PHARMACEUTICALS

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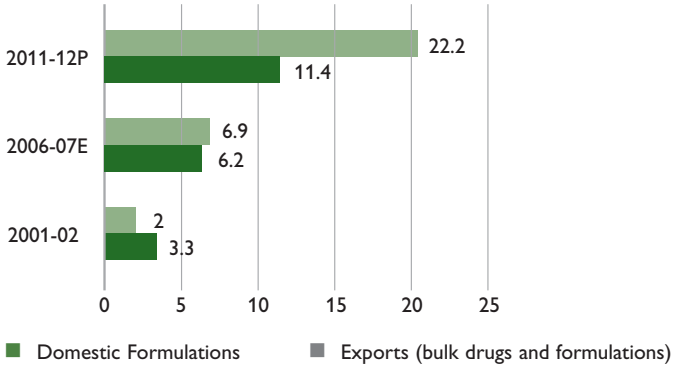
INDIA BRAND EQUITY FOUNDATION

MARKET OVERVIEW

Indian pharmaceutical market – US$ 7.3 billion opportunity

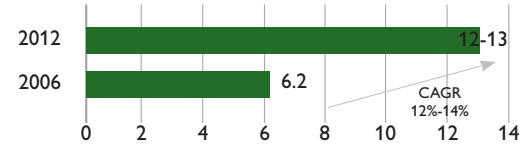
- India is among the fastest growing pharmaceutical markets in the world
- The pharmaceutical market is worth US$ 13 billion, with the domestic retail market expected to cross the US$ 10 billion mark in 2010 and reach an estimated US$ 12 billion to US$ 13 billion by 2012
- The outsourcing opportunity is set to grow to US$ 53 billion in 2010 from US$ 26 billion in 2006

Domestic pharma retail market (US$ billion)



Source: IPA, Ernst & Young analysis

Forecasted Indian pharmaceutical retail market (US$ billion)

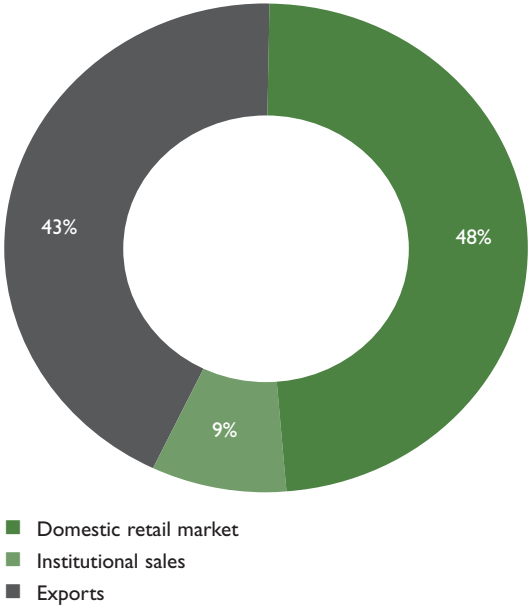


Source: Compiled from industry sources

Indian pharmaceutical market – US$ 7.3 billion opportunity

- Retail sales of pharmaceuticals were US$ 6.2 billion while institutional sales were estimated to be around US$ 1.1 billion in 2006
- Domestic consumption accounted for nearly 57 per cent and exports for the remaining 43 per cent of total industry revenues

Break-up of Indian pharma industry
(For the year 2006-07)

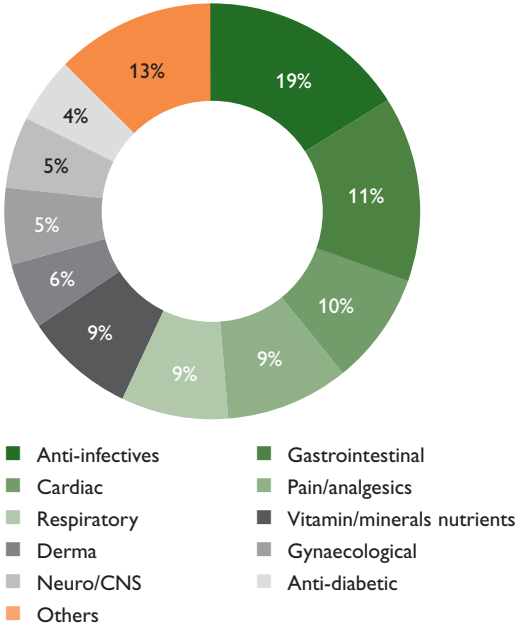


Source: IPA

Anti-infectives – largest therapeutic category

- Anti-infectives have the highest contribution (19 per cent) to the total domestic sales
- Cephalosporins, penicillins and quinolones are key drug classes among anti-infectives
- Gastrointestinal and cardiac are the second and third largest therapeutic categories, respectively
- Oral anti-diabetics and anti-peptic ulcerants are the fastest growing segments under alimentary and metabolism therapeutic categories

Market share of key therapeutic categories (2006-2007)

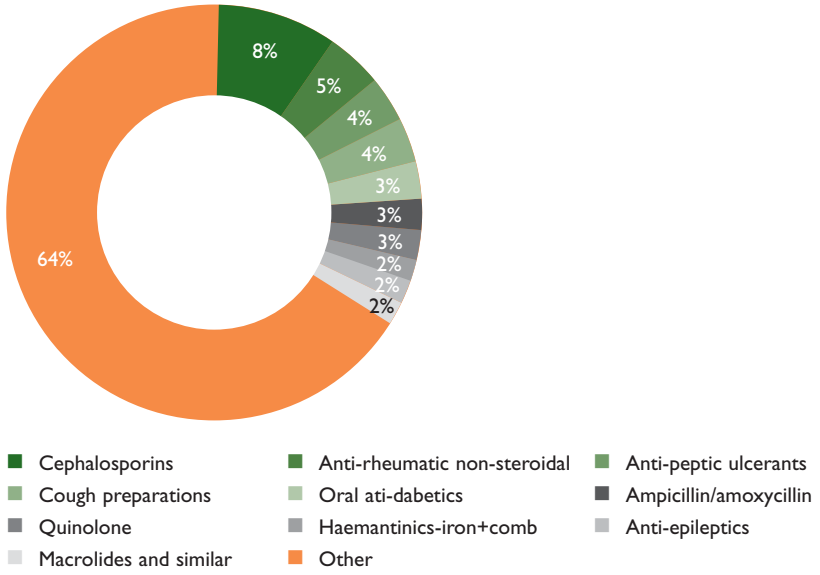


Source: CRIS INFAC, Ernst & Young analysis

Anti-infectives – largest therapeutic category

- Cholesterol reducers have emerged as a key class of cardiovascular drugs in the last few years
- Anti depressants accounted for 17 per cent of the total revenues of the central nervous system (CNS) segment in 2005-06
- Anti-inflammatory and anti-rheumatic drugs accounted for 70 per cent of the total musculo-skeletal segment revenues in 2005-2006

Market Share of Key Drug Classes (%)
(2006-2007)

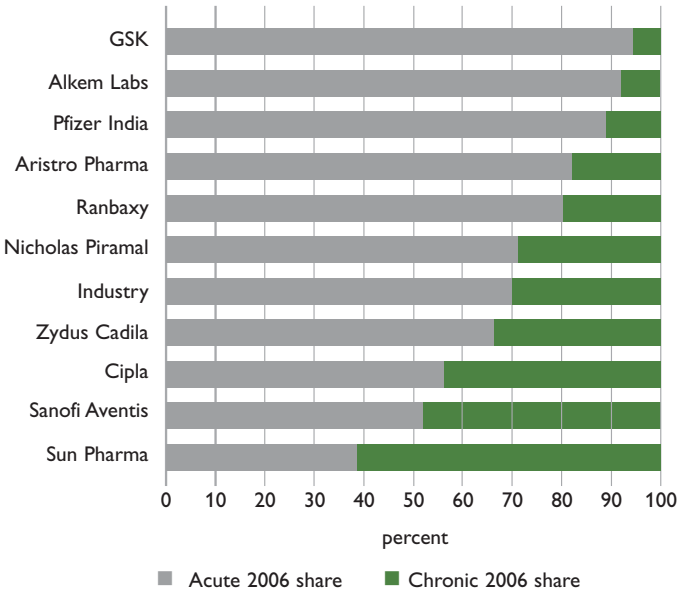


Source: CRIS INFAC, Ernst & Young analysis

Acute therapy dominates sales, chronic segment to fuel growth

- Chronic therapy contributes 22 per cent to total revenues and acute therapy dominates with 78 per cent share
- New products launched in the chronic therapy segment outnumbered acute segment launches in 2006
- The acute segment is expected to grow at a steady pace due to its mass therapy nature and unresolved issues of sanitation and hygiene in the country

Acute vs Chronic Sales Mix of Top 10 Indian Pharmaceutical Companies



Source: CRIS INFAC

Acute therapy dominates sales, chronic segment to fuel growth

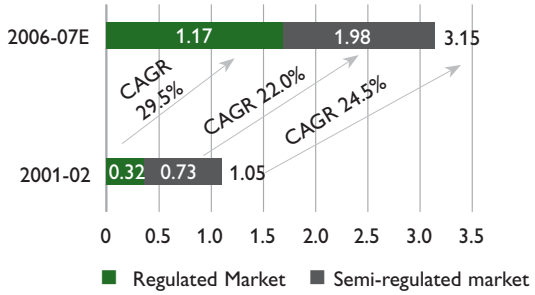
Key drivers of chronic therapy segments

- **Growing geriatric population:** 4.9 per cent of total Indian population in 2005 consisted of 65+ age group. This is further expected to increase to 6.4 per cent by 2015 and 7.5 per cent by 2020
- **Rapid urbanisation:** An increasing number of people are suffering from lifestyle diseases such as diabetes, obesity, depression, etc., due to rapid urbanisation. The urban population has grown by 31 per cent in a decade – from 217 million in 1991 to 285 million in 2001 – as against 18 per cent population growth in rural areas.

Indian pharmaceuticals exports

- Export revenues were estimated to be around US$ 6.9 billion in 2006-2007
- In 2006-2007, formulation exports constituted 46 per cent of total revenue, while bulk drugs accounted for 54 per cent
- Revenues from formulation exports are expected to surpass those from bulk drugs by 2010-11
- By 2012, exports are expected to top US$ 22.2 billion, with most of the value generated by generics and active pharmaceutical ingredients (API)

Formulation export revenues (US$ billion)



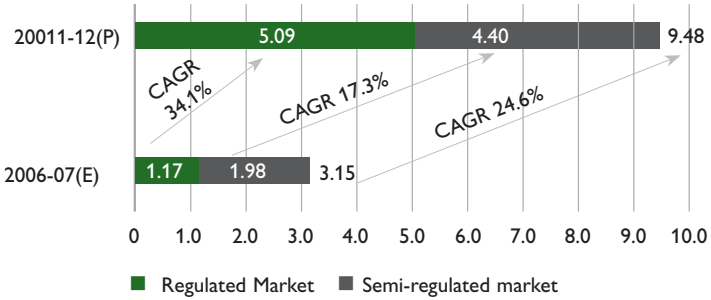
Source: CRIS INFAC

Indian pharmaceuticals exports

Demand from regulated markets bound to increase

- Exports to regulated markets surged by a CAGR of 33 per cent as compared to a CAGR of 15 per cent in semi-regulated markets during the period 2000 to 2005.
- Formulation exports to regulated markets are expected to grow at a high CAGR of over 34.1 per cent to reach US$ 5.09 billion by 2011-2012
- Demand from semi-regulated regions is estimated to grow at a modest CAGR of around 17.3 per cent and reach US$ 4.4 billion in the same period

Formulation exports demand outlook (US$ billion)

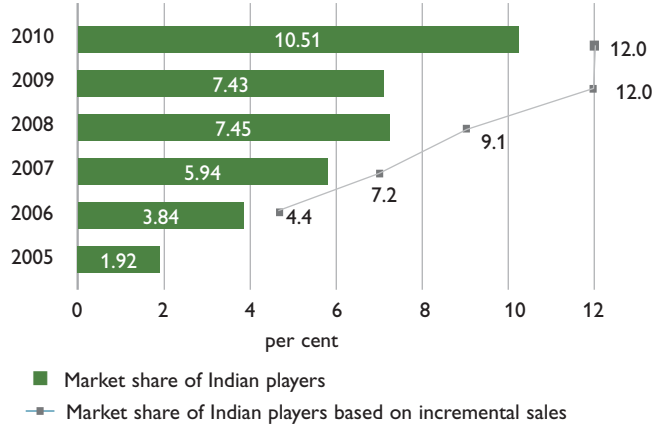


Source: CRIS INFAC

Generics to drive growth of exports from India

- By 2011-2012, the share of Indian players in the US generic market is expected to cross 6 per cent from 2.1 per cent in 2006-2007
- Formulation exports to US are expected to grow at a CAGR of 38 per cent and reach around US$ 3.03 billion in 2011-2012
- Exports of generic drugs to Europe are likely to grow at a healthy CAGR of 27 per cent to reach US$ 1.77 billion by 2011-2012

Expected market share of Indian players in the US generics market



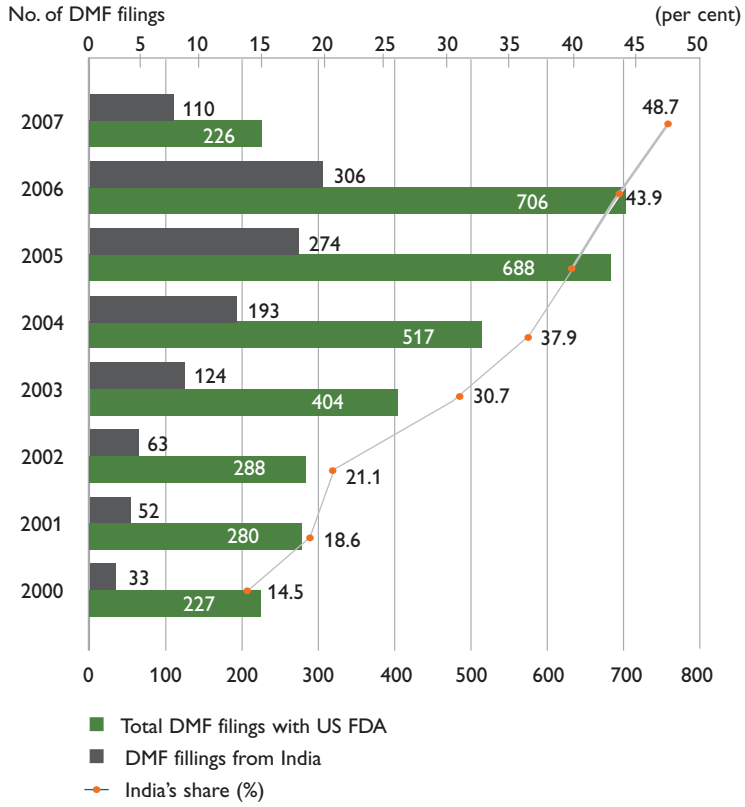
Source: CRIS INFAC

Generics to drive growth of exports from India

India to maintain focus on bulk drug exports

- India is the world's fifth largest producer of bulk drugs
- Demand for bulk drugs has grown at a CAGR of 31 per cent since 2000-01 to reach US$ 2.8 billion in 2005-06
- The share of Indian companies in the total drug master files (DMF) filed with the US FDA increased to 50 per cent in 2007 from 14 per cent in 2000
- Semi-regulated markets account for a majority of bulk drugs' exports with a 60 per cent share

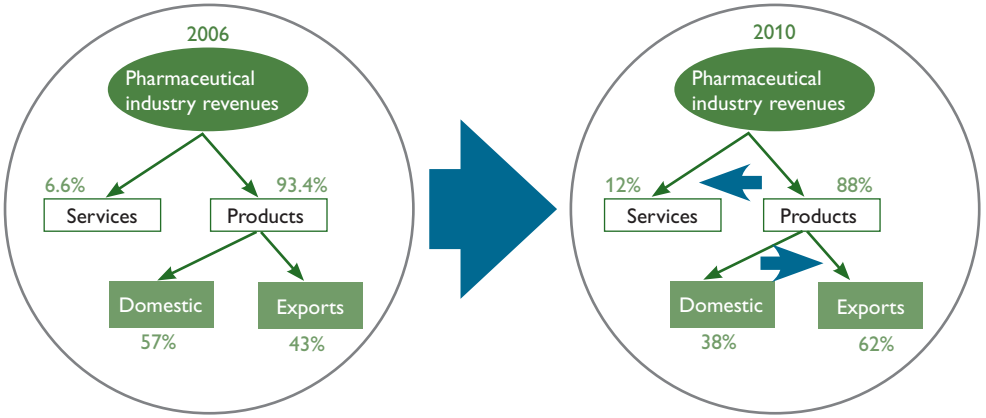
DMF filings: Global vs. India



Source: US FDA

Changing paradigm: Indian pharmaceutical industry

- Revenues from domestic market dominated the total pharmaceutical revenues in 2006-07
- Exports contribution is expected to surpass the domestic turnover by 2010
- The pharma sector would witness an upswing in the revenues from service segment due to the increase in outsourcing of Contract research & manufacturing services (CRAMS) to India



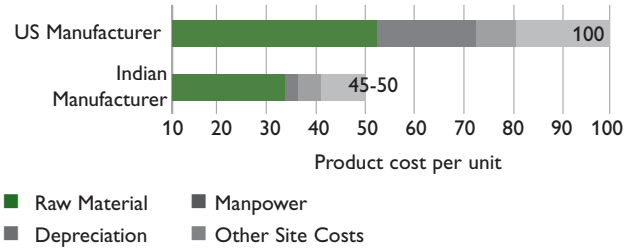
Source: E&Y Analysis

Advantage India: Significant cost arbitrage

Basic production cost in India up to 50 per cent lower than in the US

- 30 per cent to 50 per cent lower depreciation
  - * FDA approved plants can be constructed in India for 30 percent to 50 per cent lower costs
  - * Higher utilisation of equipment due to improved processes (not quantified)
- 85 per cent to 90 per cent manpower cost savings
  - * Labour costs in India typically 10 per cent to 15 per cent of the cost in the US
  - * Savings applicable across all hierarchal levels (e.g., operators, research scientists, etc.)
  - * Improved, more efficient processes contribute to lower labour costs per unit (not quantified)

India's cost arbitrage



Source: OPPI – Adapted from Monitor Group, Study on Outsourcing Opportunities in Indian Pharmaceutical Industry

Advantage India: Significant cost arbitrage

- 40 per cent to 50 per cent savings in raw materials
  * Bulk drugs can be manufactured in house at 40 per cent to 50 per cent of ethicals' cost
  * Excipients and intermediates sourced locally at 20-30 per cent lower costs
  * Most other raw materials can be sourced internally and from China

Established infrastructure for pharma R&D and manufacturing

Key manufacturing clusters

Traditional bulk drugs cluster	Gujarat - Ahmedabad Ankleshwar, Vapi, Vadodara Maharastra - Mumbai, Tarapur, Aurangabad, Pune Andhra Pradesh - Hyderabad Tamil Nadu - Chennai Pondicherry Karnataka - Mysore, Bangalore Goa - Panaji
Traditional formulation cluster	Goa, Mumbai, Pune, Hyderabad
Emerging bulk drugs cluster	Andhra Pradesh - Visakhapatnam
Emerging formulation cluster	Himachal Pradesh - Baddi Uttaranchal - Patnagar

Source: E&Y Analysis

Established infrastructure for pharma R&D and manufacturing

Key R&D Clusters

Captive R&D units	National Capital Region Ahmedabad Mumbai Aurangabad Hyderabad Bangalore Chennai
Contract R&D units	Mumbai Hyderabad Bangalore Chennai Ahmedabad

Source: E&Y Analysis

Enabling research infrastructure

- The country has over 450 institutes/colleges and departments imparting pharmacy education
- More than 25,000 pharmacy graduates pass out from these institutes every year

Key Research Institutes in India
Central Drug Research Institute (CDRI), Lucknow
National Institute of Pharmaceutical Education & Research (NIPER), Mohali
Indian Institutes of Chemical Technology (IICT), Hyderabad
Centre for Cell & Molecular Biology (CCMB), Hyderabad
Indian Institute of Chemical Biology (IICB), Kolkata
Indian Toxicology Research Institute (ITRI), Lucknow
Institute of Genomic and Integrated Biology (IGIB), New Delhi
Institute of Microbial Technology (IMTECH), Chandigarh
National Chemical Laboratory (NCL), Pune
National Centre for Biological Sciences (NCBS), Bangalore
Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore
Centre for DNA Fingerprinting and Diagnostics (CDFD), Hyderabad
Indian Institute of Science (IISc), Bangalore
National Institute of Immunology (NII), New Delhi

Enabling research infrastructure

Talent statistics

- Around 1,000 biotech and biochemistry postgraduates pass out every year
- Around 10,000 chemistry postgraduate students every year
- Around 2,500 chemical engineering students pass out every year. India had a pool of around 50,000 chemical engineering graduates till 2004-05
- Around 4,500 students pursue PhDs in various science streams
- 1,000 students pursue PhDs in engineering stream
- 1,000 students pursue PhDs in chemistry

Source: CRIS INFAC

Enabling research infrastructure

Case study: Government to introduce four more NIPERS

- The National Institute of Pharmaceutical Education and Research, India, was established by the Government of India to cater to the long-standing demand for setting up a dedicated nodal institution for quality higher education and advanced research in the pharmaceutical sciences. The benefits delivered by NIPER prompted the Government to set up four new NIPERs at Kolkata, Ahmedabad, Hyderabad and Hajipur (Bihar) in 2007

POLICY

Regulatory framework

- The main regulatory body in India is the Central Drug Standard Control Organization (CDSCO) under the Ministry of Health and Family Welfare
- CDSCO is presided over by the Drug Controller-General of India (DCGI), who is in charge of approval of licenses for drugs at both the Central and state levels
- India introduced the product patent regime, in accordance with the TRIPS agreement, in January 2005 with an amendment to the patent act
- Foreign direct investment (FDI) up to 100 per cent is permitted through the automatic route in drugs and pharmaceuticals

Source: "India Pharmaceuticals and Healthcare Report Q2 2008", Business Monitor International

Regulatory framework

- For licensable drugs and pharmaceuticals manufactured by recombinant DNA technology and specific cell/tissue targeted formulations, FDI needs prior government approvals
- The industry is undergoing consolidation due to recent legislation and policy updates:
    - Manufacturing unit should adhere to good manufacturing practices (GMP) outlined in Schedule M of the Drugs and Cosmetics Act
    - Manufacturing units are required to comply with the WHO and international standards of production
- National Pharmaceutical Pricing Authority (NPPA) is responsible for fixing and controlling the prices of 74 bulk drugs and formulations under the Essential Commodities Act

Source: "India Pharmaceuticals and Healthcare Report Q2 2008", Business Monitor International

Drug regulatory environment in India in transition

Existing drug regulatory system

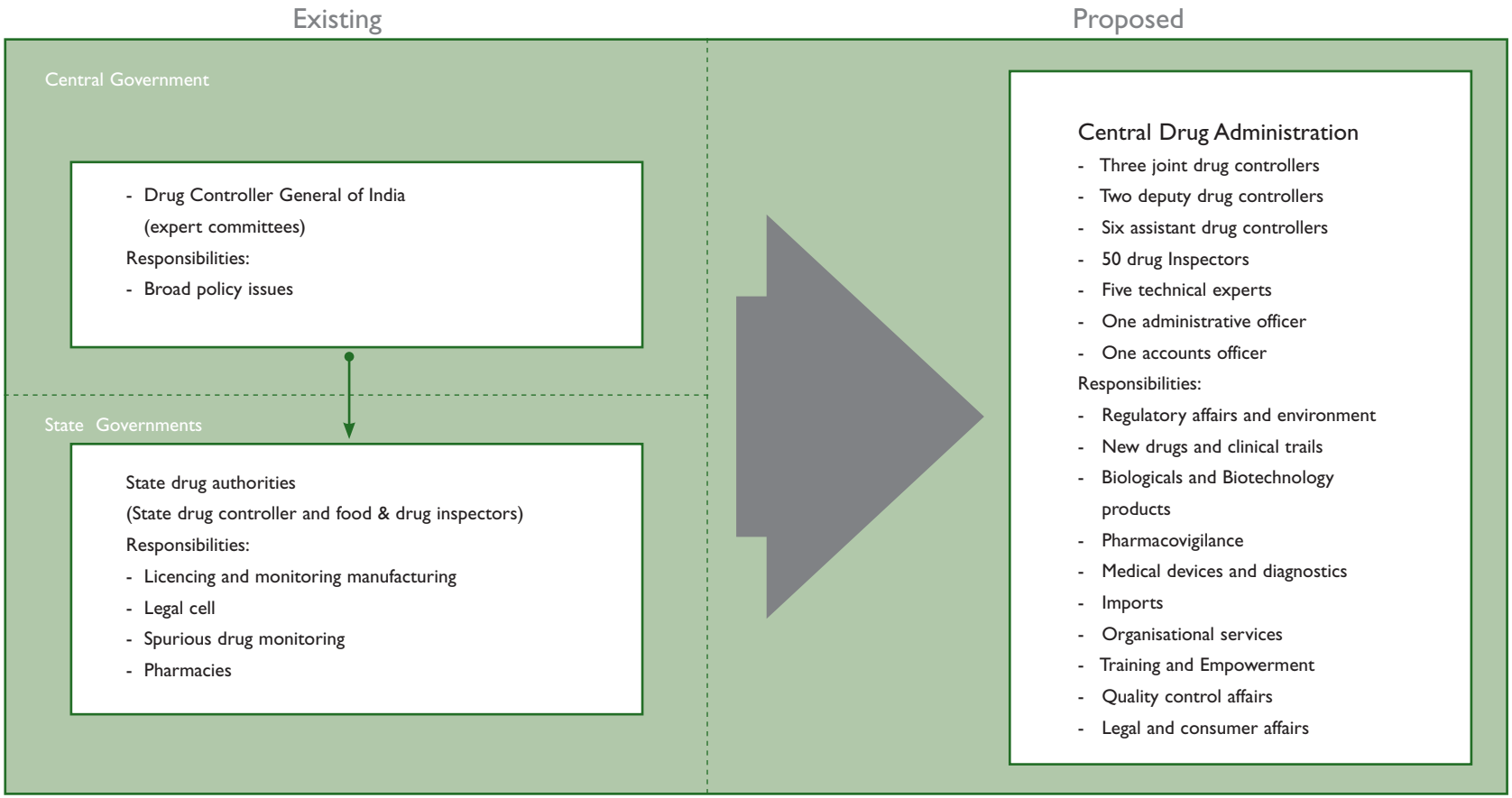
- India has a bifurcated drug regulatory system. Regulatory functions are divided between the Centre and state authorities
- Existing infrastructure at the Centre and the state is inadequate to perform the assigned functions of drug administration with efficiency and speed

Drug regulatory environment in India in transition

Proposed new system

- The Central Cabinet approved the formation of the Central Drug Authority (CDA) in January 2007
- Proposed organisational structure of the CDA would be analogous to the US FDA
- It would be a strong, well equipped, empowered, independent and professionally managed body
- It is expected to facilitate upgradation of the national drugs regulator, uniformity of licencing, and enforcement and improvement in drug regulations
- Efficiency and efficacy of drug administration is expected to be much after this transition

CDA – India's new drug regulator



Budget 2007-2008: Pharmaceutical industry perspective

Budget measures

- Increase in allocation to the health sector by 15 per cent over 2007-2008
- Allocation to the National Rural Health Mission (NRHM) increased to US$ 29.3 billion
- Provision of US$ 2.4 billion to the National Aids Control Programme and allocation of US$ 2.5 billion for eradication of polio with focus on high-risk districts in Uttar Pradesh and Bihar
- Customs duty to be reduced from 10 per cent to five per cent on certain specified life saving drugs and on bulk drugs used for their manufacture; these drugs also exempted from excise duty or countervailing duty

Note: Exchange rate 1US$ = INR 41

Budget 2007-2008: Pharmaceutical industry perspective

Budget measures

- Excise duty on all goods produced in the pharmaceutical sector reduced from 16 per cent to eight per cent
- Anti-AIDS drug, 'Atazanavir', as well as bulk drugs for its manufacture to be exempted from excise duty
- In order to promote outsourcing of research, weighted deduction of 125 per cent on any payment made to companies engaged in R&D

Note: Exchange rate 1US$ = INR 41

Budget 2007-2008: Pharmaceutical industry perspective

Budget impact

- Increase in allocation to the healthcare sector is a positive given the need to ramp up healthcare infrastructure in the country and improve the accessibility of quality healthcare to a larger section of the population
- Reduction of excise duty from 16 per cent to eight per cent positively impacts all pharma companies enabling them to boost profitability given that the excise duty is being paid on MRP.
- Increased allocation of funds for eradication of HIV/AIDS and polio and reduction in customs duty on certain life saving drugs from 10 to five per cent would help companies having product pipeline catering to these segments.

Note: Exchange rate 1US$ = INR 41

Budget 2007-2008: Pharmaceutical industry perspective

Budget impact

- Weighted deduction of 125 per cent on payments made for outsourcing research services is a positive for the sector as a whole given that the emphasis on R&D has increased
- Government would provide US$ 5.2 billion for establishing and developing six National Institutes of Pharmaceutical Education and Research (NIPERs) in the next five years.

Note: Exchange rate 1US$ = INR 41

KEY TRENDS AND DRIVERS

Changing growth fundamentals of domestic market

Increasing penetration driving growth

- Expansion of healthcare facilities in the rural and far flung areas has enhanced accessibility
- Increased government spending on roads, telecommunication and health infrastructure has facilitated the foray of pharmaceutical companies into relatively distant pockets of the market
- With sales revenues of US$ 1.4 billion, Indian pharmaceutical market in rural areas witnessed a growth of 39 per cent as compared to the growth of 18 per cent in the overall domestic market in November 2006*
- New product launches in 2006-07 contributed to only 1 per cent of the market while 15 per cent of the growth is being contributed by volume growth

Source: The Economic Times, January 26, 2007

Changing growth fundamentals of domestic market

Expansion of private sector healthcare driving accessibility

- Medical value travel has led to an investment spurt in the private healthcare services in the country
- There has been accelerated investment from the private sector in healthcare facilities across tier-I and tier-II cities in the country
- Estimated one million beds would be added by 2012 taking the total beds available in the country to over two million**

** *Source: E&Y FICCI Healthcare Report*

Changing growth fundamentals of domestic market

- Estimated US$ 69.7 billion would be invested by private sector in healthcare infrastructure by 2012
- Number of patients visiting Indian hospitals is expected to rise by 30 per cent to 22 million by 2015

Changing growth fundamentals of domestic market

Increasing penetration of medical insurance

- Penetration of medical insurance would grow at a higher pace due to increasing influx of foreign players
- Favourable regulatory changes such as permitting Foreign Direct Investment (FDI) of 51 per cent in the stand-alone health insurance companies and setting the minimum capital requirement at US$ 5.4 million would drive growth in this segment.
- Indian middle class with its increasing purchasing potential is expected to become a major buyer segment
- Increasing penetration of customised insurance plans would drive the affordability, influencing the consumption of medical and healthcare products

Rising disposable income to drive drug consumption

- 16.4 million middle class households with annual income ranging between US$ 4,849 to US$ 24,242 in 2006
- Segment expected to grow at a CAGR of 14 per cent, to touch 28.4 million by 2010 and be the key driver of consumption
- 1.7 million households in the upper income group with annual income greater than US$ 24,242 in 2006
- Aggregated household expenditure on healthcare services increased at a CAGR of 9.3 per cent in the period 1993-94 and 2001-02*
- Healthcare expenditure is expected to rise by 15 per cent per annum*

*Source: E&Y FICCI Healthcare Report

Rising disposable income to drive drug consumption

- High purchasing potential of the burgeoning Indian middle class to drive consumption of healthcare services including pharmaceuticals which constitutes 22.6 per cent of total healthcare expenditure in 2007*

Income distribution across households					
Segment	FY1996	FY2002	FY2006	FY2010	CAGR
Rich (Annual income greater than US$ 24,242)	268,000	807,000	1.7 million	3.8 million	21%
Middle Class (Annual income between US$ 4,849-24,242)	4.5 million	10.7 million	16.4 million	28.4 million	14%
Aspirers (Annual income bewtween US$ 2,182-4,849	28.9 million	41.3 million	53.3 million	75.3 million	7%
Deprived (Annual income less than US$ 2,182)	131.2 million	135.4 million	132.2 million	114.4 million	1%

Source: "The Great Indian Market", August 2005, National Council of Applied Economic Research

*Source: Espicom

Focus of Indian companies shifting from the US

- Pricing pressures and shrinking margins in the generics space and the increasing litigation instances in the US are compelling Indian companies to consider opportunities beyond US
- Indian companies have invested more than US$ 1.2 billion in the European markets

Increasing Focus on Japan

- Japan is the world's second largest pharmaceutical market after the US
- With sales worth US$ 60 billion in 2006, it constitutes around 11 per cent of the global market
- Generics penetration has been extremely low till date in Japan
- Government has initiated a string of pro-generics legislation reforms to increase the penetration upto 40 per cent from the present 16 per cent

Focus of Indian companies shifting from the US

Key pro-generic reforms in Japan

- Generics substitution is allowed
- Physicians are incentivised to prescribe generics medications over branded ones
- Regulatory body would expedite the drug approval process
- Obligations to manufacture locally, removed with these reforms

Key initiatives of Indian companies in Japan
Cadila Healthcare acquired Nippon Universal Pharmaceutical Ltd
Lupin has acquired a majority stake in Japanese generic drug maker Kyowa Pharmaceutical
Dishman has established a Joint Venture (JV) with Azzuro Corporation, in 2007
Ranbaxy has established a JV with Nippon Chemiphar
Strides has entered into a JV with Sorm Corporation Ltd

Indian companies preferring the inorganic growth route

- M&A has been the key strategy adopted by Indian companies to gain a foothold in the export markets
- Large Indian companies have increased their foothold in the regulated markets
- Small and medium sized players are focusing on semi-regulated markets
- Increased penetration, access to established distribution networks and increase in buyer confidence due to localised presence, have been the key factors driving acquisition led growth

Indian companies preferring the inorganic growth route

Date	Announced total value (US$ millions	Target Name	Target Market	Acquirer name
6/11/2008	2460.4	Ranbaxy Laboratories Ltd	India	Daiichi Sankyo Co Ltd
6/11/2008	2237.9	Ranbaxy Laboratories Ltd	India	Daiichi Sankyo Co Ltd
6/11/2008	796.7	Ranbaxy Laboratories Ltd	India	Daiichi Sankyo Co Ltd
4/19/2008	284.5	Dabur Pharma Ltd	India	Fresenius SE
5/3/2007	265.0	Negma Lerads SAS	France	Wockhardt Limited
4/4/2008	226.2	Draxis Health Inc	Canada	Jubilant Organosys Ltd
4/24/2007	122.5	Hollister-Stier Laboratories	United States	Jubilant Organosys Ltd
11/18/2007	72.7	Natrol Inc	United States	Plethico Pharmaceuticals Ltd
4/23/2008	59.8	Dabur Pharma Ltd	India	Fresenius SE
10/3/2007	47.8	Zenotech Laboratories Ltd	India	Ranbaxy Laboratories Ltd
4/15/2008	29.0	Anafortan and CEFL brand groups from Khandelwal Laboratories (K-Lab) Ltd	India	Piramal Healthcare Limited
6/2/2008	27.8	Zandu Pharmaceuticals Works	India	Emami
2/20/2007	26.3	Lupin's Intellectual PPTY & Assets for perindopril		Servier
6/25/2007	26.0	Quimica E Farmaceutica NIKKH	Brazil	Cadila Healthcare Ltd
11/20/2007	25.8	PowerCliff	India	Aspen Pharmacare Holdings Ltd
6/11/2007	24.4	Grandix Pharmaceuticals	India	Strides Arcolab Ltd
7/31/2007	17.7	Rubamin Group	India	ICICI Bank Ltd

Indian companies preferring the inorganic growth route

Date	Announced total value (US$ millions	Target Name	Target Market	Acquirer name
11/20/2007	16.7	ONCO Therapies Ltd	India	Aspen Pharmacare Holdings Ltd
9/27/2007	16.0	Rubamin Laboratories Ltd	India	Lupin Ltd
10/31/2007	14.1	Enaleni Pharmaceuticals Cons	South Africa	Marico Limited
7/26/2007	11.6	Neutrahealth PLC	Britain	Elder Pharmaceuticals Ltd

Source: Bloomberg

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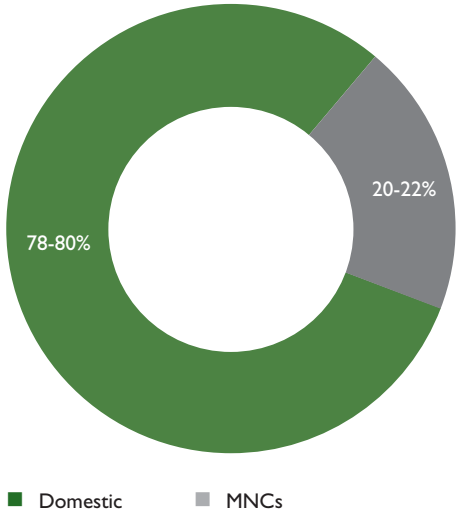
Rising confidence of global pharma companies in the Indian market

- Enactment of Product Patent in 2005 has reposed the confidence of innovator pharmaceutical companies in the Indian market
- Since January 2005, about 17 patented products have been launched in the country

Break-up of Indian pharmaceutical market



Source: E&Y Research

Rising confidence of global pharma companies in the Indian market

- Innovators are treading a cautious path and are awaiting further clarity on several issues such as data protection, patenting of derivatives and pre and post-grant opposition

Patented molecule launches in India after enactment of Product Patent Regime in 2005

Product	Company	Therapeutic category	Launch date
VFend	Pfizer	Systemic Anti-Fungal	Feb 2005
Viagra	Pfizer	Erectile Dysfunction	Dec 2005
Lyrica	Pfizer	Neuropathic	Jan 2006
Caduet	Pfizer	Cardiovascular	Feb 2006
Carvedilol	GSK	Cardiovascular	Mar 2006
Avastin	Roche	Various cancers	Apr 2006
Tarceva	Roche	Lung Cancer	Apr 2006
Tamiflu	Roche	Bird flu	Apr 2006
Pegasys	Roche	Hepatitis C	May 2006
Macugen	Pfizer	Wet Age-Related Macular Degeneration	Jun 2006
Avalide	Sanofi Aventis	Cardiovascular	Jul 2006
Lucentis	Novartis	Wet Age-Related Macular Degeneration	Nov 2006
Ambien	Sanofi Aventis	Insomnia	Jan 2007
Champix	Pfizer	Smoke cessation	Feb 2008
Tykerb	GSK	Breast Cancer	May 2008
Abraxane	Abraxis	Breast Cancer	Jul 2008
Januvia	Merck	Diabetes	Jul 2008

Source: Ernst & Young Research

Global pharmaceutical companies establishing local presence

Case Study: AMRI extends its R&D centere at Hyderabad, India*

- Albany Molecular Research, Inc. (AMRI), a global drug discovery company that provides chemistry services to pharmaceutical and biotechnology companies, has announced the construction of a new 50,000 sq. ft. research and development centre at the Shapoorji Pallonji Biotech Park in Hyderabad, India. Completed in the latter part of 2007, the new R&D centre conducts contract projects in early stage drug discovery research, including custom chemical synthesis and medicinal chemistry.

*Source: EY USAIC Position Paper "Pharma-Biotech Research: Decoding the Indian link"

Recent global players to enter the Indian market

Company	Area of focus in India	Investment (US$ million)
Allergan Inc	Inflammatory, infection, urological indications	3 – 5
Eisai Pharmaceuticals	API processes	120
Dupont	Molecular biology, bio-informatics and polymer synthesis	23
Ratiopharm GmbH	Basic processes	36
Teva	Basic processes	3 – 4
AstraZeneca	TB and NCE research, process and development	15
BMS-Syngene	Basic drug discovery	N/A
Pliva	Basic studies for generics	1
Nektar Therapeutics	Pre-clinical and bio-analytical development	10
Daiichi Sankyo Company Limited	Strengthen their generic presence through acquisition of Ranbaxy	3,400-4,600
Actavis Group	60 per cent of Grandix Pharmaceuticals and API division of Sanmar Specialty Chemicals	NA
Merieux Alliance	60 per cent of Shantha Biotechnics Limited	NA
Mylan Laboratories Inc	Strengthen their generic presence through acquisition of Matrix Laboratories	736

Source: Business Standard: August 27, 2007

Global pharmaceutical companies establishing local presence

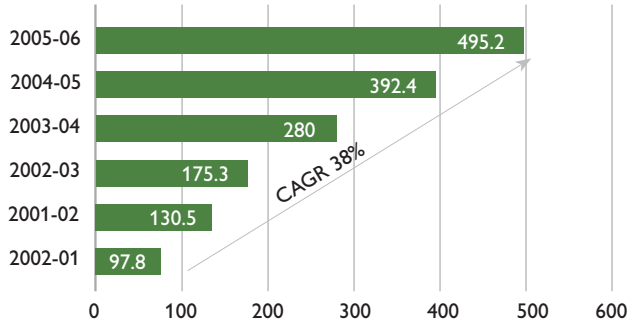
- In addition, a scale-up laboratory, would be used to develop efficient methods for producing larger quantities of active pharmaceutical ingredients and intermediates. When fully staffed, the new facility would add over 100 employees to the company's existing Hyderabad operations, which currently has 19 employees in the facility at ICICI Knowledge Park. The current facility can accommodate up to 40 employees and is expected to reach full capacity in the coming months.

*Source: EY USAIC Position Paper "Pharma-Biotech Research: Decoding the Indian link"

Increasing quest for New Chemical Entities (NCE)

- Indian pharmaceutical companies striving to move up the value chain and make place for themselves in the innovator league
- Enhanced level of investment in R&D capabilities and infrastructure by the industry and the Government
- Dr. Reddy's Laboratories' NCE Balaglitazone is India's the first indigenously developed molecule to enter the Phase III trial.
- Growing R&D pipeline of Indian companies presents significant in-licensing opportunities for global companies.

Indian pharmaceutical R&D expenditure (US$ million)



Source: Assocham

Increasing quest for New Chemical Entities (NCE)

Drug development pipeline of key R&D companies in India				
	Discovery/ Preclinical Phase	Phase I	Phase II	Phase III
Ranbaxy	4	0	1	0
Dr Reddys	1	1	0	1
Glenmark	7	2	3	0
Wockhardt	3	1	1	0
Zydus Cadila	5	3	2	0
Nicholas Piramal	3	0	3	0
Lupin	4	1	2	3
Orchid	1	1	1	0
Sun	3	0	1	0
Torrent	7	0	0	0

Sources: Ernst & Young Research; Company website and annual reports; Life Science Analytics

Strategic partnerships on the rise, 2007-2008

Select Strategic Alliances with Indian Companies		
Indian Company	Overseas Company	Description
Biocon	Bayer Healthcare	Register and market insulin in China
	Invitrogen	Develop and market pharmaceutical grade insulin
	BMS	Establish a research facility in Bangalore with more than 400 scientists
Dr Reddy's	Ciln Tech	Development of an anti-cancer compound
	7TM Pharma	Identification of drugs to treat metabolic disorders
	Albemarle Corp	DRL will distribute the drug globally. Ibuprofen, used for relief from pain, fever
	The Medical House	Create a new self-injectable disposable injector
	Ceragenix Pharm In	Distribute and market EpiCeram, a cream used to treat atopic dermatitis
GVK Biosciences	Wyeth	Develop drug candidates for Wyeth
Jubilant	Forest Laboratories	Develop drug candidate to treat a novel metabolic disorders
	Amgen	Novel drugs in new target areas of interest across multiple therapeutic areas
	Eli Lilly	Collaboration in the area of discovery research
Ranbaxy	Glaxosmithkline	Ranbaxy will advance leads beyond candidate selection to completion of clinical proof of concept. GSK thereafter will conduct further clinical development
	Merck & Co	Develop new products in the field of anti-infectives
	Cipher Pharmaceuticals	Develop and market Cipher's Cip-Isotretinoin in the US market
	Pharma (Yemen)	Marketing alliance

Source: Ernst & Young Research

Strategic partnerships on the rise, 2007-2008

Select Strategic Alliances with Indian Companies		
Indian Company	Overseas Company	Description
Suven Life Sc	Eli Lilly	NCE research for nervous system disorders
Zydus Cadila	Karo Bio AB	Develop glucocorticoid receptor modulators used in the treatment of rheumatoid arthritis
	Prolong Pharma	Development of PEG-EPO, therapeutic protein used for the treatment of anaemia

Source: Ernst & Young Research

In and out licensing deals, 2007-2008

Select Strategic Alliances with Indian Companies					
Indian co	Partner	Deal value (US$ mn)	Nature of deal	Year	Molecule/technology
Alembic	UCB, Belgium	Milestone payment of US$ 11 mn and royalty sales	Out-licensing	2007	NDDS for Keppra XR
Glenmark	Eli Lilly	350	Out-licensing	2007	GRC 6211 - Pain treatment molecule
Lupin Labs	Laboratories Servier	26.7	Out-licensing	2007	Sale of patent applications and other intellectual property for Perindopril, a drug used to treat hypertension and cardiac diseases
Piramal Healthcare	Eli Lilly	Milestone payments of up to US$ 100 million and royalties on sales	In-licensing	2007	Pre-clinical drug candidate for metabolic disorder
	Merck & Co.	Milestone payments of up to US$ 175 million and royalties on sales	In-licensing	2007	Two oncology targets
Ranbaxy	PPD Inc	44	Out-licensing	2007	RBx 10558 (Dyslipidemia)
Venus Remedies	Jiangsu Provincial Institute of Microbiology	NA	In-licensing	2007	Amino-glycoside

Source: Ernst & Young Research

Private Equity (PE) deals in pharmaceuticals and healthcare, 2007

Date	Investors	Investee	Business segment	Per cent stake	Deal value US$ mn
Nov 2007	Citigroup Venture Capital	Unimark Remedies	Pharmaceuticals	27.0	28.79
Nov 2007	Sequoia Capital India	GVK Biosciences	CRAMS	NA	25.48
Nov 2007	ICICI Venture Funds Management	RG Stone Urological Research	Healthcare	NA	10.00
Nov 2007	Indiaco Ventures	Laser Cosmetics	Healthcare	20.8	NA
Nov 2007	BTS Investment Advisors, ICICI Venture Funds, IL&FS Investment Managers and Undisclosed Investors	Arch Pharmalabs	Pharmaceuticals	NA	26.62
Oct 2007	Sequoia Capital India	Sai Advantium Pharma	CRAMS	20.1	12.80
Sep 2007	Avenue Capital Group / Avenue Asia Capital	Morepen Laboratories	Pharmaceuticals	15.0	19.08
Sep 2007	Kotak Investment Advisors	Intas Biopharmaceuticals	Pharmaceuticals	NA	10.00
Sep 2007	Sequoia Capital India	Sai Advantium Pharma	CRAMS	18.3	12.50
Aug 2007	Apax Partners India Advisers	Apollo Hospitals Enterprises	Healthcare	12.00	103.47
Jul 2007	Indivision Investment Advisors	Global Hospitals	Healthcare	25.0	31.00
Jun 2007	International Finance Corporation (IFC)	Max Healthcare Institute Ltd.	Healthcare	NA	74.03
Jun 2007	3 Logi Capital	HealthCare Global Enterprises Ltd.	Healthcare	NA	4.94
May 2007	Blue Ridge Capital LLC.	Ankur Drugs & Pharma Ltd.	CRAMS	NA	5.12
May 2007	International Finance Corporation (IFC)	Granules India Ltd.	Pharmaceuticals	11.5	6.34
May 2007	Standard Chartered Private Equity Ltd.	Morepen Laboratories Ltd.	Pharmaceuticals	10.0	24.38
Apr 2007	ChrysCapital Management Co.	Mankind Pharma Ltd.	Pharmaceuticals	NA	24.74
Mar 2007	TCK Advisers Pvt. Ltd. (Trikona Capital)	Fortis Healthcare Ltd.	Healthcare	3.2	20.04

Source: Ernst & Young research

Private Equity (PE) deals in pharmaceuticals and healthcare, 2007

Date	Investors	Investee	Business segment	Per cent stake	Deal value US$ mn
Jan 2007	One Equity Partners LLC.	Apollo Hospitals Enterprise Ltd.-Western Hospital Corp.	Healthcare	60.0	81.42
Jan 2007	ICICI Venture Funds Management Company Ltd.	Medicare Synergie Pvt Ltd.	Healthcare	NA	29.37
Aug 2008	CVCI and Everest Capital	Nectar Lifesciences	Pharmaceuticals	16.2	23.6
Aug 2008	Kotak Private Equity	Rubicon Research	CRAMS	NA	NA
Aug 2008	IFC	Rockland Hospitals	Healthcare	NA	15.0
Jul 2008	AIF Capital	Bioplus Life Sciences Pvt Ltd	Pharmaceuticals	NA	31.0
Jul 2008	New York Life Investment Management Jacob Ballas India Fund	Themis Laboratories	CRAMS	NA	21.0
Jun 2008	VenturEast	Itero Biopharmaceuticals	Pharmaceuticals	NA	21.0
May 2008	BTS India Private Equity Fund	Parabolic Drugs	Pharmaceuticals	NA	7.0
May 2008	PremjiInvest	HealthCare Global	Healthcare	NA	20.0
May 2008	MPM Capital	Sai Advantium Pharma	CRAMS	NA	NA
Apr 2008	Seedfund and Aavishkaar	Vaatsalya Healthcare Solutions	Healthcare	NA	1.5
Apr 2008	Apax Partners	Apollo Hospitals	Healthcare	1.9	NA
Mar 2008	Actis Capital LLP.	Paras Pharmaceuticals Ltd.	Pharmaceuticals	37.0	NA
Feb 2008	India Value Fund Advisors Pvt. Ltd.	DM Healthcare Pvt Ltd.	Healthcare	26.0	51.1
Jan 2008	ICICI Venture Funds Management Company Ltd.	Vikram Hospital & Heart Care	Healthcare	NA	24.0

Source: Ernst & Young research

Private Equity (PE) deals in pharmaceuticals and healthcare, 2007

Date	Investors	Investee	Business segment	Per cent stake	Deal value US$ mn
Jan 2008	GVFL Ltd.	Century Pharmaceuticals Ltd.	Pharmaceuticals	NA	NA
Jan 2008	Ashmore Investment Management Ltd.	Quality Care India Ltd.	Healthcare	19.0	22.8
Jan 2008	3 Logi Capital	3 Logi Capital	Pharmaceuticals	NA	30.4
Jan 2008	ICICI Venture Funds Management Company Ltd.	Sahyadri Hospitals Ltd.	Healthcare	NA	35.5

Source: Ernst & Young research

- In 2008, PE investment declined 34 per cent to $303.0 million compared to $459.2 million invested during first 10 months of 2007.
- Average PE deal size has came down to $16.8 million from $30.6 million in 2007.
- Healthcare segment witnessed more PE deals than pharmaceuticals business. US$ 170 million worth of deals materialised in 2008 as against US$ 344.3 million worth of deals in 2007.

KEY PLAYERS

Key players

Company Name	Annual sales (US$ millionn, Dec 2007)
Dr. Reddy's Laboratories Ltd	1024
Cipla Ltd	892
Ranbaxy Laboratories	892
Lupin Ltd	500
Aurobindo Pharma Ltd.	486
Glaxosmithkline Pharmaceuticals Ltd	430
Sun Pharmaceutical Inds. Ltd	420
Piramal Healthcare Ltd	417
Cadila Healthcare Ltd	375
Wockhardt Ltd	290
Ipca Laboratories Ltd.	241
Aventis Pharma Ltd	234
Orchid Chemicals & Pharmaceuticals Ltd	228
Torrent Pharmaceuticals Ltd	218
Biocon Ltd	217
Panacea Biotec Ltd	206
Glenmark Pharmaceuticals Ltd.	205
Pfizer Ltd	194
Intas Pharmaceuticals Ltd	191
Matrix Laboratories Ltd	189

KEY MNC companies in India

* Exchange rate 1US$ = INR 41

Source: Prowess

Select domestic players

Ranbaxy

- Incorporated in 1961
- Ranked among the top 10 generics companies in the world
- Ground operations in 49 countries and manufacturing operations in 11 nations
- Exports contribute to around 80 per cent of the total revenues
- The company's net profit in first quarter of 2008 was US$ 39 million.

Select domestic players

Ranbaxy

- Aspires to become a research based pharmaceutical company with revenues of US$ 5 billion by 2012
- Envisions being in top five global generics players by 2012
- TC presence: Anti-infectives, CVS, diabetes, dermatological, neuro-psychiatry, Pain management, GI and Nutritional

Select domestic players

Dr. Reddy's Labs

- Established in 1984
- Ranks among the top 15 generics players in the world
- First pharmaceutical company in Asia-Pacific (outside Japan) to be listed on NYSE
- Presence in 35 countries with operations in over 115 countries
- Generated revenues of US$ 1.5 billion in 2007
- Overseas business contributes to around 86 per cent of the total revenues
- Aspires to become a discovery led global pharmaceutical company and one of the top 10 generic companies in the world
- TC presence: Anti-infectives, CVS, diabetes, dermatological, pain management, GI, nutritional, dental, urological and oncology

Select domestic players

CIPLA

- Set up in 1935
- World's largest manufacturer of cost effective anti-retroviral drugs
- Cipla's products are bought by over 170 countries across all the continents
- Partnerships with nine companies for over 125 products
- Recorded a turnover of US$ 800 million in 2007
- Exports account for over 50 per cent of the overall sales
- Over 100 Drug Master File (DMF) registrations in the US and over 85 in Europe
- Presence across most of the therapeutic category

Select domestic players

Nicholas Piramal India Ltd. (NPIL)

- Came into existence in 1988
- Fourth largest pharmaceutical company and is the leader in the CVS segment
- Has grown primarily on acquisitions, mergers and alliances in the last 15 years
- Merged with Global Bulk Drugs and Fine Chemicals (India) in 2003
- Acquired Pfizer's custom manufacturing plant located in Morpeth (UK)
- NPIL recorded a turnover of US$ 335 million
- Domestic market accounts for approximately 87 per cent of the company's annual sales
- TC presence: Anti-infectives, CVS, diabetes, dermatological, pain management, GI, respiratory, nutritional, CNS and urological

Select foreign players

GlaxoSmithKline

- Two manufacturing units in India, located at Nasik and Thane
- 2000-strong fieldworkers and a country wide network of over 4000 stockists
- Net sales of the pharmaceuticals business segment was US$ 326 million, which constitutes 92 per cent of the company's total sales
- It exported bulk drugs and formulations worth US$ 7.1 million
- Two R&D centres which are approved by the Department of Scientific and Industrial Research, Government of India
- TC presence: Anti-infectives, CVS, diabetes, dermatological, pain management, CNS, GI, nutritional, gynaecological, respiratory, sera and immunoglobulin, hormones

Select foreign players

Pfizer India

- Forayed in the Indian market in 1950
- Manufacturing facility at Thane, Maharashtra
- Launched five patented products since 2005 - Vfend, Viagra, Lyrica, Caduet and Macugen
- Seven of Pfizer's brands feature among the top 100 pharmaceutical brands
- Pfizer Limited (India) has a turnover of US$ 172 million (November 2006)
- Clinical research investments of US$ 15.75 million in India
- TC presence: Anti-infectives, CVS, dermatological, sera and immunoglobulin, pain management, diabetes, CNS, GI, nutritional, gynaecological and respiratory

Select foreign players

AstraZeneca

- R&D, manufacturing and marketing offices in Bangalore
- R&D centre is dedicated to the 'Discovery of Novel Therapies for the Developing World' diseases with more than 90 scientists
- Added a state-of-the-art process R&D facility employing more than 50 scientists
- Sales turnover of US$ 62.9 million in 2006 with a PAT of US$ 11.5 million
- TC presence: Focus on respiratory, maternal health, oncology, infection, pain control and anaesthesia

Select foreign players

Sanofi Aventis

- Incorporated in1956 under the name Hoechst Fedco Pharma Pvt. Ltd.
- 1,840 employees
- Manufacturing facilities in Ankleshwar and Goa
- TC presence: CVS, thrombosis, oncology, metabolic disorders, CNS, internal medicine and vaccines

Key contract research organisations in India

Company	Services Portfolio	Clients
Advinus Therapeutic	Drug discovery, medicinal chemistry, toxicology studies	Development projects for Merck
Avra Labs	Product chemistry, organic synthesis, chiral synthesis and technology	Top 20 big pharma and biotech companies
BioArch Research Solutions	Medicinal chemistry, custom synthesis and formulations, preclinical pharmabiology, BA/BE, CRAMS	NA
Aurigene	Lead generation and optimisation and early computational chemistry aided ligand design, mining and screening of novel chemical entities. Early animal work involving ADME and toxicity	Collaborative discovery programmes with Novo Nordisk on Diabetes and discovery services with Rheosciences, Denmark
GVK Biosciences	Medicinal chemistry, bioinformatics, clinical trials, custom synthesis and drug discovery	Pharma/ biotech companies across US, UK, Germany and Japan; Wyeth, Biogen, Merck & Co (50 projects)
Hikal Ltd.	Medicinal chemistry, custom synthesis , CRAMS	Five pharma companies also work in agrochemical
Innovasynth	Medicinal chemistry, custom synthesis, CRAMS	Works for big pharma companies
Jubilant Organosys	Bioinformatics, clinical trials, CRAMS, medicinal chemistry services, custom synthesis and drug discovery services	60 clients/20 projects at any time
Matrix	CRAMS, medicinal chemistry, custom synthesis and dossier development.	Rigen Inc., GSK India, Merck Kgaa
Procitius Research	Medicinal chemistry, custom synthesis, biology services, clinical trials and CRAMS	NA

Source: E&Y Research

Key contract research organisations in India

Company	Services Portfolio	Clients
Sai Life Sciences	Medicinal chemistry services, scale up services	200 projects for almost 30 MNC pharmaceutical and biotech companies
Shasun Chemicals & Drugs	CRAMS, organic chemistry, medicinal chemistry, custom synthesis and biology services like protein purification, microbial fermentation and process optimisation	NA
Suven Life Sciences	CRAMS, medicinal chemistry services, custom synthesis and clinical trials (ACT and Sipra), drug discovery services	About 18 to 20 international clients from across US and Europe
Syngene	Medicinal chemistry, custom synthesis and drug discovery, affiliate clinigene	Novartis, Merck & Co.
TCG	Silicogene, medicinal chemistry, drug discovery services	NA
Bharavi Labs	Medicinal chemistry services, custom synthesis and drug discovery services	20 to 25 ongoing projects. Works on FTE and ongoing contracts

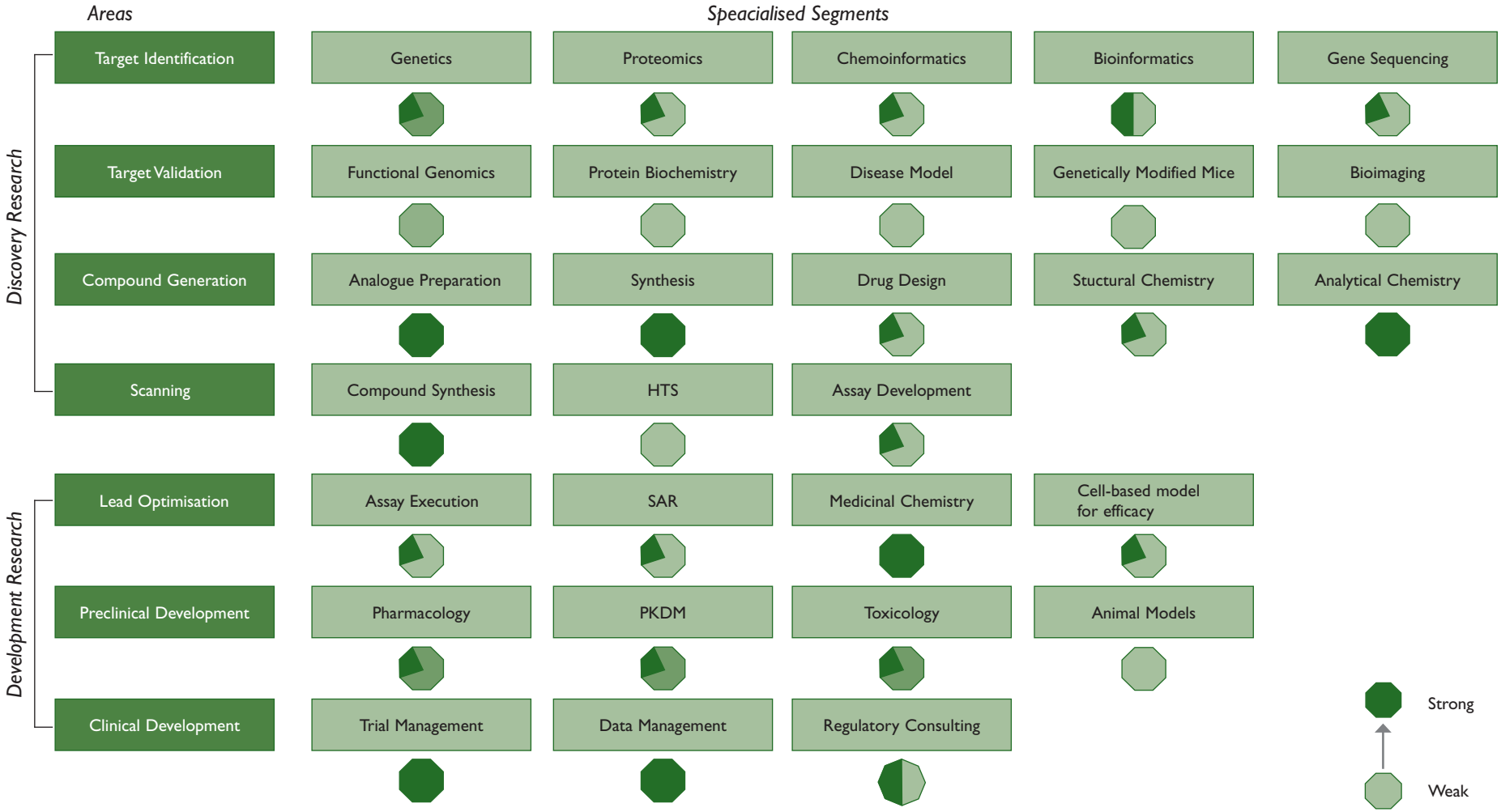
Source: E&Y Research

KEY OPPORTUNITIES

Contract research – India an emerging hotspot

- Contract research recorded a growth of 45 per cent to reach $ 175 million in 2006
- Presently, a major portion of the services is limited to chemistry based lead identification/optimisation, preclinical and clinical research stages
- Select companies provide biology based services for target validation; notable examples are Avesthagen, Ocimum Biosolutions and TCG Lifesciences
- Bioinformatics companies that offer research enabling software technologies are also emerging as a valuable segment

Contract research – India an emerging hotspot



Source: Offshoring in the Pharmaceutical Industry: Mridula Pore,Yu Pu, Charles Cooney, MIT, E&Y Analysis

Clinical research – leveraging India's advantage

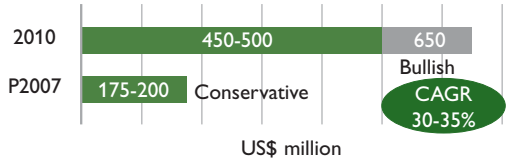
- Clinical research market in India was estimated at around US$ 200 million in 2006 and is expected to become US$ 400 to 500 million by 2010, moving with a high CAGR of 30 to 35 per cent
- Outsourced clinical trials generated an estimated US$ 220 million in revenues for Indian companies in this sector, and there are predictions that the Indian clinical trials market will be valued between US$ 500 million and US$ one billion by 2010.
- Clinical trials for NCEs constitute around 60 per cent of the total revenue mix while the rest 40 per cent is contributed by the BA/BE studies for generics development. However, by volume around 70 per cent of the work is directed towards generic research
- The market for BA/BE studies in India was estimated around US$ 60 to 70 million in 2006. It is estimated to reach US$ 150 to 200 million by 2010-11, growing at a CAGR of 18 to 20 per cent

Key disease populations

Indications	Incidence
Cardiovascular diseases	Two million deaths every year
Diabetes	An estimated 30 to 35 million diabetics in 2005
Cancer	Two million cases; 500,000 new cases detected each year
Infectious diseases	Represent 51 per cent of deaths (HIV, malaria, tuberculosis, tetanus, diarrhea, acute respiratory infections, etc)
Other medical conditions	40 million asthmatics, 1.5 million patients of Alzheimer's, 10 million with major psychiatric disorders

Source: E&Y Research

Forecasted clinical research market US$ million

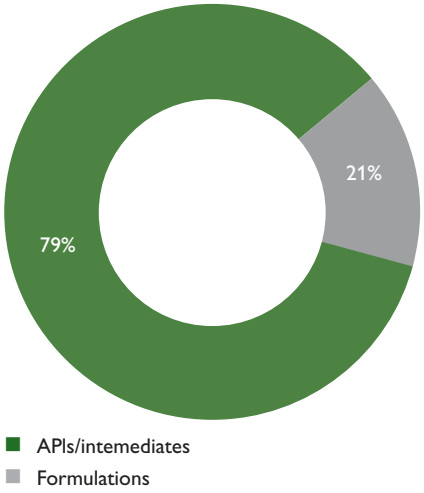


Source: compiled from industry sources, p- projected

Contract Manufacturing (CM)

- Contract research and manufacturing (CRAMS) market in India was valued at US$ 800.4 million, of which contract manufacturing accounted for 84 per cent of the total market size.
- Contract research, excluding clinical trials accounted for the remaining 16 per cent.
- Both contract research and manufacturing segments registered a robust growth of over 45 per cent in 2006-2007.
- The market is estimated to increase to US$ one billion by 2010.
- By 2010, the demand for contract manufacturing of formulations is likely to be around US$ 210 to 300 million. On the other hand, APIs and intermediate demand is likely to be in the range of US$ 600 to 700 million by 2010.

India contract manufacturing (2010)



Source: India Infoline

Source: Assocham

Contract Manufacturing (CM)

Key Growth Drivers

- Rise in the confidence of global pharma due to enforcement of product patent
- Large capital investment by Indian companies in building world class production facilities
- Increased service offerings by Indian players

Source: Assocham

Oncology – Indian players eyeing the global opportunity

- Cancer accounts for an estimated 7.6 million deaths globally
- Treatment for cancer is estimated to become the largest sales value area at US$ 55 billion by 2009, from the current US$ 45 billion
- The oncology pipeline is the richest in number and potential in value, with a large number of pharmaceutical and biotech companies focusing on oncology drugs

Oncology – Indian players eyeing the global opportunity

- Over 50 new oncology products are expected to be launched in the next five years with new players entering the market
- About 30 per cent of all launches by 2010 will be in oncology
- The global oncology drug market is growing at 17 per cent annually
- Presently, the Indian oncology market stands at US$ 18.6 million and is expected to treble by 2010

Oncology – Indian players eyeing the global opportunity

- Biocon recently launched its monoclonal antibody-based drug BIOMAb-EGFR for treating solid tumours. The company is looking at introducing products in the US and Europe
- Dabur Pharmaceuticals introduced a nano technology based chemotherapy agent, Nanoxel, in the country and plans to take it to the US and the European markets and has already planned clinical trials there
- Ranbaxy Laboratories Ltd has entered into a strategic alliance with Zenotech Laboratories Ltd. Ranbaxy will market Zenotech's oncology cytotoxic injectible products under the Ranbaxy label, leveraging its global marketing and distribution network, in the key markets of Latin America (LATAM), including Brazil and Mexico, Russia and other CIS markets

Pharmaceutical retail – emerging growth segment

- With revenues of US$ 130 to 140 million in 2006-07, organised retail constitutes just two per cent of the pharmaceutical retail market in India
- It is expected to grow at a high y-o-y growth of 30 to 40 per cent and is likely to become US$ 400 to 530 million market by 2010
- Government contemplating to increase the FDI cap to 51 per cent in the case of single brand product
- Sensing the tremendous potential of organised retail, US retail majors Wal-Mart, Boots and Asian retailer AS Watson are expected to soon make a major foray in to the domestic market

Current players' expansion plans

Pharmacy Chains	Plans
Apollo Pharmacy (part of the Apollo Hospital Group)	To operate more than 1000 outlets by 2009.
Subhiksha	Presently has over 1500 outlets
Medicine Shoppe (part of Medicine Shoppe International Group)	To double the count to 250 by the end of 2007
Guardian Lifecare	Regional player with 65 pharmacies expected to increase to 3,500 by 2015
98.4	Has a presence of close to 60 outlets and plans to increase to more than treble its count to 300 by 2011.

Sources: Global Insight and news articles

Indian pharmaceutical players - retail plans

Case Study: Reliance Retail

- The Mukesh Dhirubhai Ambani Group is planning a foray into the pharma retail segment. This is part of an overall strategy for building super-malls in 21 zones across India. Through its biopharmaceutical venture, Reliance Life Sciences, the firm is due to increase investments, targeting US$ 33 billion of the local market by 2012
- The company has allocated US$ 2.2 billion for setting up production facilities. The firm is also keen on acquiring small local drug-producing units and companies to offer low-margin drugs at the retail level

Indian pharmaceutical players - retail plans

Case Study: AIOCD

- All India Organisation of Chemists and Druggists (AIOCD) is a leading industry association with a membership of around 6,00,000 pharma retailers and wholesalers in the country. It would facilitate the creation of a centralised procurement system and a Special Purpose Vehicle (SPV) network in each state
- A centralised procurement system is part of a general push by AIOCD towards a network of small pharma retailers, who have dominated the Indian market for decades. This initiative was test-piloted last year in Maharashtra, where the largest network of small pharma retailers exists

Indian pharmaceutical players - retail plans

Case Study: Ranbaxy/Fortis

- Ranbaxy-backed Fortis Healthcare has laid plans to enter the pharma retail segment, investing close to US$ 1.7 billion. Fortis will roll out 1,000 shops covering 400 towns across the country in five years. The first 250 of these are expected to be operational by the end of 2008-09. The retail unit will promote products and services offered by both Ranbaxy Laboratories and Fortis Healthcare

Indian pharmaceutical players - retail plans

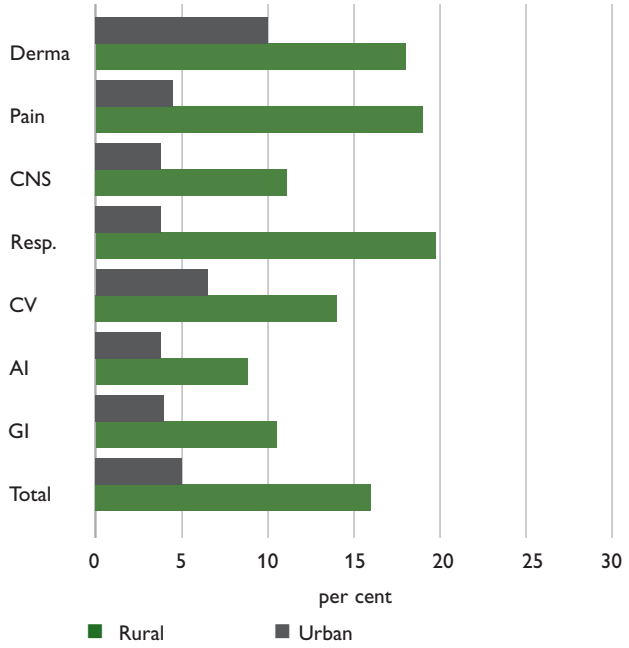
Case Study: Zydus Cadila

- Zydus Cadila plans to create a separate company from its health product lines. The first outlet of this new company was commissioned in 2007. The company expects to enhance its product range by launching a smoking-cessation product and hopes to improve its revenues by close to 300 per cent to US$ one billion from the current US$ 266 million

Rural market – opportunities at the bottom of the pyramid

- 65 per cent of the population resides in the rural areas with limited or no access to medicines and other healthcare facilities
- With a growth rate of 39 per cent in 2006, rural market has outstripped the growth in the urban region, across most of the therapeutic categories in both value and volume terms
- General physician driven segments such as anti-infectives, analgesics, etc. have registered high growth compared to the specialist-driven segments such as CNS
- Non-communicable diseases such as cancer, blindness, mental illness, hypertension, diabetes, HIV/AIDS, accidents and injuries are also on the rise

Volume growth (2005-06)



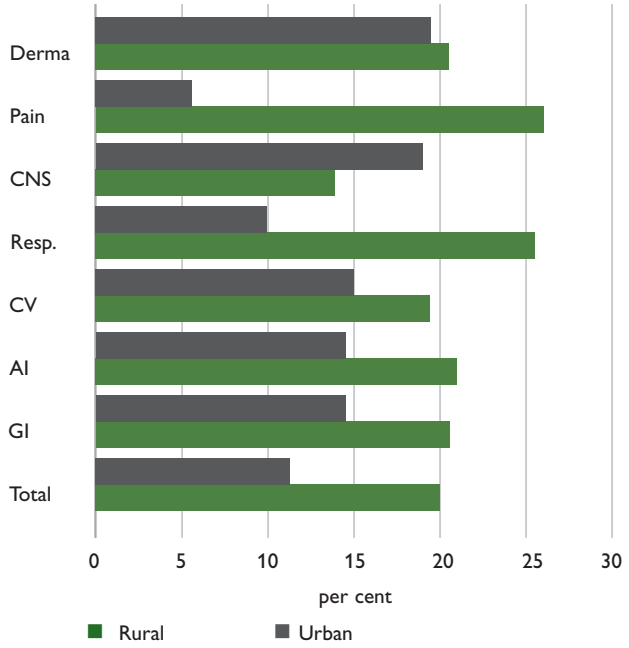
Source: Enam

Rural market – opportunities at the bottom of the pyramid

Lifestyle disease on the rise in rural areas

- According to a recent study conducted by the George Institute for International Health in 45 villages in east and west Godavari districts of Andhra Pradesh, diseases of the cardiovascular system, such as heart attacks and stroke caused 32 per cent of deaths in this region

Volume growth (2005-06)



Source: Enam

Biopharma – domestic players eyeing the global bio-similar market

- Globally, sales of biological drugs are estimated to reach US$ 52 billion by 2010
- Leading Indian companies are intensifying their focus on the biotech segment
- Presently one in every four drugs under development is biologic
- Moreover, Indian players are also eyeing the huge opportunity presented by biosimilars across the globe

Biopharma – domestic players eyeing the global bio-similar market

- Leading Indian pharmaceutical companies such as Biocon, Ranbaxy, Dr.Reddy's, Wockhardt and Glenmark have invested in manufacturing facilities for biosimilars
- A legal framework for biosimilars has been established in the EU
- Further, US is expected to set up an approval framework for biosimilars soon

Biopharma – domestic players eying the global bio-similar market

Key Initiatives of Indian Companies

- Ranbaxy Laboratories has signed a development and marketing agreement with generic injectables company Zenotech Laboratories to produce its first biosimilar G-CSF
- Reliance Life Sciences has bought 74 per cent stake in GeneMedix. The joint entity will develop biosimilar drugs and offer full service in CRAMS
- DRL has created a copy of Roche's Rituximab which is used to treat Non-Hodgkin's lymphoma which generated more than US$ two billion last year. Marketed by Genentech Inc. and Biogen Idec Inc. as Rituxan in the US
- Dr. Reddy's sells Grafeel or filgrastim in India, which is used to boost white blood-cell production and is marketed by Amgen in the US

Biopharma – domestic players eyeing the global bio-similar market

- Glenmark has set up biologics research facility in Switzerland with 25+ European scientists. It expects first biological lead to enter into clinics in 2009 and two more by 2010
- Glenmark tied up with US based Dyax to expedite biologics research. Dyax will perform funded research for three of Glenmark's targets in the areas of inflammation and oncology
- Biocon has started clinical trial on Insugen, BIOMAb-EGFR trials in the regulated markets

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