percentage of aged people:*** Currently, 5% of the population in India is aged above 65 years.. By 2025 India will have an estimated 200 million[vi] elderly people (aged 60 and above). An aging section of the population will need increasing medical device support, especially in orthopedic and prosthetic devices. The prosthetic device market in India is expected to grow to nearly $600 million by 2015[vii].

- ***Increasing affluence and ability to afford healthcare:*** With a $1.8 trillion GDP growing at 6.9% in 2011, India is slated to outperform most of its competitors and neighbors in the rate of affluence. The rising middle class[viii] expects better medical services and is willing to pay for it.

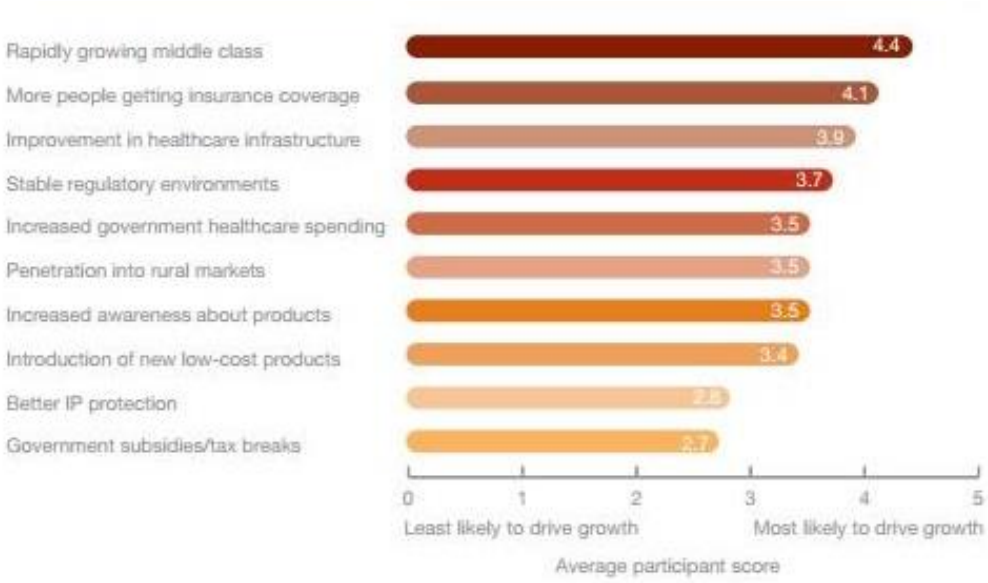
- ***Disease capital:*** India has the largest number of patients with communicable diseases in the world;[ix] diseases such as dengue fever and malaria affect large numbers of the population. Not surprisingly, diagnostic and imaging systems are in high demand. Among non-communicable diseases, India is fast emerging as the diabetes capital of the world and middle class Indian have high rates of cardiovascular disease.

- ***Unmet demand:*** India accounted for 22% of the global figures for post-partum and expectant mother mortality rates. Further, the infant mortality rate in India is roughly 58 deaths to every 1000 pregnancies: a fact that can be ameliorated with the use of proper imaging systems and awareness.

- ***Government support:*** The Government of India has committed to doubling spends on healthcare expenditure to 2.5 percent of the GDP – about $4.3 billion by 2017[x].

- ***Increasing health insurance coverage[xi]:*** Private insurance for health is expected to grow at 30% CAGR up to 2015 and cover up to 6% of the population, as opposed to just 1% in 2009.

- ***Improving infrastructure:*** Healthcare infrastructure, while still far short of first world standards, is improving at a rapid pace. Over 80% of healthcare needs are met by private players, who are improving their infrastructure by leaps and bounds.



Graph: Growth Factors in Indian Medical Device Market

Domestic Success: Frugal Innovation[xii]

Stories and examples of Indian companies that are developing devices in India for India

Notable successes in the domestic medical devices market in India often aim to drive costs down and provide value. Of late, products or services that utilize India's strengths in Information Technology have also done well in the market and won various awards.

Here is a listing of some of the success stories:

- **Jaipur Foot[xiii]** – This is a famous domestic success story. The low-cost prosthetic foot was developed using local materials and was specifically targeted for Indian farmers and farm workers who spend a lot of time standing barefoot in wet paddy fields. 1.2 million people now benefit from this device, and the Jaipur foot is also exported. The principle has been extended to prosthetic limbs, knees, polio calipers and other equipment.

- Aravind Eye Care's **low cost intraocular lenses[xiv]** manufactured through their non-profit entity AuroLab costs about $$2 versus international costs of $70-100. Today Aurolab addresses the needs of not just Indian patients, but holds 7% of the intraocular lenses market globally.

- SRL Diagnostics' **CLIMS Cloud Application[xv]** has won awards as the best-in-class information management system in the diagnostics business.

- Skanray makes world-class **high-frequency X-Ray machines** at half the price global product[xvi]. They have recently acquired construction giant Larsen & Toubro's healthcare business, which gives the company access to access to monitoring devices in the critical care, operation theatre and intensive care unit segments.

- Transasia Biomedicals[xvii] manufactures **bio-medical analyzers, instruments and reagents for the diagnostics market**. It has over 300,000 installations within India and exports to over 60 countries.

- The Sushrut Adler Group developed an **External Fixator** for the Indian market. They also manufacture bone plates and screws, prostheses, trauma implants and instrumentation products[xviii].

- Opto Circuits[xix] [xx]offers **cardiovascular interventional products**, such as cardiac stents, body implants and monitoring systems, at nearly half the price of its competitors. The company also manufactures cardiac monitoring devices, patient monitors and consumables.

- Bangalore-based Biotech pioneer Biocon has launched[xxi] a **reusable insulin pen** to compete with imports from Novo Nordisk. **Low-cost insulin pens** have been launched by

Wockhardt. Other Indian companies in this market include Lupin Laboratories and Shreya LifeSciences.

- Based on an innovation emerging out of Stanford University[xxii], Bangalore-based startup OneBreath is launching a **low-cost ventilator** in 2013. The company has attracted funding from EBay's Pierre Omidyar.
- BigTec Labs' low cost no-frills **PCR (polymerase chain reaction) machine** costs 1/15th the price conventional PCRs[xxiii].
- Perfint Healthcare makes **robotics-based targeting systems for CT-guided interventions[xxiv]** that cost half that of comparable international brands.

The Role of Western Companies[xxv]

The role of foreign companies developing products for the India market or offering worldwide products for the India market

Many multinational companies have established a significant presence in India and have introduced devices customized for Indian consumers and suitable for local price points. Some examples are:

- Roche Diagnostics has developed a **screening device for cardio-vascular diseases**, called iCCNet, which is suitable for use in remote rural settings. The data collected from a blood test is sent to a cardiologist for diagnosis and treatment. The company has also developed an advanced technology solution for **blood screening that ensures safe blood** for patients who need transfusion. They also offer **a high-risk HPV test** to aid in prevention of cervical cancer, which is the number one cancer that kills among women in India[xxvi].

- GE Healthcare[xxvii] has a big presence in India. Under its "In India, for India" approach the company has introduced a host of devices for the Indian market, including a **low cost EKG machine** and **a low cost ultrasound machine** for the Indian market.

- Philips Healthcare is using its recent acquisitions in India to develop and launch a low cost cath lab for the Indian market. The **cardio cath lab** would cost less than $200,000.

- Johnson and Johnson has developed a **knee implant** and a **reusable stapler for use in surgeries** at price points suitable for the Indian market.

Over 65% of products in this sector come from imports, most major medical device, equipment and furniture manufacturers have a presence in India. For instance, Insulin delivery product makers like Novo Nordisk enjoy the lion's share of the market in insulin pens and allied products, which close of 20%[xxviii] of insulin users utilize.

Medical Device Hubs in India

Which regions/clusters in India are becoming strong in medical device development?

As the world wakes up to the possibilities of marrying India's low costs in manufacturing with its technology skills, India is on the way to becoming a global hub for development of low cost medical devices[xxix]. Within India, some regions have become hot spots for medical device development, due to the convergence of talent, capital and support from state governments.

Hub	Number and type of medical devices	Biggest name(s)	Advantages
Faridabad[xxx]	Reports suggest there are over 25 manufacturers, big and small, located in this industrial city. Syringes, surgical equipment, x-ray equipment, dental implants.	• Hindustan Syringes and Medical Devices, who make syringes, blood collection kits, surgical blades and other equipment. The company has six manufacturing units in the area.	Proximity to Delhi; availability of industrial work force and pool of technical staff
MedTech Row[xxxi] **Delhi**	An ecosystem of innovators and manufacturers targeting affordable healthcare for India	• Stanford-India Biodesign Program • Program for Appropriate Technology in Health (PATH) • Bill and Melinda Gates Foundation • Michael and Susan Dell Foundation	• Convergence of government, industry, academia and non-profit organizations • Situated in an enclave of the Qutub Institutional area bordering IIT Delhi's biomedical engineering department and the All India Institute of Medical Sciences (AIIMS - the country's premier medical institute); as well as close to the Jawaharlal Nehru University's campus, and the offices of the Government of India's Department of Science and Technology.
Tamil Nadu	CID (Cardiology and Implantable devices), Diagnostics, Critical life support systems, Ophthalmology, dental technologies	• Trivitron Healthcare • Opto Circuits • Perfint Healthcare	• Support from state government • South Asia's first medical technology park at Sriperumbudur: Trivitron Medical Technology Park[xxxii] • Availability of labor force • The state is a technology and manufacturing hub

Andhra Pradesh	• Stents, catheters, stent systems • Medical disposables	• St Jude Medical has India headquarters in Hyderabad[xxxiii] • Relisys Medical Devices[xxxiv] [xxxv]	• Support from state government • Vast pool of manpower, technicians • Capital city Hyderabad is a technology hub • A "MedTech Valley" initiative has been proposed
Karnataka	• Insulin pens • Medical IT • Telemedicine • X-ray equipment • Pacemakers • Cardiac stents, body implants and monitoring systems • PCR machines	• Biocon (insulin pens) • Skanray (x-ray equipment) • MediVed (low cost manufacturer for medical devices)[xxxvi] • HQ of Opto Circuits (cardiac intervention products) • BigTec Labs	• Capital city Bangalore is famous as India's silicon valley • Convergence of educated/skilled workforce, proximity to academia, political stability • Health tourism destination

National R&D Programs

Which national labs and universities have credible programs that support medical device development?

While there is visible research and development activity in the medical device development field, much of it is happening in the private sector. There is no institute or organization in the public sector solely devoted to R&D in medical devices. A 2009 report by Frost & Sullivan recommends[xxxvii] that the Government of India set up a "National Centre for Medical Devices" which does not seem to have happened yet.

Here are some noteworthy organizations in the public arena, among national labs and institutes:

- **Sri Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum (Kerala)**[xxxviii] is the leading institute of its kind in India. The institute is engaged in research and clinical trials in multiple specialties, including biomaterials research in polymers and ceramic materials, tissue engineering, and in cardiovascular devices and implants. It is deemed as an "Institute of National Importance" by the Government of India.

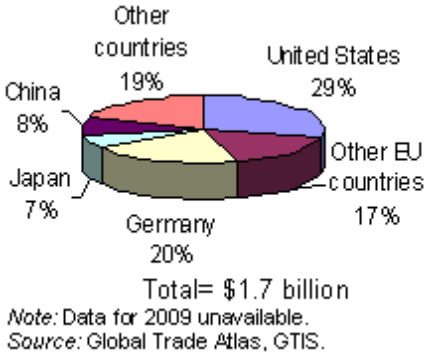
- **The Indian Council of Medical Research**[xxxix] has multiple institutes under its aegis, which engage in R&D in various medical specialties and technologies.

- **The Stanford India Biodesign Program**[xl] – An ambitious public-private partnership program between Stanford University, Government of India, IIT Delhi, AIIMS and other supporters, the program aims to "train the next generation of medical technology innovators in India".

India Market Overview

Who are the top foreign and Indian companies serving the India medical device market?

Imports dominate the market, as previously stated. The US accounts for a majority of imported devices, closely followed by Germany and other EU countries.



Graph: 2008 figures for India Imports in Medical Devices[xli]

While there are no figures available on market shares, here is a representative listing of some companies that have a significant presence in the Indian market:

Company	Website	Noteworthy developments in India
GE Healthcare India	http://www3.gehealthcare.in/	• Close to $500 million sales in India in 2012, expects to touch 1 billion dollars in 2 years[xlii] • 14 products released "in India for India", 40 in the pipeline including solutions in ventilation, radiology, cancer, life sciences, and a series of PET/CT molecular imaging systems
Philips India	http://www.healthcare.philips.com/in_en/	• Greenfield plant in Chakan, Pune (Maharashtra) opened in June 2012. To make diagnostic and interventional imaging solutions primarily targeting cardiology and radiology applications[xliii]. • Acquired Alpha X-Ray Tech and Meditronics in 2008 to be able to deliver low cost x-ray solutions to Indian market
Johnson and Johnson Medical	http://www.jnjindia.com/business/medical	• Leading provider in India of Advanced Sterilization Products (ASPs), cardiovascular care products, Ethicon brand of biosurgery, wound closure and

		tissue management products, DePuy brand of orthopedic implants, instrumentation for neuro-surgery, LifeScan range of diabetes management products, hospital supplies etc.
Opto Circuits	http://www.optocircuits.com/	• Bangalore-based medical device manufacturer • 2012 revenues $440 million, plans to hit $1 bn by 2015[xliv] • Makes and markets patient monitors, stents, EKG machines, defibrillators
Siemens Group India[xlv]	http://www.siemens.com/answers/in/en/#	• Wide range of products including hearing instruments, laboratory diagnostics, medical imaging, therapy systems etc. • Medical equipment product range in India since 1954 • First Indian medical device factory in Goa in 1996 • Incorporated Siemens Hearing in 1998 • Responsible for many "firsts" in India – MRI systems, Cardiac CT etc.
B Braun[xlvi]	http://www.bbraun.com/	• Entered India directly in 1994 via JV with local partner • Established medical disposables factory in Ponda, Goa in 1996 • Moved factory to Chennai, Tamil Nadu in 2007 – make IV sets, sutures, right heart catheters etc • Most Braun products available in India since 2001

About Amritt, Inc. and the Medical Device Business

Amritt, Inc. is a global management consultancy headquartered in California. Senior executives at large and mid-sized Western companies trust Amritt's guidance on key questions relating to emerging markets. We help medical device and related companies to grapple with emerging market challenges and opportunities on many dimensions including:

- Determining the right approach to countries such as India and China.
- Global Scouting for technology, IP, talent and research partners.
- Finding and evaluating partners or targets for mergers and acquisitions.
- Finding, evaluating and managing offshore engineering service providers (aka outsourcers)
- Helping determine if a captive offshore engineering or technical center makes sense
    - Locating, Staffing, building and managing such centers
    - Determining and executing a roadmap for success in global engineering in the device business
    - Predicting, identifying, mitigating and overcoming the challenges of global R&D
- Market entry and expansion strategy and execution into India
    - What current products will sell and how do they need to be modified?
    - What new products could lead to a breakthrough in revenues
    - Understanding and engaging with the Indian healthcare ecosystem:
        - Hospitals and Clinics
        - Distributors, Agents and Third parties
        - Government, state, federal and local as needed
        - The unique expectations of Indian patients and their families
        - Role of third party reimbursements.
- Training Workshops for executives, middle managers and individual contributors
    - How Western professionals can succeed in emerging companies
    - Overcoming cross-cultural barriers to maximize productivity
    - Based on our award-winning program first offered at the Caltech

Many of our client case studies are listed (anonymously) on our website. We have worked with medical device companies ranging from 10 employees to 100,000 and more and located in the USA, Germany, Canada, Northern Europe and India. We are often sponsored by the heads of technology, international sales or by leaders of business units. Sometimes we are retained directly by the CxO's of device companies.

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References

[i] "Medical technology industry in India: Riding the growth curve", Deloitte, http://www.deloitte.com/assets/Dcom-India/Local%20Assets/Documents/Medical_technology_Industry_in_India.pdf, July 2010

[ii] "Taking advantage of the Medtech market potential in India: Success will hinge on operating model innovation", PWC, http://download.pwc.com/ie/pubs/2012_taking_advantage_of_the_medtech_market_potential_in_india.pdf, 2012

[iii] BioSpectrum Bureau report, "India medical devices market to touch $11 bn by 2023", BioSpectrum, http://www.biospectrumasia.com/biospectrum/news/122665/india-medical-devices-market-touch-usd11-bn-2023#.UMQybeRkxXE, Dec 2012

[iv] http://www.globalhealthfacts.org/data/topic/map.aspx?ind=74&by=Location&order=d&fmt=76 .

[v] Torsekar, Mihir, "India's medical device sector: Increasing US export opportunities", USITC Executive Briefings on Trade, http://www.usitc.gov/publications/332/executive_briefings/FINAL_EBOT_torsekar_0630.pdf, Jun 2010

[vi] Torsekar, "India's medical device sector: Increasing US export opportunities"

[vii] Torsekar, "India's medical device sector: Increasing US export opportunities"

[viii] "Taking advantage of the Medtech market potential in India: Success will hinge on operating model innovation", PWC

[ix] "Medical technology industry in India: Riding the growth curve", Deloitte

[x] Kristie Neo, "Robust growth prompts medical technology firms to boost R&D", channelnewsasia.com, http://www.channelnewsasia.com/stories/singaporebusinessnews/view/1238244/1/.html, Nov 2012

[xi] "Taking advantage of the Medtech market potential in India: Success will hinge on operating model innovation", PWC

[xii] Federation of Indian Chambers of Commerce and Industry

[xiii] For more about the Jaipur Foot, visit http://www.jaipurfoot.org/

[xiv] For more about Aravind's products and award-winning processes, visit http://www.aravind.org/Downloads/draravindinterview.pdf - a Health International interview with Dr. Aravind Srinivasan

[xv] PharmaBiz report, "SRL Diagnostics bags best use of technology award for CLIMS", http://pharmabiz.com/NewsDetails.aspx?aid=72170&sid=2, Nov 2012

[xvi] Bose, Praveen, "Skanray seeks bigger slice of medical devices market", Business Standard, http://business-standard.com/india/news/skanray-seeks-bigger-slicemedical-devices-market/494361/, Dec 2012

[xvii] TransAsia website, http://www.transasia.co.in/, accessed Dec 8 2012

[xviii] Sushrut website, http://www.sushrut.com/products.aspx, accessed Dec 8 2012, and media reports

[xix] Opto Circuits website, http://www.optocircuits.com/, accessed Dec 8, 2012

[xx] Dharmakumar, Rohin, "Vinod Ramnani: Time To Grow Opto Circuits Organically", Forbes India, http://forbesindia.com/article/leaderhip-award-2012/vinod-ramnani-time-to-grow-opto-circuits-organically/33859/1, Oct 2012

[xxi] Madhumathi D S, "Reusable insulin pen to lead Biocon's new launches", The Hindu Business Line, http://www.thehindubusinessline.com/companies/article2148035.ece?homepage=true, June 2011

[xxii] Newby, Kris, "Another biodesign success: Researchers develop low-cost medical ventilators for global disasters", Stanford.edu, http://med.stanford.edu/ism/2011/february/ventilator-0214.html, February 2011

[xxiii] "Medical technology industry in India: Riding the growth curve", Deloitte

[xxiv] Perfint Healthcare website, http://www.perfinthealthcare.com/ROBIO.html, accessed Dec 9, 2012

[xxv] Mukherjee, Rupali, "Med device makers eye bottom of the pyramid", Times of India, http://timesofindia.indiatimes.com/business/india-business/Med-device-makers-eye-bottom-of-pyramid/articleshow/10964989.cms, Dec 2011

[xxvi] Mukherjee, Rupali, "Roche Diagnostics plans to outperform industry growth", Times of India, http://timesofindia.indiatimes.com/business/india-business/Roche-Diagnostics-plans-to-outperform-industry-growth/articleshow/15391545.cms, Aug 2012

[xxvii] GE Healthcare website, http://www3.gehealthcare.in/, accessed Dec 9 2012

[xxviii] Madhumathi, "Reusable insulin pen to lead Biocon's new launches"

[xxix] Mukherjee, Writankar, "'India can be global hub for low cost medical devices'", The Economic Times, http://articles.economictimes.indiatimes.com/2009-12-26/news/27657648_1_ge-healthcare-south-asia-medical-equipment-global-hub, Dec 2009

[xxx] Tripathy, Mohinni Piyush, "Why Faridabad is becoming a hub for medical device manufacturers", The Economic Times, http://articles.economictimes.indiatimes.com/2012-08-23/news/33342133_1_medical-devices-hindustan-syringes-rajiv-nath, Aug 2012

[xxxi] Lavakere, Jyoti Pande, "In Delhi, a 'Sand Hill Road' for Cheap Health Care", The New York Times, http://india.blogs.nytimes.com/2012/11/26/in-delhi-a-sand-hill-road-for-cheap-health-care/, Nov 2012

[xxxii] "South Asia's First Medical Technology Park to make Quality Healthcare Affordable", Express Technology, http://www.expresshealthcare.in/201002/market16.shtml, Feb 2010

[xxxiii] Shafeeq, Mohammed, "US firm to launch hi-tech medical devices in India", iGovernment, http://www.igovernment.in/site/us-firm-launch-hi-tech-medical-devices-india, Apr 2012

[xxxiv] Relisys website, http://www.relisysmedicaldevice.com/, accessed Dec 9, 2012

[xxxv] "Care Hospitals' Relisys aims high", eHealth, http://ehealth.eletsonline.com/2012/12/care-hospitals-relisys-aims-high/, Dec 2012

[xxxvi] Ghosh, Anirvan, "Indian medical devices cos finding space in global arena", The Economic Times, http://articles.economictimes.indiatimes.com/2009-11-13/news/28404398_1_medical-devices-pacemaker-opto-circuits, Nov 2009

[xxxvii] Frost & Sullivan report, "Recommendation for NIPERs: Medical devices in India", report hosted on PERD website, http://www.perdcentre.com/niperahd/download/finalbook-events.pdf, 2009

[xxxviii] Sri Chitra Tirunal Institute website, http://www.sctimst.ac.in/, accessed Dec 6, 2012, and journal reports

[xxxix]ICMR website, http://www.icmr.nic.in/institute.htm#Permanent Institutes/Centres, accessed Dec 6, 2012

[xl] Stanford India Biodesign website, http://biodesign.stanford.edu/bdn/india/, accessed Dec 9, 2012

[xli] Torsekar, "India's medical device sector: Increasing US export opportunities"

[xlii] Mukherjee, Rupali, "India revenue to touch $1 billion in 2 years", The Times of India, http://timesofindia.indiatimes.com/business/india-business/India-revenue-to-touch-1billion-in-2-years/articleshow/12421500.cms, Mar 2012

[xliii] Press Release, "Philips commences operations at greenfield healthcare manufacturing facility in India", Philips India website, http://www.newscenter.philips.com/in_en/standard/about/news/press/pressinformation_2012-06-14_greenfield-healthcare-manufacturing-facility-chakan-pune-india.wpd#.UMQ8EuRkxXE, Jun 2012

[xliv] Dharmakumar, "Vinod Ramnani: Time To Grow Opto Circuits Organically"

[xlv] Halfpap, Bernhard, "Siemens Medical Solutions in India", Siemens.com, http://www.siemens.com/investor/pool/en/investor_relations/downloadcenter/051125_med_cmd_india_1339778.pdf, Nov 2005

[xlvi] Braun website, "History", http://www.bbraun.co.in/cps/rde/xchg/cw-bbraun-hi-in/hs.xsl/7352.html, accessed Dec 9, 2012