PHARMACEUTICAL INDUSTRY PROFILE

I. INDUSTRY BACKGROUND

A. Industry Definition

The U.S. pharmaceutical industry is defined by the Census Bureau as companies engaged in researching, developing, manufacturing, and marketing drugs and biologicals for human or veterinary use. For statistical purposes, the U.S. Government classifies all medicines as part of the pharmaceutical industry, including products developed through the use of biotechnology (see Box 1).

B. Key Products

The main products covered in this profile are drugs and biologicals, which are substances intended for use in the diagnosis, cure, mitigation, treatment, or prevention of diseases. Chemically-derived drugs are produced in forms such as pills, tablets, capsules, vials, ointments, powders, solutions, and suspensions. Biologicals include a wide range of products such as vaccines, therapeutic proteins, blood and blood components, anti-sera, tissues, etc.

Box 1. Definition of Biotechnology

"Biotechnology" has been defined by the U.S. Department of Commerce and the White House Office of Science and Technology Policy as a set of enabling "technologies that use organisms or its components to make products; or to modify plants, animals, and micro-organisms to carry desired traits." Advances in molecular biology have led to the development of recombinant DNA or genetic engineering, monoclonal antibodies, gene therapy, DNA amplification or PCR, genomics, stem cells, RNA, and a host of other technologies that have become workaday tools in life sciences research. These techniques have provided scientists with the means to discover the underlying genetic basis for diseases and develop new medically useful substances with far greater precision and speed than previously possible.

The highest revenue classes of drugs are used in the treatment of cancers, blood cholesterol, respiratory conditions, digestive disorders, diabetes, high blood pressure, mental disorders, epilepsy, and autoimmune disorders such as arthritis, blood clots, HIV, and anemia.

C. North American Industry Classification System (NAICS) Codes for Pharmaceuticals and Biotechnology

The North American Industry Classification System (NAICS) is the standard used by Federal statistical agencies, such as the Census Bureau and the Bureau of Labor Statistics, to classify business establishments for the purpose of collecting, analyzing, and publishing data related to the U.S. economy. Data on companies that produce drugs and biologics, such as geographic location and employment, are classified under *NAICS 3254, "Pharmaceutical & Medicine Manufacturing."* Biotechnology research is captured under *NAICS 541711, "Research and Development in Biotechnology."*

Box 2. North American Classification System Codes
Pharmaceuticals and Biotechnology

3254	Pharmaceutical and Medicine Manufacturing
325411	Medicinals and Botanicals
325412	Pharmaceutical Preparations
325413	*In Vitro* Diagnostics
325414	Biologicals
541711	Research and Development in Biotechnology

***Note*:** The Census Bureau defines *In vitro* Diagnostics (IVDs) as part of the pharmaceutical industry. The data presented in this paper includes the IVDs sector. Due to its regulatory and marketing characteristics, the Office of Health and Consumer Goods in ITA includes IVDs as part of the medical devices industry and issues pertaining to IVDs are discussed in a separate paper.

II. INDUSTRY CHARACTERISTICS

Large, diversified and globalized, the U.S. pharmaceutical industry is one of the most critical and competitive sectors in the economy. Pharmaceuticals have brought tremendous benefits for public health and economic productivity by saving lives, increasing life spans, reducing suffering, preventing surgeries, and shortening hospital stays.

A. Industry Dimensions

In addition to improving human health, the U.S. pharmaceutical industry plays a crucial role in the economy. According to the 2007 Economic Census, there were an estimated 1,552 companies in the U.S. that develop, manufacture and market drug and biological products.[1] In 2008, the industry shipped products valued at about $195 billion.

Employment: The industry is knowledge-intensive and employs a significant number of high technology workers[2]. The Bureau of Labor Statistics estimates that as of May 2010 the industry employed about 416,000 persons at pharmaceutical manufacturing and biotechnology research firms. Manufacturing firms employed about 278,000 people,[3] with employment highest in California, New Jersey, Puerto Rico, Pennsylvania, New York, Indiana, and North Carolina.[4] Firms that principally conduct biotechnology research employed an additional 138,000 people. The largest concentration of biotechnology clusters were in: Massachusetts, California, Pennsylvania, Maryland, New Jersey, North Carolina, and Illinois.[5] Average annual wages in 2008 ranged from $96,000 in pharmaceutical manufacturing to $105,000 in biotechnology research. Due to restructuring in the pharmaceutical industry, employment has declined by 5.8% from a peak of 295,000 in 2007 and is expected to decline further due to industry consolidation.

Research and Development: According to a study by the National Science Foundation, the pharmaceutical industry is a close second to the computer and electronics sector in the level of R&D investment.[6] The industry allocates about 19 percent of sales revenues to R&D activities, according to a private sector survey. Pharmaceutical and biotechnology firms expended $65

billion on R&D in 2009, with most (about 70 percent) spent in the U.S. Industry R&D investment has been under strain in recent years and spending by large firms has declined by 4 percent since 2007.[7]

The pharmaceutical industry reports that 2,950 medicines are in development, up from 1,800 a decade earlier.[8] Over 600 of these products are derived through biotechnology. The principal targets for R&D investment are in treatments for cancers, infectious diseases, autoimmune conditions, and HIV/AIDS,[9] and other diseases for which no effective treatments exist.

B. Product Sectors

The major segments of the pharmaceutical industry are: originator chemical drugs, generics, over-the-counter drugs, active pharmaceutical ingredients, excipients, biologicals, and biosimilars. Their key characteristics are described below:

Originator chemically-synthesized drugs are developed as a result of extensive research and development (R&D) and clinical trials in both humans and animals prior to being approved by the U.S. Food and Drug Administration (FDA). The originator relies on patents and other forms of intellectual property rights to justify the investment required to bring a product to market. The pharmaceutical industry is heavily dependent on the development of new molecules to replace the revenue stream of older drugs that have come to the expiration of their patent terms. The cost of bringing a new drug to market in the U.S. has been estimated from $500 million to more than $2 billion, depending on the target treatment.[10] According to the Pharmaceutical Research Manufacturers of America (PhRMA), only one in 1,000 compounds that enter preclinical testing makes it to human clinical trials, one out of five drug candidates tested in humans is approved, and two out of ten marketed drugs generate revenues greater than R&D costs.[11]

Generic drugs are duplicative copies of originator chemically-synthesized drugs that contain the same active ingredient, and are identical in strength, dosage form, and route of administration. In the U.S., upon patent expiration or a successful challenge of relevant patents that are listed by the originator in the electronic version of the Approved Drug Products with Therapeutic Equivalence ("Orange Book"), a manufacturer can produce a generic drug that references an originator drug that was approved under the Drugs and Cosmetic Act, as long as the FDA grants final approval to the applicant for the product.[12] A generic version of the drug must be bioequivalent to the originator drug and meet all other regulatory requirements. In general, a generic drug does not have to duplicate the clinical trial requirements for market approval with the exception of bioequivalence trials.

Generics that are sold under the chemical name are known as "commodity generics." Commodity generics are often manufactured by more than one company and compete mainly on price. "Branded generics" are marketed by a drug company under its own label and typically command higher prices than non-brand generics.

Over-the-Counter (OTC) drugs are distinguished from originator and generic drugs in that consumers do not need prescriptions to purchase the drugs. OTC drugs are considered by regulators to be safe for self-diagnosis and self-medication. In the U.S., there are an estimated 100,000 OTC drug products marketed and sold in a variety of outlets such as

pharmacies, grocery stores and convenience stores. Sometimes drugs become OTC as a result of extensive market use that enables regulators to determine that the product is safe to dispense without a prescription. Also, the originator may move to apply to have a drug move to OTC status upon patent expiration. The FDA determines if a drug can be sold as an OTC medication.

Pharmaceutical Substances: Active Pharmaceutical Ingredients (APIs) and Excipients. Medication, in dosage form, is composed of active pharmaceutical ingredients (APIs) and excipients. APIs are the ingredients that make drugs effective. Excipients are the inert substances that give a medication its form, such as cornstarch (to make a tablet) or sterile water (to make a liquid) and serve as a delivery vehicle to transport the active ingredient to the site in the body where the drug is intended to exert its action. Other functions of excipients include keeping the drug from being released too early; allowing the drug to disintegrate into particles small enough to reach the blood stream more quickly; protecting the product's stability so it will be at maximum effectiveness at time of use; and improving its taste and appearance.[13] APIs and excipients must meet standards established by pharmaceutical standards-setting bodies (*e.g.*, pharmacopeias), including purity, toxicity and absorption rates.

Biologicals are often referred to as "biotech" drugs, "large-molecular weight" drugs or "biopharmaceuticals." In contrast to chemically-synthesized drugs, which have a well-defined structure and can be thoroughly verified, biological drugs are derived from living material (human, animal, microorganism or plant), are vastly larger and more complex in structure, and thus are difficult to characterize well. Many vaccines and therapeutic biologicals are developed and produced through the application of modern biotechnology. Biotechnology-derived drugs are often administered by injection in physician offices. Like originator chemical drugs, biologicals are the end-result of extensive R&D and clinical trials. The timeline from discovery to marketing approval for a new molecule can run 10-15 years and cost $1.2 billion. As such, developers rely on intellectual property rights and eventual reimbursement by payers to justify the high costs and risks associated with the development of new biologicals.

Biosimilars, or Follow-on Biologics, are versions of biological products that reference the originator product in applications submitted for marketing approval to a regulatory body. With the signing into law of healthcare reform legislation in March 2010 (Patient Protection and Affordable Care Act),[14] the FDA is authorized to approve biosimilars, or follow-on versions of biologic drugs that were approved under the Public Health Service Act.[15] The FDA is in the process of developing implementing guidelines and procedures that would, among other things, determine the extent of testing necessary to establish similarity of a follow-on product with a reference originator biologic. The EU, Canada and Japan and others have established guidelines for biosimilars.

III. U.S. MARKET

A. U.S. Market Size

The U.S. pharmaceutical market, the world's largest, was estimated at $300 billion in 2009.[16] Growth has slowed in recent years due notably to an increase in the number of drugs losing

patent protection and replacement by generic equivalents. New product introduction has not kept pace and some newer products are specialty and orphan drugs with smaller patient populations. Safety issues have also raised scrutiny of drugs in development and on the market. Other reasons for slowing growth are the impact of increased patient co-pays and the economic recession.[17]

The fastest growing segments of the pharmaceutical market are biologicals and generics. Biotechnology-derived medicines, valued at $58.4 billion in 2008, are a growing component of the pharmaceutical industry, accounting for a quarter of all new drugs in clinical trials or awaiting FDA approval.[18] Over the years, many biotechnology firms have been acquired by larger pharmaceutical companies. Amgen, Genzyme and Biogen Idec are among the top independent biotechnology companies.

The U.S. generic drug market is estimated at about $34 billion, or 41 percent of global sales.[19] Generic drugs' share of filled prescriptions has risen from 19 percent in 1984 to 75 percent in 2009.[20] The driving factor behind this growth is the savings that generics offer. In the U.S., generics with multiple competing firms can cost between 70-80 percent less than reference originator drugs. Automatic substitution in the U.S. requires a pharmacist to dispense the lowest cost pharmaceutical and therapeutically equivalent drug unless a physician writes a specific prohibition on the prescription. Generic drug sales are expected to ramp up, reaching $54 billion in U.S. sales by 2014[21] due to an unprecedented number of patented drugs (with current sales estimated at $142 billion) going off-patent in the next five years.[22] The largest generic manufacturers operating in the U.S. are: Teva, Sandoz (Novartis), Mylan, and Watson.

The nonprescription drug or OTC market segment is driven by pharmaceutical firms converting drugs from prescription to OTC status and marketed under their own labels. Expansion in the aged population, and a growing consumer trend to self-medicate, are factors underlying its growth.

B. Domestic Environment

The United States has a supportive domestic environment for the development and commercialization of pharmaceuticals. Its strengths include a robust intellectual property system that recognizes and rewards innovation and a science-based regulatory system that is considered the most rigorous in the world. FDA approval facilitates regulatory approval in other countries, especially in developing economies. The U.S. is the world's largest market by value and its reimbursement and pricing environment is considered by industry as the most favorable in terms of recognizing the value of innovative drugs. Moreover, the U.S. also has the world's largest scientific research base fostered by decades-long government biomedical research funding that has been instrumental in supporting medical product development.

These factors, along with capital markets and technology transfer laws, have helped foster the formation of the largest global concentration of biotechnology companies. According to an industry survey by Ernst and Young, the U.S. accounts for over 60 percent of the world's employment in dedicated biotechnology firms and 70 percent of R&D.[23] Significant biotechnology clusters are found in California, Massachusetts, New Jersey, New York, Pennsylvania, and Maryland. Pharmaceutical players, both foreign and domestic, have established facilities near leading universities and research hospitals. Acquisitions of

biotechnology companies, in-licensing of products, and R&D alliances have been popular routes for established pharmaceutical companies to diversify into biologicals.

Research and Development Incentives: To encourage the development of new drugs for unmet needs, the USG enacted the Orphan Drug Act (ODA) in 1983. The ODA allows manufacturers that develop drugs used to treat diseases that affect less than 200,000 people in the U.S. to obtain market exclusivity for seven years following FDA approval and tax credits for R&D. In the decade before the adoption of ODA, only ten drugs had been developed for the treatment of rare diseases; since its passage, more than 350 orphan drugs have been approved by the FDA. Nearly one-third of all new approved drugs and biologics are orphan products.[24]

The Patient Protection and Affordable Care Act (PPACA) of 2010 includes temporary measures to foster drug development for unmet needs. The Therapeutic Discovery Project Credit provides $1 billion in competitive tax credits and grants to cover up to 50 percent of eligible expenses incurred in 2009-2010 related to research on certain critical therapies (such as hiring research staff and conducting clinical trials) at small companies with fewer than 250 employees. The legislation also established the Cures Acceleration Network program that provides an estimated $500 million for competitive research grants to companies, universities and patient groups that lack the funding to commercialize promising treatments for high needs.

Regulatory Environment: The FDA regulates the testing, approval, production and marketing of drugs and biologics. The level of regulatory scrutiny varies according to the type of product and level of potential risk. New drugs and biologicals are subject to the most rigorous evaluation to prove safety and efficacy for its intended use. The FDA is in the process of developing guidelines and policies to provide industry with a regulatory pathway for approval of biosimilar or "follow-on" versions of biotechnology-derived drugs that were approved under the Public Health Service Act and whose patents have expired. Other organizations that develop drug quality and registration standards include the U.S. Pharmacopoeia, the International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH), and the World Health Organization.

Import Safety: Although the U.S. drug supply is considered one of the safest in the world, the globalization of the pharmaceutical supply chain has increased challenges for the FDA and manufacturers in ensuring that imported ingredients and finished dosage drugs meet safety and efficacy standards. For example, China and India have become the largest sources of APIs and generic drugs for the U.S. market, respectively. The FDA has been working with its counterpart regulatory authorities to build cooperation and regulatory capacity. Although FDA is increasing inspections and established field offices in China, India and elsewhere,[25] manufacturers of drugs sold in the U.S. will be relied upon to build in necessary safety procedures throughout the production and marketing supply chain.[26]

Healthcare Financing: The healthcare reform law (PPACA) is expected to have a significant impact on the pharmaceutical industry by both expanding the pool of insured potential consumers by 32 million people over the next decade and by requiring manufacturers that participate in Medicaid and Medicare to shoulder some of the costs. The cost to participating firms is estimated at $100 billion over ten years through reduced reimbursement rates and fees.

IV. INDUSTRY COMPETITIVENESS

The largest pharmaceutical companies are multinational and historically based in the U.S. and Western Europe (see Table 1). The top 10 firms, half of which are headquartered in the U.S., currently account for about 40 percent of the world market. The largest U.S. companies ranked by revenues were: Pfizer, Merck, Johnson & Johnson, Eli Lilly, Bristol-Myers Squibb, Abbott Labs, and Amgen.

The top European-headquartered companies include: Novartis and Roche (Switzerland), Sanofi-Aventis (France), GlaxoSmithKline and Astra-Zeneca (UK), Bayer and Boehringer Ingelheim (Germany), and Novo Nordisk (Denmark). Pharmaceutical firms from other regions, such as Teva (Israel) and Japan-based firms Takeda, Astellas, and Daiichi Sankyo, are also important players. Whereas the U.S. industry's traditional strengths are in drug discovery and patented drugs, India and Israel are significant producers of generic drugs, while China, India and Italy are the world's largest API producers.

Table 1
Top 10 Pharmaceutical Companies, World, 2009

	Company	Revenues ($ bil.)	Headquarters
1	Pfizer (+Wyeth)	57.0	U.S.
2	Merck (+Schering Plough)	39.0	U.S.
3	Novartis	38.5	Switzerland
4	Sanofi-Aventis	35.5	France
5	GlaxoSmithKline	35.0	UK
6	AstraZeneca	34.4	UK
7	Roche (+Genentech)	32.8	Switzerland
8	Johnson & Johnson	26.8	U.S.
9	Eli Lilly	20.3	U.S.
10	Bristol-Myers Squibb	18.8	U.S.

Sources: IMS Health, annual reports

The research-based pharmaceutical industry worldwide is facing unprecedented challenges caused by patent expirations of existing drugs, increased competition from generics, increasing costs of R&D, and a slowing in development of new drugs. The most significant challenge to sustaining future growth is improving R&D productivity for new innovative drugs. The number of novel drugs approved by the FDA has declined since the mid-1990s, falling to the mid-20 in recent years.[27] During the five years from 2002 through 2006, the industry brought to market 43 percent fewer chemical-based drugs than in the last five years of the 1990s, despite a doubling of R&D spending.[28] Analysts do not expect that revenues from new drugs will be able to compensate, at least in the near-term, for those coming off patent.

Drug manufacturers are adjusting to a more competitive environment by diversifying into biologicals, vaccines, branded generics, over-the-counter medicines, and personal care products.

Mergers and acquisitions have increased industry consolidation. Cost controls have resulted in sizeable employment reductions including in marketing, manufacturing and research operations. Multinational pharmaceutical firms have stepped up facilities in Asia and elsewhere to lower costs and better compete in emerging markets.

V. INTERNATIONAL MARKETS

The world pharmaceutical market in 2009 was estimated at $837 billion, according to IMS Health, a leading provider of pharmaceutical industry data.[29] The U.S. accounts for about 36 percent of global pharmaceutical sales, and the U.S., Europe and Japan collectively account for over three-quarters of global expenditures (see Figure 1). The top 10 global markets in 2009 were: the United States, Japan, France, Germany, China, Italy, Spain, UK, Brazil, and Canada. Sales of biotechnology-derived drugs are expanding faster than the overall industry, exceeding $120 billion in 2008 and comprised 17 percent of the global market.[30] The world generic drug market was estimated at $88 billion in 2009 and forecast to reaching $130 billion by 2014.[31] Various industry estimates place the global OTC market in the $100 billion range.

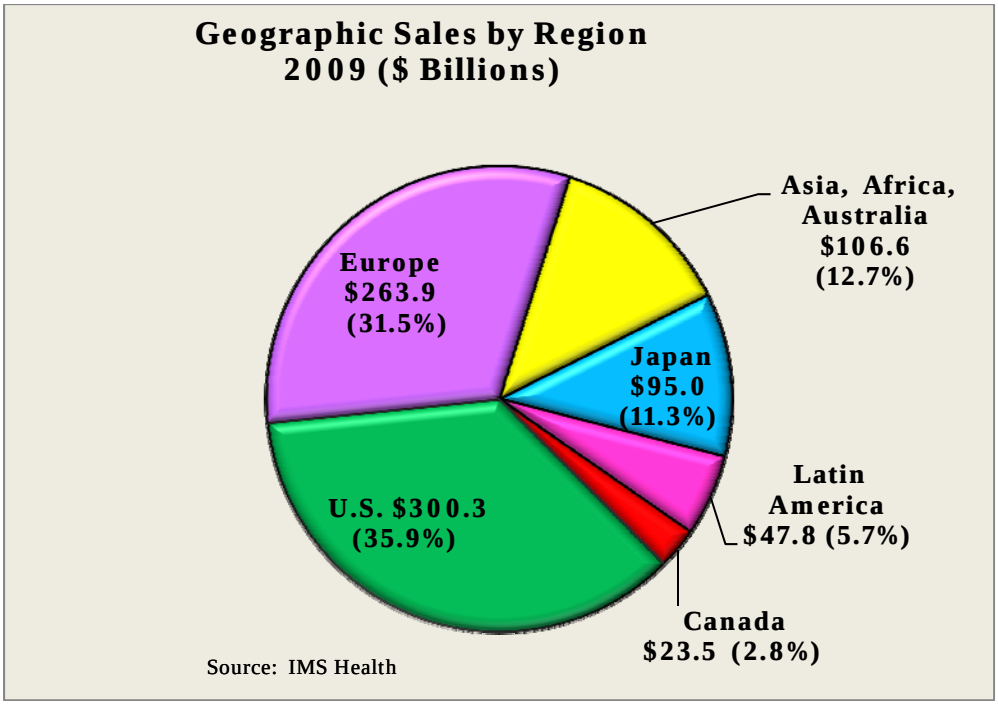

Figure 1

VI. INDUSTRY TRADING ENVIRONMENT

A. International Trade

Foreign markets are critical to the U.S. pharmaceutical industry, with some multinational firms generating 40 percent of revenues or higher from overseas sales. However, U.S. trade statistics do not fully reflect the globalized nature of the pharmaceutical industry, which procures

ingredients and generic drugs based on cost and quality. To maintain competitiveness, U.S. firms have established manufacturing facilities in locations based on cost, availability of skilled labor, proximity to markets, transportation infrastructure, tax, tariff, and other considerations. For example, there is significant U.S. industry production of pharmaceuticals in countries such as Ireland and Singapore, from which companies export to third countries, including intra-company exports to the United States. These factors have resulted in a U.S. trade deficit in pharmaceutical products since the mid-1990s.

In 2009, pharmaceutical exports from the U.S. were about $46 billion and imports were $82.5 billion, resulting in a negative trade balance of $35.5 billion.[32] The largest U.S. trading partners in 2009 were the European Union, Canada, and Japan. The top 10 export destinations took three-fourths of U.S. shipments. Ireland accounted for about one-sixth of U.S. pharmaceutical imports.

Table 2
U.S. Trade Patterns for NAICS 3254:
Pharmaceuticals Medicines & Manufacturing, 2009

	Exports Destination Country	US Exports ($ billions)	**Imports** Country of Origin	US Imports ($ billions)
	Germany	7.3	Ireland	17.4
	Netherlands	5.6	United Kingdom	12.2
	United Kingdom	4.5	Germany	8.8
	Canada	3.6	Canada	5.1
	France	2.9	France	4.9
	Japan	2.6	Switzerland	4.7
	Belgium	2.5	Singapore	4.4
	Spain	2.4	Belgium	4.3
	Switzerland	2.1	Israel	3.9
	Italy	1.4	Japan	2.5
	Subtotal Top 10	34.9	Subtotal Top 10	68.2
	Other Destinations	11.1	Other Sources	14.3
	Total	46.0	Total	82.5

B. Market Opportunities

The worldwide market for pharmaceuticals is growing at a 5-8 percent rate and projected to reach $1.1 trillion by 2014 according to IMS Health.[33] Several global trends are expected to increase pharmaceutical consumption: world population growth, higher disposable incomes, an increase in the aged population with an associated rise in chronic diseases, greater government outlays for healthcare, and increased consumer demand for more effective medications. In the U.S. alone, people 65 or older account for nearly one-third of the country's prescription medication consumption.

Although the primary pharmaceutical markets will continue to be in the traditional strongholds of the U.S., Western Europe and Japan, market growth is shifting towards "emerging" markets in Asia, Latin America, Russia, and elsewhere. Developed economies growth rates are projected to hover in the low to mid-single digits, while emerging markets are forecast to expand at double digit rates. Table 3 illustrates the changing landscape of global market opportunities. Notably, China's pharmaceutical market, ranked 9th in the world in 2003, is projected to become the third largest by 2011.

Table 3
Global Markets Ranked by Size

	2003 Rank	2008 Rank	2013 Rank
1	United States	United States	United States
2	Japan	Japan	Japan
3	Germany	France	China
4	France	Germany	Germany
5	Italy	China	France
6	United Kingdom	Italy	Italy
7	Spain	United Kingdom	Spain
8	Canada	Spain	Brazil
9	China	Canada	Canada
10	Brazil	Brazil	United Kingdom
11	Mexico	Mexico	Russia
12	Australia	Turkey	Venezuela
13	India	India	India
14	Poland	South Korea	South Korea
15	Netherlands	Australia	Turkey
16	Belgium	Greece	Mexico
17	South Korea	Poland	Australia
18	Turkey	Netherlands	Greece
19	Portugal	Belgium	Poland
20	Greece	Russia	Belgium

Source: IMS Health, MIDAS, March 2009 & 2010

C. Trade Impediments

Companies considering entering a foreign market face a plethora of challenges. Not only does each country have its unique regulatory, marketing and reimbursement environment but foreign government policies and practices can pose impediments to market expansion. The most commonly cited problems occur in regulatory review processes, reimbursement and pricing policies, intellectual property rights and enforcement, and counterfeit medicines.[34]

Regulatory Approvals: Differences in regulatory approval standards can lead to duplicative testing requirements, delays in product approval, and higher costs to manufacturers. Importantly, regulatory barriers contribute to drug lags and delay the availability of important medicines for patients. The U.S. has encouraged countries to harmonize national regulations with guidelines developed through the International Conference on Harmonization on pharmaceuticals.

Reimbursement and Pricing Policies: The pharmaceutical industry is facing cost constraints globally as payers look to a variety of mechanisms to help control health care expenditures, such as limiting eligible products and price controls. Sometimes pricing levels can make it difficult to generate returns to compensate for investment into high risk, innovative drugs. The reimbursement and pricing process can be nontransparent to manufacturers and lengthy, furthering delaying market entry. The U.S. encourages countries to foster reimbursement policies that best promote innovation and transparency, while controlling costs and improving healthcare.

Intellectual Property Rights (IPR): The originator pharmaceutical industry is heavily dependent on patents and other forms of IP protection to recoup the substantial costs of developing new medicines. The most commonly cited concerns are the lack of protection against unauthorized disclosure of test data generated to obtain regulatory marketing approval for pharmaceuticals, and unfair commercial use of regulatory test data. Other issues include laws that limit the scope of patentability for certain chemical forms, inadequate protection and enforcement of patented products on the market, the proliferation of counterfeit medicines, and lack of an effective system to prevent the issuance of marketing approvals of generic copies of patented drugs. Countries with the 20 largest pharmaceutical markets that are highlighted in the USTR Special 301 and National Trade Estimates reports as needing IP reform and enforcement include: China, Brazil, India, Russia, and Venezuela.

Counterfeit Medicines are a danger to public health but also infringe the trademark of right holders and cause economic loss. The rise in counterfeit trade is partially attributable to: (1) potential market size and low risk of interdiction; (2) shifting of production of API and formulation to countries with less well developed regulatory systems, resulting in supply chain vulnerabilities; (3) insufficient oversight of sourcing of excipients from lower cost markets; (4) insufficient international coordination and agreement on depth of problem and awareness; and (5) limited criminal enforcement and penalties in some developing countries against counterfeiters. The USG has called on trading partners to step up efforts to reduce counterfeiting and join in international collaborative efforts, such as the World Health Organization's International Medical Products Anti-Counterfeiting Taskforce (IMPACT) and the Anti-Counterfeiting Trade Agreement (ACTA).

VII. SUMMARY

The U.S. pharmaceutical industry is one of the most critical and competitive sectors of the economy. Research and development of new drugs is the linchpin to its survival. The economics and global positioning of the pharmaceutical industry in the U.S., Europe and Japan are undergoing unprecedented changes. Underlying factors include the difficulty in developing innovative drugs to replace those losing patent protection, the rising cost of R&D and healthcare cost containment pressures in many markets. The U.S. pharmaceutical industry continues to restructure operations and diversify into biologicals, generics and OTCs to replace sales from drugs being lost to patent expirations, while reducing its cost structure. As growth in traditional, developed markets has slowed, multinational firms have expanded overseas to reduce development costs and better position themselves to compete in emerging markets.

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