



Bio Exports: Singapore

Market Research Guide for Maine Biotechnology,
Medical Device, and Life Sciences Companies

August 2010

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Market Overview

Singapore Economy

2009 Statistics¹

GDP: \$235.7 billion
Import: \$240.5 billion
Export: \$274.5 billion
Population: 4,701,069 (July 2010 est.)

Considered the “gateway to Southeast Asia”, Singapore serves not only as a regional showcase and distribution center for global products and services, but also as a strategic location for foreign companies to test product receptivity in Asia. With political stability, security, low corruption, and strong intellectual property rights, there is little operational risk associated with business in Singapore. The country has an English speaking population and a pro-business environment with a corporate tax rate of 17%.² A multi-ethnic society with well developed infrastructure, Singapore is often a springboard for U.S. companies looking to penetrate the Asian market.³

Involved in 18 free trade agreements covering 60% of world GDP—including the U.S.-Singapore Free Trade Agreement (FTA) of 2004, 61 double taxation avoidance agreements, and 34 investment guarantee agreements – Singapore’s global trade connectivity is unmatched.⁴ Singapore’s repertoire of titles includes: the easiest country to do business in (World Bank’s “Doing Business 2010”), the most open economy for international trade and investment (World Economic Forum’s “The Global Enabling Trade Report 2009”), the lowest political risk in Asia (Political and Economic Risk Consultancy 2010), the most transparent country (IMD World Competitiveness Yearbook, 2009), and the country with the best intellectual property protection (WEF Global Competitiveness Report, 2009-2010).⁵

In addition to its focus on foreign investment and trade, the Government of Singapore (GOS) actively uses public sector investment as a catalyst for development.⁶ As a result, Singapore’s economy is heavily based on investments through government –linked corporations (GLC’s); as of November 2008, the top six Singapore GLCs accounted for nearly 24% of total capitalization of the Singapore Exchange. Although some argue that Singapore’s state-led development approach has hindered private sector entrepreneurship, investment, and competitiveness, the dominant role of the GLC’s in the economy has undoubtedly enabled Singapore to evolve as a base for multinational corporations (MNC’s). In addition to GLC’s, the Economic Development Board (EDB), Singapore’s investment promotion agency, focuses on securing major investments in high value-added manufacturing and service activities.⁷ As part of a strategy to replace outsourced labor-intensive and low value-added activities, the EDB illustrates the GOS’s continued investment in economic planning.

In the coming years, Singapore is expected to continue to invest in infrastructure by developing the road system, expanding the subway network, and upgrading housing. Since the 1990’s, the GOS has increased spending on the environment and water resources by over \$US500 million, with investment in

¹ CIA, The World Factbook, Singapore, accessed July 15, 2010, <https://www.cia.gov/library/publications/the-world-factbook/geos/sn.html>.

² Singapore – the Biopolis of Asia”. Singapore Economic Development Board. www.sedb.com. pp16.

³ “Doing Business in Singapore: 2010 Country Commercial Guide for U.S. Companies”. U.S. Commercial Service. 2010. Pp39.

⁴ Singapore – the Biopolis of Asia”. Singapore Economic Development Board. www.sedb.com. pp14.

⁵ Ibid..

⁶ “Doing Business in Singapore: 2010 Country Commercial Guide for U.S. Companies”. U.S. Commercial Service. 2010. Pp54.

⁷ “Doing Business in Singapore: 2010 Country Commercial Guide for U.S. Companies”. U.S. Commercial Service. 2010. Pp55.

such sectors standing at \$US641 in 2010. In April of 2009, the GOS set aside \$US 714 million over 5 years to implement initiatives under the Singapore Sustainable Blueprint including reducing carbon emissions by 7% - 11%, below business as-usual (BAU) levels by 2020. With investment in the development of clean energy a top priority, the government asserts that in the next 8-10 years solar architecture and energy are expected to contribute \$US 2 billion to GDP, creating over 15,000 jobs in the process.⁸ Such investments in infrastructure and renewable energy are illustrations of the government's continued efforts to improve Singapore's business climate and investment prospects as a whole.

Healthcare Market

As the medical hub of the region, Singapore presents exciting opportunities for foreign companies looking to penetrate the market.⁹ According to the WEF's Global Competitiveness Report 2009-2010, Singapore is home to the world's 4th best healthcare infrastructure, 3rd lowest infant mortality rate, and the 7th highest life expectancy.¹⁰ Named the world's leading medical travel destination and the world's 6th best healthcare system, Singapore draws over 350,000 patients a year.

Singapore hospitals and clinics now treat their own citizens as well as patients from neighboring countries (Malaysia, Brunei, Indonesia, Thailand, the Philippines) and even around the world (United States, Britain, Japan, Seychelles, China, Hong Kong and Bangladesh).¹¹ The government currently spends approximately 3.8% of GDP annually on healthcare, although there are plans to raise this to US\$1.37 billion a year in the next five years.¹² The three key healthcare strategies that Singapore is pursuing are clinical research, improvement of long-term care, and a movement towards more sophisticated care. The major goal is to treat one million patients by year 2012.¹³

With a reputation of healthcare services comparable to those of other industrialized countries, the demand for medical equipment, devices, pharmaceutical, biomedical and other healthcare technologies is high. Various factors are also leading to increased market opportunities including an aging population; expected to reach 5.5 million by 2020, 100% of whom will have healthcare coverage as a result of the national healthcare plan. Additionally, the emphasis towards a healthy lifestyle, preventative care, and a strengthening reputation as the healthcare hub of East Asia, is only accelerating the demand for healthcare in Singapore.¹⁴ With several hospitals having already been accredited by the Joint Commission International (JCI), the overseas arm of the United States' main hospital accreditation agency, it is expected that all major hospitals in Singapore attain such standards.

Because government hospitals account for 80% of the 11,830 hospital beds in Singapore, the Health Ministry is the largest consumer of healthcare technologies and related goods, accounting for nearly 70% of local demand.¹⁵ At the same time, Singapore's public hospitals and specialty centers engage in clinical research with the many pharmaceutical, biotechnology and medical technology companies based in Singapore. According to the U.S. Commercial Service, laboratory and scientific instruments, as

⁸ Ibid...pp3.

⁹ Ibid...pp31.

¹⁰ "Singapore – the Biopolis of Asia". Singapore Economic Development Board. www.sedb.com. pp8.

¹¹ "Doing Business in Singapore: 2010 Country Commercial Guide for U.S. Companies". U.S. Commercial Service. 2010. Pp32.

¹² Ibid...pp.31

¹³ Healthcare Technologies Resource Guide". US Commercial Service. Global Healthcare Technologies Team. 2009-2010. Pp 130.

¹⁴ Healthcare Technologies Resource Guide". US Commercial Service. Global Healthcare Technologies Team. 2009-2010. Pp 130.

¹⁵ "Doing Business in Singapore: 2010 Country Commercial Guide for U.S. Companies". U.S. Commercial Service. 2010. Pp32.

well as medical devices, are the two best prospects for U.S. companies in Singapore.¹⁶ Major U.S. competitors in Singapore are Germany and other European countries, Japan, and Australia.¹⁷

Government Procurement Opportunities

The Singapore Ministry of Finance maintains a website listing all of the current and future procurement needs of the entire government (<http://www.gebiz.gov.sg>).¹⁸ For a government-published guide on how to become qualified for public-sector procurement opportunities click here:

<http://app.mof.gov.sg/data/cmsresource/For%20Businesses/Govt%20Procurement%20Guide%20SME%20Over%20Apr2006.pdf>.¹⁹

In order to supply goods and services to the Government of Singapore, one must:

1. Sign up as a GeBIZ Trading Partner; and/or,
2. Sign up as an EPPU Supplier or as a BCA Supplier.

Those registered as GeBIZ Trading Partners can actively bid on all electronic quotations and tenders, while those who are not registered can only view posted opportunities. First-time registration is free; however, a charge of S\$320 is exacted for each subsequent year of membership.

The EPPU is an evaluation system used to insure that suppliers have the financial ability and resources to complete government contracts. Registration with EPPU is not mandatory, but some tenders may require suppliers to be registered with EPPU for specific bids. The BCA only applies to suppliers of construction and engineering goods and services.

Market Entry Strategy

U.S. companies who are new to the market and interested in exporting to Singapore may consider appointing a local distributor to represent their company's product and services. Given the small market size of the island state, most potential distributors would request for exclusive rights to sell the product. They will also likely to ask for distribution rights for the regional South East Asia countries as Singapore serves as a gateway into the region. U.S. exporters of medical equipment should evaluate the suitability of the distributor based on the company's contacts in the market, their product range and whether their products complement that of the U.S. firm. As the sales in the local market increases, the U.S. firm can look into setting up an on-going presence in Singapore much like how some large MNCs have set up regional offices in Singapore. This brings the U.S. firm closer to their customers, demonstrates their commitment to the region and allows for prompt and enhanced customer service.²⁰

Market Challenges

Although Singapore remains one of the most liberal countries in the world, imposing no tariffs on most goods, it does maintain high excise taxes on particular goods, most notably distilled spirits and wine, tobacco products, motor vehicles, and Gasoline.²¹ Moreover, the U.S. Commercial Service reports that U.S. Companies have complained of fraudulent credit card transactions committed by individuals and companies purporting to be in Singapore. It is reported that shipments of imported goods have been

¹⁶ Ibid...pp3.

¹⁷ "Healthcare Technologies Resource Guide". US Commercial Service. Global Healthcare Technologies Team. 2009-2010. Pp 131.

¹⁸ In addition to the above mentioned interactive database, a search provided at the following website is a non-binding, but useful, list of procurement opportunities continuously maintained by the GOS. This search can be refined to fit specific industries and products (i.e. A*STAR; Duke-NUS Graduate Medical School Singapore; Health Promotion Board; Health Science Authority; Ministry of Health; Singapore Medical Council; SPRING Singapore). Available at: <http://app.mof.gov.sg/mfeupdate/index.asp>

¹⁹ For a very helpful guide to government procurement in Singapore, see

<http://app.mof.gov.sg/data/cmsresource/For%20Businesses/Govt%20Procurement%20Guide%20SME%20Over%20Apr2006.pdf>

²⁰ "Healthcare Technologies Resource Guide". US Commercial Service. Global Healthcare Technologies Team. 2009-2010. Pp 130.

²¹ "Doing Business in Singapore: 2010 Country Commercial Guide for U.S. Companies". U.S. Commercial Service. 2010. Pp2.

received by freight forwarders in Singapore and then diverted to unknown consignees in neighboring countries.²²

Tariffs

Singapore is generally a free port and an open economy. The U.S.-Singapore Free Trade Agreement, implemented in 2004, has lowered tariffs and allowed for easier movement of citizens between the U.S. and Singapore. More than 99% of all imports enter the country duty-free, including health care products. Singapore levies high excise taxes only on certain products: beer, wine and liquor, tobacco products, motor vehicles and petroleum products. Singapore levies a 7% Goods and Services Tax (GST). The GST is calculated based on the CIF (Cost, Insurance and Freight) value plus any duties and other charges. Special provisions pertain to goods stored in licensed warehouses and free trade zones.

Labeling Requirements

Generally, labeling laws required that:

- 1) the composition of the products be disclosed in English,
- 2) labels/packaging materials not contain any references to diseases/conditions as specified in the schedule to the Medicines (Advertisement & Sale) Act (<http://agcvldb4.agc.gov.sg/>); and
- 3) the advertising/sale promotion of the product in the public media be approved by the Health Sciences Authority.

Labels are required on imported food, drugs, liquors, paints and solvents and must specify the country of origin. A description (in English) of the contents of the package may be added to the face of the label provided the additional language is not contrary to or a modification of any statement on the label. Foods having defined standards must be labeled to conform to those standards and be free from added foreign substances. Packages of food described as “enriched”, “fortified”, “vitaminized” or in any other way that implies that the article contains added vitamins or minerals must show the quantity of vitamins or minerals added per metric unit. Special labels are required for certain foods, medicines and goods such as edible and non-edible animal fats as well as liquors, paints and solvents. Labeling and advertising legislation applies to the sale of vitamins and dietary supplements.

Documentation Requirements

Companies must make an inward declaration for all goods imported into Singapore. All imports require an import permit although this is largely a statistical requirement for most goods. Details can be found at <http://www.customs.gov.sg/leftNav/trad/Permits+and+Documentation.htm>.

Bona Fide Trade Samples

Imports of trade samples for which the total value is below US\$286 (S\$400) are not subject to payment of duty and/or GST. In addition, no permit is required for their import.

Bona fide trade samples (excluding liquors and tobacco) may be imported if they are imported solely for the purpose of soliciting orders for goods to be supplied from abroad, for demonstration in Singapore to enable manufacturers in Singapore to produce such articles to fulfill orders from abroad or by a manufacturer for the purpose of copying, testing or experimenting before they produce such articles in Singapore. More information is available at <http://www.customs.gov.sg/leftNav/trav/Business+Travellers.htm>.

²² Ibid...pp3.

Medical and Medicinal Products Import Regulations

In accordance with Singapore's Health Products Act, as of 2010 all medical and medicinal products, prescription and over-the-counter pharmaceuticals imported or sold in Singapore must be licensed via Singapore's **Health Science Authority (HSA)**, through its Centre for Medical Devices Regulation (CMDR).²³ The onus of applying for a product license rests with the license holder, i.e., a locally registered company that is responsible for the safety, quality and efficacy of the product. If U.S. companies have concerns regarding product licensing, they should contact the Health Sciences Authority (<http://www.hsa.gov.sg>) or ask a potential distributor to submit samples to the Health Sciences Authority.²⁴

Market Opportunities

According to the U.S. Commercial Service, out of all healthcare technologies, Singapore was the only country to receive the highest ranking—"very high probability of success for U.S. exporters"—in the biomedical sector. Biomedical was Singapore's only healthcare technology sector to receive the highest ranking. Healthcare technology sectors receiving the second highest ranking—"There are more opportunities than challenges for U.S. exporters"—in Singapore included medical devices (monitoring equipment and orthopedic), medical capital equipment, clinical chemistry and diagnostics, dental, health IT, and laboratory equipment.²⁵

Research and Development

General Investment

In 2000, Singapore's Biomedical Sciences (BMS) launched a major initiative aimed at developing the biomedical industry into a mainstay of the Singaporean economy. The initiative sought to bolster the country's foundation of human, industrial, and intellectual capital.²⁶ The government agencies with the most direct and prominent involvement in the biotech investment are the Singapore Economic Development Board (EDB), the Agency for Science, Technology and Research (A*STAR), the Ministry of Health (MOH), and public universities.²⁷

One A*STAR project seeks to recognize and nurture the essential link between education and a specialized, highly skilled workforce. This project is a national scholarship program which awarded about 800 scholarships as of early 2010, in addition provides mentoring services to the roughly 1,000 local PhD graduates.²⁸ The Technology Enterprise Commercialisation Scheme (TECS), started in 2008 and administered by SPRING Singapore, is another impressive program. TECS targets local entrepreneurs and public sector researchers by providing S\$75 million in early-stage funding for POC/POV studies.

More than 30 of the world's most prominent biomedical sciences companies have established regional headquarters in Singapore, including Abbott, AstraZeneca, Bayer, Boehringer-Ingelheim, Bristol-Myers Squibb, Genzyme, GlaxoSmithKline, Merck Sharp & Dohme, Quintiles, Roche and sanofi-aventis.²⁹

²³ Country Commercial Guide pp31

²⁴ Country Commercial Guide pp43

²⁵ "Healthcare Technologies Resource Guide". US Commercial Service. Global Healthcare Technologies Team. 2009-2010. Pp 6.

²⁶ Singapore Educational Development Board, Transitional & Clinical Research, pp. 1, http://www.sedb.com/edb/sg/en_uk/index/industry_sectors/pharmaceuticals___industry_background.html

²⁷ Ibid.

²⁸ Singapore Government, Economic Development Board, Pharmaceuticals & Biotechnology: Industry Background,

²⁹ Singapore Government, Economic Development Board, Pharmaceuticals & Biotechnology: Industry Background, http://www.sedb.com/edb/sg/en_uk/index/industry_sectors/pharmaceuticals___industry_background.html

In terms of labor, Singapore has an impressive core of more than 4,800 skilled engineers and technicians specializing in biotechnology and pharmaceutical manufacturing. There are also roughly 300,000 skilled employees in related sectors like chemicals, electronics, and general engineering. In an effort to further cultivate the country's labor talent, the National University of Singapore Academy of GxP Excellence (NUSAGE) runs an initiative that provides post-graduate training in pharmaceutical manufacturing.³⁰

Translational and Clinical Research (R&D)

Over 50 companies, and 30 public-sector institutes, together expend more than S\$1 billion on biomedical R&D annually.³¹ This work is performed by an impressive legion of 4,300 researchers which is supplemented by the annual influx of roughly 8,500 science and engineering graduate students.

Notable areas of strength in discovery science include: cancer genetics, epigenetics, genome-wide association studies, computational biology, systems immunology, stem cells for assays & therapy, pre-clinical to clinical imaging, biomarker discovery, animal model development, biologics process optimization, bioengineering & nanotechnology. Much of this groundbreaking research has been published in high-impact journals. As of 2008, research performed under A*STAR had achieved more than 1,900 publications in biomedical journals.

Among these more than 50 companies performing biomedical sciences R&D (drug discovery, and translational and clinical research) exist high-profile industry names such as Abbott, GlaxoSmithKline, Merck Sharp & Dohme, Novartis, Lilly, Takeda, FORMA Therapeutics, S*Bio, MerLion Pharmaceuticals, and PharmaLogicals.³²

Singapore's protection of intellectual property rights is renowned and certainly a hallmark of its success in the industry. The WEF Global Competitiveness Report for 2009-2010 ranked Singapore #1 in intellectual property protection.³³ Industry wide, about 730 patents have been awarded out of 1,581 applications.

Singapore's most prominent investment in the area of clinical research is the Translational & Clinical Research Flagship Programme.³⁴ The program presents an opportunity for researchers and clinician-scientists to collaborate in developing their research into viable healthcare solutions. The project encompasses five separate programs, each with its own five-year budget of S\$25 million. The program focuses on key disease areas which are suited to Singapore's particular strengths: cancer (Singapore Gastric Cancer Consortium), eye diseases (Translational Research Innovations in Ocular Surgery), neuroscience (Vulnerability, Disease Progression and Treatment in Schizophrenia and Related Psychoses), cardiovascular/metabolic diseases (Developmental pathways to metabolic diseases), and infectious diseases (Scientific exploration, translational research, operational evaluation of disease prevention and preventive measures through new treatment strategies against Dengue (STOP Dengue)).³⁵

³⁰ "Singapore – the Biopolis of Asia". Singapore Economic Development Board. www.sedb.com. pp6.

³¹ Singapore Educational Development Board, Biomedical Sciences Factsheet 2010, pp. 1, available at http://www.sedb.com/edb/sg/en_uk/index/industry_sectors/pharmaceuticals_/industry_background.html

³² Singapore Government, Economic Development Board, Pharmaceuticals & Biotechnology: Industry Background

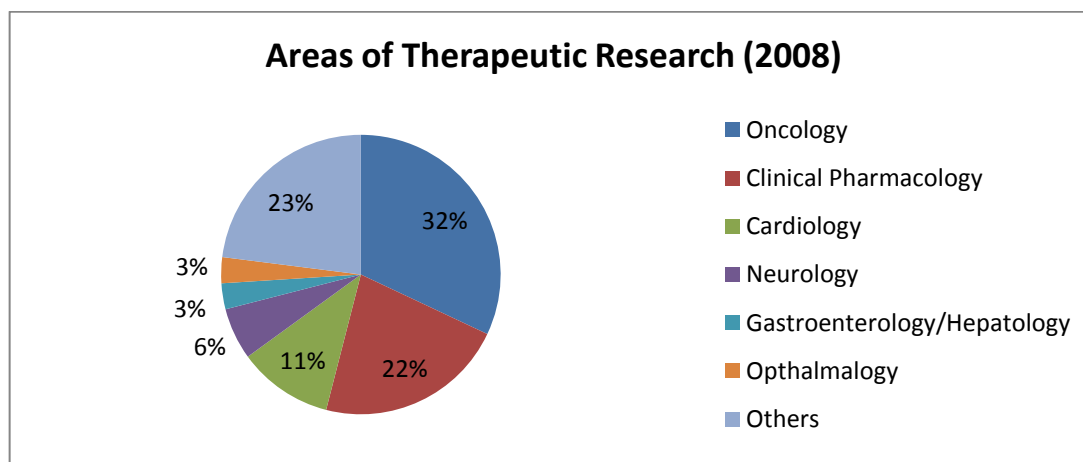
³³ "Singapore – the Biopolis of Asia". Singapore Economic Development Board. www.sedb.com. pp3.

³⁴ Singapore Educational Development Board, Transitional & Clinical Research, pg. 1, available at http://www.sedb.com/edb/sg/en_uk/index/industry_sectors/pharmaceuticals_/industry_background.html

³⁵ Ibid.

Gross Expenditures on Research and Development (GERD) as a Percentage of GDP (2008)³⁶	
Finland (2008)	3.49%
Japan (2007)	3.44%
Korea (2007)	3.21%
USA (2008) [^]	2.77%
Singapore (2008)	2.77% (S\$ 7.1 billion; approximately US\$ 4.92 billion)
Germany (2007)	2.53%
United Kingdom (2008)	1.88%
China (2007)	1.44%
[^] Excludes most or all capital expenditure	

R & D in Biomedical Sciences (2008)³⁷	
Gross Expenditures on Research and Development (GERD)	S\$1,143.86 million
Private Sector	S\$ 425.76 million
Public Sector	S\$ 718.10 million
A*STAR (Agency for Science, Technology and Research)	S\$ 351.61 million
A*STAR publications	1,927



Source: Health Sciences Authority, Singapore³⁸

³⁶ Singapore Educational Development Board, Biomedical Sciences Factsheet 2010 , pg. 2, citing OECD: Main Science and Technology Indicators, December 2009, available at http://www.sedb.com/edb/sg/en_uk/index/industry_sectors/pharmaceuticals_/industry_background.html

³⁷ Ibid.

³⁸ Ibid, pg. 3.

Biopolis

Biopolis is an expansive industrial park entirely focused on biomedical and health related technologies. It is at the heart of Singapore's R&D success. Biopolis's chief purpose is to facilitate close interaction, and collaboration, between public sector research institutes and corporate laboratories. Because of its design, Biopolis affords researchers a highly efficient resource pool of cutting-edge facilities, scientific infrastructure, and specialized services. For example, labs can conveniently access "services ranging from basic glassware washing to high-end scientific services such as confocal microscopy, mass spectrometry and customized proteomics." This increased efficiency due to centralized location has allowed resident companies to significantly cut operating costs and often accelerate the development timeline.

Beyond its professional purpose, the complex includes cafes, shops, and other amenities that create a community environment. Initially built at about 2.4 million sq/ft, current construction will put total space at about 2.8 million sq/ft.³⁹ Phase 1 of Biopolis' expansion project has seven buildings (185,000 sqm) and houses A*STAR's biomedical research institutes which employ more than 2,000 skilled scientists, researchers, technicians, and administrators.⁴⁰ Currently, Phase 1 is more than 95% occupied. Phase 2, with two buildings and an additional 37,000 sqm, provides more biomedical R&D space for research institutions and biomedical companies.⁴¹ Phase 3, which is scheduled to be completed in 2010, is primarily geared towards translational & clinical research and medical technology research.⁴²

Tuas

Tuas Biomedical Park is another cluster development intended to increase efficiency by centrally locating important scientific infrastructure.⁴³ While Tuas does include a broad spectrum of biomedical companies, it is primarily designed for pharmaceutical manufacturers, and its infrastructure provides all the necessary utilities and amenities for operations in that field.⁴⁴ The park occupies a 360-hectare property, set-aside and specifically-zoned by the Government of Singapore.⁴⁵ Some of the companies that occupy space in Tuas include Abbott, Alcon, CIBA Vision, GlaxoSmithKline Biologicals, Lonza, Merck Sharp & Dohme, Novartis, Pfizer and Roche. The collective investment of these companies in Tuas manufacturing facilities exceeds S\$6 billion.⁴⁶ More specifically, the primary production operations of these companies in Singapore are as follows:

³⁹ Singapore Government, Economic Development Board, Pharmaceuticals & Biotechnology: Industry Background.

⁴⁰ Singapore Educational Development Board, Biopolis Factsheet , pp 1, available at http://www.sedb.com/edb/sg/en_uk/index/industry_sectors/pharmaceuticals___/industry_background.html

⁴¹ Ibid.

⁴² Ibid.

⁴³ Singapore Educational Development Board, Tuas Biomedical Park Factsheet , pp. 1, http://www.sedb.com/edb/sg/en_uk/index/industry_sectors/pharmaceuticals___/industry_background.html

⁴⁴ Ibid.

⁴⁵ Singapore Government, Economic Development Board, Pharmaceuticals & Biotechnology: Industry Background.

⁴⁶ Ibid.

Company	Selected Operations
Abbott Manufacturing	bulk production of nutritional products like Grow
CIBA Vision Asian Manufacturing and Logistics	contact lens manufacturing
Genentech	production of E. coli derived products
GlaxoSmithKline Biologicals	bulk production of vaccines for meningitis and pneumonia
Lonza Biologics Singapore	bulk production of biological products
Lonza Biologics Tuas	mammalian manufacturing plant
Merck Sharp & Dohme	pharmaceutical production: VIOXX, SINGULAR
Novartis Singapore Pharmaceutical Manufacturing	anti-hypertension drug Diovan; abdominal discomfort treatment drug Zelnorm; new cancer drug Gleevec; mammalian cell culture technology for a variety of medical conditions, including rheumatoid arthritis, cancer, asthma, and spinal cord injury
Wyeth Nutritionals	pediatric nutritionals: S26, Promil, and Progress
Alcon	ophthalmic pharmaceutical drug manufacturing ⁴⁷
Pfizer Asia Pacific	active pharmaceutical ingredients (API)

Academic Medical Centers

In 2007, an effort to streamline research, clinical care, and academic training led to the creation of two important academic medical centers: Kent Ridge Campus, and Outram Campus. The Kent Ridge campus project unified the operations of National University Hospital and National University of Singapore Yong Loo Lin School of Medicine, both of which are now managed by a single entity – National University Health System. The Outram campus houses Singapore General Hospital, Duke-NUS Graduate Medical School Singapore, and national disease centers.⁴⁸

Both Kent Ridge and Outram campuses saw the opening of Investigational Medicine Units (IMUs) which will focus on early stage clinical research (i.e. Proof of Concept; Phase 1 (including First in Man) and Phase 2a clinical trials for new drugs and diagnostics; biomarkers and disease mechanisms; and, bio-imaging studies).⁴⁹ The Singapore Clinical Research Institute was also established to be “a one-stop coordination site for later stage multicentre clinical research projects in Singapore and the region.”⁵⁰ Harvard’s Beth Israel Deaconess Medical Center also announced, in 2010, that it intends to collaborate with NUHS in education, research, and clinical care.

⁴⁷ Singapore Educational Development Board, Tuas Biomedical Park Factsheet , pp2.

⁴⁸ Singapore Educational Development Board, Transitional & Clinical Research, pp. 1, http://www.sedb.com/edb/sg/en_uk/index/industry_sectors/pharmaceuticals_/industry_background.html

⁴⁹ Ibid.

⁵⁰ Ibid...pp2.

Other sites designed to facilitate the integration of biomedical research, clinical care, and medical academics include the Centre for Translational Medicine at NUHS, and the new Khoo Teck Puat Building at the Singapore General Hospital Campus. Also, the establishment of the Singapore University of Technology and Design is planned in a partnership between the Massachusetts Institute of Technology and Zhejiang University.

Pharmaceuticals

Currently, more than 25 large-scale pharmaceutical manufacturing facilities are operated in Singapore.⁵¹ Many of these factory operations are run by 8 of the top pharmaceutical and biotechnology companies in the world, like Abbott, GlaxoSmithKline, Lonza, Merck Sharp & Dohme, Novartis, Pfizer, Roche and sanofi-aventis. All of these operations have been approved by both U.S. and European regulatory authorities.

Recently, four companies (Baxter, Lonza, GlaxoSmithKline and Roche) have announced plans to establish major biologic facilities in Singapore, representing fresh capital investment totaling about US\$2 billion.

Other notable projects include:

- A partnership between Lilly-Singapore Centre for Drug Discovery (LSCDD), the Singapore Institute for Clinical Sciences (SICS), and the National Neuroscience Institute (NNI) to advance drug discovery using adult stem cells.⁵²
- Humalys SAS and Cytos Biotechnology are working with the Singapore Immunology Network to develop antibody-based therapies for infectious diseases that are prevalent in Asia.
- Siena Biotech is partnering with A*STAR's Experimental Therapeutics Centre to develop molecular inhibitors of a major signaling pathway in oncology to target difficult-to-treat forms of cancer such as gastric cancer, leukemia and brain tumors.
- Rhapsody Biologics, a spin-off from SigN, licensed a portfolio of technologies to create a new Personalized Peptide Vaccine (PPV) platform that is highly accurate in predicting and optimizing peptide vaccines. Rhapsody is in talks with major pharmaceutical companies to develop vaccines based on the PPV platform.
- S\$2 million public-private partnership between GSK Biologicals and A*STAR's Bioprocessing Technology Institute to collaborate on vaccine and adjuvant system-related research projects.
- Singapore's Institute of Chemical and Engineering Services (ICES) opened a pilot-scale laboratory facility that will enable greater collaborations with pharmaceutical companies in process development.
- Lonza's establishment of a cutting-edge cell therapy facility currently being developed by Lonza.

Laboratory & Scientific Instruments

In Singapore there is a predilection for American manufactured equipment, particularly in the field of laboratory equipment and instrumentation, with the U.S. accounting for 35% of total market share. Although total imports of laboratory and scientific equipment from the U.S. to Singapore decreased in 2008 by 24%, the U.S. maintained its 35% market share.

⁵¹ Singapore Government, Economic Development Board, Pharmaceuticals & Biotechnology: Industry Background, http://www.sedb.com/edb/sg/en_uk/index/industry_sectors/pharmaceuticals_/industry_background.html

⁵² Singapore Educational Development Board, Biomedical Sciences Factsheet 2010, pp. 2, http://www.sedb.com/edb/sg/en_uk/index/industry_sectors/pharmaceuticals_/industry_background.html

Laboratory & Scientific Instruments – Overview (USD\$ billions)*			
	2008	2009	2010 (estimate)
Total Market Size	1.641	1.226	1.264
Total Local Production	1.373	1.413	1.455
Total Exports	2.545	2.496	2.570
Total Imports	2.813	2.310	2.379
Imports from the U.S.	1.067	0.810	0.833
*U.S. Commercial Service, Doing Business in Singapore, 2010 Country Commercial Guide			

R&D spending in the biomedical sciences sector amounted to US\$5.05 billion in 2008 and is believed to be on track to hit the target of 3% of GDP by 2010. In 2008, the GOS announced that nearly US\$1 billion will be pumped into the biomedical sciences sector over the next few years to boost healthcare standards and clinical research capabilities. Furthermore, the National Research Council was established to provide a national framework for strategic research and development efforts. As a result of the presumed investment, the best prospects for U.S. companies are for laboratory and scientific equipment pertaining to the biomedical sciences (particularly in R&D, product testing, certification, consulting and education services), environmental and water technologies, specialty chemicals, petroleum refining, petrochemicals, plastics, and interactive and digital media. 30 medical technology companies now carry out R&D that includes value engineering and product development for regional and global markets in Singapore. They include 3M, Becton Dickinson, Hill-Rom, Siemens, Thermo Fisher, Welch Allyn, AB Sciex, as well as local start-ups like Amaranth Medical, HealthSTATS and Veredus Laboratories.⁵³

Several partnerships and initiatives have formed in Singapore's medical technology community which are expected to particularly stimulating to the sector.⁵⁴ Key initiatives are listed below.

- Singapore-Stanford Biodesign Program that is designed to meet the medtech industry's need for Asian medical device innovators who are familiar with the medtech innovation process and Asia's healthcare needs.
- Agency for Science, Technology and Research (A*STAR)'s collaboration with CIMIT (Center for Integration of Medicine and Innovative Technology) in Boston, USA, which will enable engineers, clinicians and scientists in Singapore to work with clinicians in Boston to develop engineering solutions that have clinical and market relevance.
- A*STAR's Biomedical Engineering Programme: oversees eight research projects which involve collaborations between research engineers and clinicians/researchers at local hospitals and universities. Aimed at developing and providing cost-effective, innovative, and clinically impactful solutions for healthcare systems.
- SPRING Singapore's S\$75 million Technology Enterprise Commercialisation Scheme (TECS): provides technology start-ups and enterprising public-sector researchers with early-stage funding support for Proof-of-Concept (POC) or Proof-of-Value (POV) projects.

Medical Devices

Similar to the laboratory and scientific instruments sector, despite the recent economic downturn, the United States has maintained a leading market share (30%) in the medical devices sector. Although Singapore imports of medical equipment and supplies declined 16% between 2008 and 2009, import from the U.S. saw only a 5% decrease despite global economic trough. Through 2010 medical device

⁵³ Singapore Educational Development Board, Biomedical Sciences Factsheet 2010 , pp. 3.

⁵⁴ Ibid.

market conditions are expected to hold steady, the medical device market will rebound in the coming years because healthcare is considered a necessity.

With the government pumping nearly US\$1 billion into the biomedical sciences sector over the next few years, boosting standards and research capabilities, U.S. firms will find opportunities in cutting edge technology, laboratory and testing equipment and services, especially those that can facilitate R&D. Additionally, because more than 20% of Singapore’s population will be over the age of 65 within the next two decades, there is increased demand for facilities for the elderly (i.e. nursing homes and rehabilitation centers). The biggest prospects for U.S. firms are those specializing in elder-care products and services. Additionally, an increasingly health conscious population focused on preventive care, U.S. firms with revolutionary medical technology pertaining to health screening and disease management will find opportunities in Singapore.

Singapore is currently planning development of two new acute general hospitals. One in the western part of the island will have 700 beds with an adjoining 200-bed community hospital and is expected to be ready by 2014 and 2016 respectively. The hospital in the eastern side of the island is expected to be ready by 2018. There are also plans to upgrade the facilities at the National Heart Centre, National University Hospital, and Singapore General Hospital.

In the private sector, there are plans for a 350-bed hospital with a 63-clinic medical center attached to be built by 2012. The hospital will cost between US\$207 million and US\$345 million and will cater mainly to foreign patients demanding high quality healthcare services.

Medical Devices – Overview (USD\$ billions)*			
	2008	2009	2010 (estimate)
Total Market Size	0.692	0.526	0.594
Total Local Production	1.360	1.218	1.254
Total Exports	2.005	1.819	1.873
Total Imports	1.338	1.126	1.213
Imports from the U.S.	0.374	0.354	0.364
*U.S. Commercial Service, Doing Business in Singapore, 2010 Country Commercial Guide			

Trade Shows

Medical Fair ASIA 2010

8th International Exhibition on Hospital, Diagnostic, Pharmaceutical, Medical, & Rehabilitation Equipment and Supplies

September 15-17, 2010 (held every 2 years)

Suntec Singapore International Convention & Exhibition Centre

Suntec City, Singapore

<http://www.medicalfair-asia.com>

OS+H Asia 2010 (Messe Dusseldorf Asia)

Occupational Safety & Health Exhibition for Asia

September 15-17, 2010 (every two years)

Suntec Singapore International Convention & Exhibition Centre

Suntec City, Singapore

<http://www.osha-singapore.com/event.html>

BioMedical Asia

March 2011 (every year)

Suntec Singapore International Convention & Exhibition Centre

Suntec City, Singapore

<http://www.the-infoshop.com/conference/biomedical-asia09>

LogiPharma Asia 2010

November 30-December 3, 2010 (every year)

Hilton Hotel

Singapore

<http://www.wbresearch.com/logipharmaasia>

Interphex Asia 2011

Pharmaceutical Manufacturing, Processing & Technology

May 30-31, 2011 (every year)

Suntec Singapore International Convention & Exhibition Centre

Suntec City, Singapore

<http://www.interphexasia.com>

ISPE Singapore Conference 2011

International Society of Pharmaceutical Engineering

May 29-31, 2011 (every year)

Suntec Singapore International Convention & Exhibition Centre

Suntec City, Singapore

<http://www.interphexasia.com/en/ispe-singapore-conference>

APPENDIX

The “Biotech” data criteria for the next two charts includes the following HS Codes:

300220	Vaccines for human medicine
300230	Vaccines for veterinary medicine
300120	Extracts of glands or other organs or of their secretions
300190	Other
300290	Vaccines for veterinary medicine, other
300310	Containing penicillins or derivatives thereof, with a penicillanic acid structure, or streptomycins or their derivatives; 300320Containing other antibiotics
300331	Containing insulin
300339	Other
300340	Containing alkaloids or derivatives thereof but not containing hormones or other products of heading 2937
300390	Other
300410	Containing penicillins or derivatives thereof, with a penicillanic acid structure, or streptomycins or their
300420	Containing other antibiotics derivatives
300431	Containing insulin
300432	Containing corticosteroid hormones, their derivatives or structural analogues
300439	Other
300440	Containing alkaloids or derivatives thereof but not containing hormones, other products of heading 2937
300450	Other medicaments containing vitamins or other products of heading 2936
300490	Other
300510	Adhesive dressings and other articles having an adhesive layer
300590	Other
300610	Sterile surgical catgut, similar sterile suture materials (including sterile absorbable surgical or dental yarns) and sterile tissue adhesives for surgical wound closure; sterile laminaria and sterile laminaria tents; sterile absorbable surgical or dental haemostatics; sterile surgical or dental adhesion barriers, whether or not absorbable
300620	Blood-grouping reagents
300630	Opacifying preparations for X-ray examinations; diagnostic reagents designed to be administered to the patient
300640	Dental cements and other dental fillings; bone reconstruction
300660	Chemical contraceptive preparations based on hormones, on other products of heading 2937 or on spermicides
300691	Appliances identifiable for ostomy use cements
340700	Modeling pastes, including those put up for children's amusement; preparations known as "dental wax" or as "dental impression compounds", put up in sets, in packings for retail sale or in plates, horseshoe shapes, sticks or similar forms; other preparations for use in dentistry, with a basis of plaster (of calcined gypsum or calcium sulfate)
382100	Prepared culture media for development or maintenance of microorganisms (including viruses and the like) or of plant, human or animal cells
382200	Diagnostic or laboratory reagents on a backing, prepared diagnostic or laboratory reagents whether or not on a backing, other than those of heading 3002 or 3006.

APPENDIX

Top Exporters of Biotech Products to Singapore (USD\$)											
Rank	Description	2005	2006	2007	2008	2009	% 2005-2006	%2006-2007	%2007-2008	%2008-2009	%2005-2009 TOTAL
	TOTAL COUNTRIES OF ORIGIN	1,141,058,918.00	1,413,953,587.00	1,496,245,924.00	1,709,955,057.00	1,920,448,487.00	23.9%	5.8%	14.3%	12.3%	68%
1	France	301,627,672.00	354,592,444.00	335,775,775.00	320,880,862.00	413,360,046.00	17.6%	-5.3%	-4.4%	28.8%	37%
2	USA	179,362,177.00	234,840,813.00	242,233,530.00	304,048,077.00	355,225,273.00	30.9%	3.1%	25.5%	16.8%	98%
3	Netherlands	5,833,870.00	6,156,462.00	6,728,091.00	40,810,782.00	189,354,875.00	5.5%	9.3%	506.6%	364.0%	3146%
4	Germany	80,076,347.00	96,190,559.00	119,988,942.00	151,178,439.00	170,785,128.00	20.1%	24.7%	26.0%	13.0%	113%
5	United Kingdom	48,199,186.00	58,624,115.00	97,165,495.00	124,382,841.00	135,131,227.00	21.6%	65.7%	28.0%	8.6%	180%
6	Ireland	159,348,130.00	144,426,775.00	142,492,366.00	179,244,568.00	130,249,306.00	-9.4%	-1.3%	25.8%	-27.3%	-18%
7	Australia	35,933,874.00	37,216,489.00	37,115,941.00	66,470,986.00	78,761,992.00	3.6%	-0.3%	79.1%	18.5%	119%
8	Switzerland	60,965,534.00	87,224,603.00	84,410,096.00	65,093,631.00	64,474,036.00	43.1%	-3.2%	-22.9%	-1.0%	6%
9	Japan	20,977,260.00	23,176,867.00	24,776,239.00	31,851,856.00	38,075,060.00	10.5%	6.9%	28.6%	19.5%	82%
10	Belgium	37,073,346.00	54,527,182.00	43,449,348.00	49,345,220.00	37,620,540.00	47.1%	-20.3%	13.6%	-23.8%	1%
11	Hong Kong	7,525,400.00	10,175,091.00	11,804,084.00	18,677,671.00	36,999,801.00	35.2%	16.0%	58.2%	98.1%	392%
12	Malaysia	25,946,601.00	28,972,826.00	32,806,981.00	35,991,783.00	35,479,377.00	11.7%	13.2%	9.7%	-1.4%	37%
13	China	19,960,069.00	26,396,606.00	72,261,280.00	85,763,916.00	31,111,108.00	32.2%	173.8%	18.7%	-63.7%	56%
14	Italy	34,044,046.00	50,579,935.00	53,650,032.00	49,572,226.00	30,060,373.00	48.6%	6.1%	-7.6%	-39.4%	-12%
15	India	33,416,335.00	81,891,670.00	65,354,527.00	33,861,575.00	24,647,894.00	145.1%	-20.2%	-48.2%	-27.2%	-26%
16	Other Europe	40,986.00	61,581.00	39,858.00	9,546.00	18,951,403.00	50.2%	-35.3%	-76.0%	198427.2%	46139%
17	Canada	5,602,405.00	12,517,911.00	12,966,306.00	21,168,913.00	17,384,549.00	123.4%	3.6%	63.3%	-17.9%	210%

APPENDIX

Top U.S. Biotech Export Destinations (USD\$)											
Rank	Description	2005	2006	2007	2008	2009	%2005-2006	%2006-2007	%2007-2008	%2008-2009	%2005-2009 TOTAL
	TOTAL PARTNER COUNTRIES	25,601,228,210.00	29,330,618,617.00	33,626,161,232.00	39,026,395,104.00	45,311,544,536.00	15%	15%	16%	16%	77%
1	Germany	1,647,675,811.00	2,146,387,492.00	4,230,436,587.00	5,452,113,804.00	6,919,372,403.00	30%	97%	29%	27%	320%
2	Netherlands	3,630,954,698.00	4,371,522,012.00	3,833,064,793.00	4,470,032,284.00	5,066,200,717.00	20%	-12%	17%	13%	40%
3	Canada	3,161,470,431.00	3,741,780,539.00	3,772,170,289.00	3,590,453,014.00	4,884,176,037.00	18%	1%	-5%	36%	54%
4	United Kingdom	3,139,875,563.00	3,940,016,125.00	4,014,276,061.00	4,252,606,677.00	4,525,673,910.00	25%	2%	6%	6%	44%
5	Japan	1,666,003,231.00	1,866,526,510.00	1,949,323,163.00	2,222,611,293.00	2,862,765,715.00	12%	4%	14%	29%	72%
6	Switzerland	1,450,993,038.00	1,820,533,157.00	2,260,154,307.00	2,468,805,269.00	2,515,079,682.00	25%	24%	9%	2%	73%
7	Belgium	1,887,178,757.00	2,140,182,825.00	2,297,701,344.00	2,633,971,788.00	2,504,959,899.00	13%	7%	15%	-5%	33%
8	Spain	320,872,332.00	284,787,274.00	1,065,732,811.00	2,205,255,381.00	2,384,944,414.00	-11%	274%	107%	8%	643%
9	France	1,516,520,609.00	1,592,057,579.00	1,541,585,988.00	1,859,644,073.00	1,854,869,322.00	5%	-3%	21%	0%	22%
10	Australia	710,502,906.00	737,417,490.00	940,062,559.00	968,444,429.00	1,316,051,873.00	4%	27%	3%	36%	85%
11	Italy	992,826,968.00	1,019,935,072.00	1,107,282,790.00	1,287,095,279.00	1,313,562,087.00	3%	9%	16%	2%	32%
12	Mexico	672,455,675.00	790,782,821.00	697,053,887.00	986,384,245.00	1,256,371,457.00	18%	-12%	42%	27%	87%
13	Ireland	731,377,491.00	543,033,462.00	861,359,556.00	865,851,632.00	875,023,923.00	-26%	59%	1%	1%	20%
14	Brazil	496,340,947.00	625,020,692.00	696,085,443.00	861,003,451.00	871,498,370.00	26%	11%	24%	1%	76%
15	China	237,892,069.00	310,100,568.00	434,661,685.00	493,626,204.00	610,768,260.00	30%	40%	14%	24%	157%
16	Korea	280,956,396.00	354,976,987.00	405,190,689.00	462,164,046.00	607,784,390.00	26%	14%	14%	32%	116%
17	Sweden	120,985,101.00	157,361,490.00	109,847,552.00	150,095,698.00	553,884,332.00	30%	-30%	37%	269%	358%
18	Austria	211,500,677.00	275,358,857.00	345,893,225.00	389,188,617.00	480,037,494.00	30%	26%	13%	23%	127%
19	Taiwan	176,728,096.00	199,489,453.00	235,195,240.00	227,289,812.00	283,200,297.00	13%	18%	-3%	25%	60%
20	Hong Kong	127,100,110.00	152,809,227.00	190,599,562.00	195,007,431.00	270,550,636.00	20%	25%	2%	39%	113%
21	Singapore	316,329,773.00	92,809,801.00	155,523,757.00	175,203,827.00	234,071,790.00	-71%	68%	13%	34%	-26%
22	Argentina	135,168,266.00	143,946,841.00	176,842,757.00	210,100,176.00	214,691,181.00	6%	23%	19%	2%	59%

APPENDIX

Biotech Exports from Maine (Total USD\$)												
Rank	HS Code	Description	2005	2006	2007	2008	2009	%2005-2006	%2006-2007	%2007-2008	%2008-2009	%2005-2009 Total
		TOTAL COMMODITIES	61,983,804.00	64,760,713.00	92,973,839.00	54,179,023.00	65,174,824.00	4%	44%	-42%	20%	5%
1	382200	Composite Diagnostic/Lab Reagents, Exc Pharmaceut	50,255,680.00	50,412,739.00	75,956,214.00	35,741,701.00	42,112,671.00	0%	51%	-53%	18%	-16%
2	300230	Vaccines For Vetrinary Medicine	5,956,575.00	8,570,098.00	10,561,356.00	11,019,945.00	12,803,277.00	44%	23%	4%	16%	115%
3	300210	Antisera And Blood Fractions, Immun Products	3,793,178.00	3,696,218.00	4,233,649.00	4,719,139.00	5,716,436.00	-3%	15%	11%	21%	51%
4	300590	Wadding, Gauze And Similar Articles Etc Nesoi	1,015,655.00	1,383,024.00	1,301,175.00	1,301,064.00	3,542,954.00	36%	-6%	0%	172%	249%
5	300290	Human Blood; Animal Blood Prep, Toxins, Cultrs Etc	23,921.00	106,705.00	26,772.00	223,727.00	667,290.00	346%	-75%	736%	198%	2690%
6	300490	Medicaments Nesoi, Measured Doses, Retail Pk Nesoi	91,104.00	122,230.00	501,290.00	1,032,157.00	146,613.00	34%	310%	106%	-86%	61%
7	300640	Dental Cements And Other Dental Fillings Etc	0	0	0	0	67,129.00	0%	0%	0%	0%	0%
8	382100	Prepared Culture Media For Devel Of Microorganisms	86,924.00	16,799.00	26,499.00	102,043.00	41,056.00	-81%	58%	285%	-60%	-53%
9	300510	Adhesive Dressings And Other Artcl Having Adh Lay	6,825.00	0	22,214.00	15,334.00	33,930.00	-100%	0%	-31%	121%	397%
10	300610	Sterile Surgical Catgut, Similar Sterile Mater Etc	44,105.00	30,233.00	4,099.00	0	14,275.00	-31%	-86%	-100%	0%	-68%
11	300620	Blood-Grouping Reagents	0	0	5,400.00	0	12,400.00	0%	0%	-100%	0%	0%
12	300120	Extracts Of Glands Or Other Orgs Or Secretions	6,799.00	0	0	3,503.00	10,616.00	-100%	0%	0%	203%	56%
13	300450	Vitamins, Natural Or Synthetic, Dosage Etc Form	2,838.00	0	14,526.00	0	3,483.00	-100%	0%	-100%	0%	23%
14	300190	Heparin And Its Salts; Other Human Or Animal Subst	2,627.00	0	0	0	2,694.00	-100%	0%	0%	0%	3%
15	300220	Vaccines For Human Medicine	263,800.00	397,117.00	296,825.00	14,390.00	0	51%	-25%	-95%	-100%	-100%

APPENDIX

Biotech Exports from U.S. to Singapore (USD\$)												
Rank	Code	Description	2005	2006	2007	2008	2009	%2005-2006	%2006-2007	%2007-2008	%2008-2009	%2005-2009 Total
		TOTAL COMMODITIES	316,329,773.00	92,809,801.00	155,523,757.00	175,203,827.00	234,071,790.00	-71%	68%	13%	34%	-26%
1	382200	Composite Diagnostic/Lab Reagents, Exc Pharmaceut	31,032,079.00	48,411,514.00	68,290,776.00	80,273,655.00	90,065,200.00	56%	41%	18%	12%	190%
2	300490	Medicaments Nesoi, Measured Doses, Retail Pk Nesoi	251,213,920.00	10,956,775.00	31,507,659.00	26,315,955.00	59,137,084.00	-96%	188%	-16%	125%	-76%
3	300510	Adhesive Dressings And Other Artcl Having Adh Lay	1,073,270.00	2,114,062.00	10,466,680.00	10,503,206.00	12,177,296.00	97%	395%	0%	16%	1035%
4	300210	Antisera And Blood Fractions, Immun Products	3,382,594.00	5,889,108.00	10,090,577.00	13,780,191.00	28,253,466.00	74%	71%	37%	105%	735%
5	382100	Prepared Culture Media For Devel Of Microorganisms	5,199,525.00	5,011,740.00	4,699,720.00	5,373,407.00	5,895,041.00	-4%	-6%	14%	10%	13%
6	300450	Vitamins, Natural Or Synthetic, Dosage Etc Form	5,344,492.00	6,142,106.00	5,607,065.00	8,153,444.00	6,332,825.00	15%	-9%	45%	-22%	18%
7	300390	Medicaments Nesoi, Not In Dosage Form Etc	2,860,911.00	2,412,106.00	6,313,461.00	14,139,270.00	9,615,295.00	-16%	162%	124%	-32%	236%
8	300691	Appliances Identifiable For Ostomy Use	0	0	0	112,009.00	273,462.00	0%	0%	0%	144%	0%
9	300610	Sterile Surgical Catgut, Similar Sterile Mater Etc	1,129,677.00	2,916,234.00	2,366,924.00	2,760,101.00	3,761,278.00	158%	-19%	17%	36%	233%
10	300290	Human Blood; Animal Blood Prep, Toxins, Cultrs Etc	485,899.00	802,622.00	1,871,007.00	1,551,775.00	2,077,755.00	65%	133%	-17%	34%	328%
11	300590	Wadding, Gauze And Similar Articles Etc Nesoi	2,655,893.00	1,982,367.00	1,868,925.00	2,665,023.00	2,494,407.00	-25%	-6%	43%	-6%	-6%
12	300420	Antibiotics Nesoi, In Dosage Form	336,246.00	1,301,404.00	1,302,827.00	1,322,616.00	1,483,042.00	287%	0%	2%	12%	341%
13	300410	Penicillins Or Streptomycins & Derv, Dosage Form	6,698,037.00	1,141,920.00	2,799,378.00	2,788,338.00	4,705,968.00	-83%	145%	0%	69%	-30%
14	300440	Alkaloids (No Hormones Or Antibiotics), Dosage Etc	1,170,544.00	1,204,696.00	1,329,258.00	1,559,054.00	2,573,395.00	3%	10%	17%	65%	120%
15	300230	Vaccines For Veterinary Medicine	360,360.00	223,965.00	350,514.00	523,383.00	1,451,117.00	-38%	57%	49%	177%	303%
16	300630	Opacifying Preparations For X-Ray Examinations Etc	1,358,803.00	216,058.00	219,758.00	391,828.00	608,490.00	-84%	2%	78%	55%	-55%
17	340700	Modeling Pastes For Child Etc; Denta Impr Cp Etc	362,334.00	522,682.00	387,114.00	537,274.00	524,866.00	44%	-26%	39%	-2%	45%
18	300640	Dental Cements And Other Dental Fillings Etc	600,855.00	716,805.00	560,495.00	553,394.00	514,038.00	19%	-22%	-1%	-7%	-14%
19	300190	Heparin And Its Salts; Other Human Or Animal Subst	283,874.00	109,843.00	3,419,873.00	405,519.00	887,840.00	-61%	3013%	-88%	119%	213%
20	300340	Medicaments Containing Alkaloids Or Derivat Etc	0	4,599.00	0	0	141,117.00	0%	-100%	0%	0%	0%
21	300620	Blood-Grouping Reagents	225,550.00	258,792.00	352,668.00	309,922.00	204,516.00	15%	36%	-12%	-34%	-9%
22	300439	Hormones Etc. (No Antibiotics Contained) Dosage Fm	187,549.00	141,128.00	573,688.00	518,158.00	201,065.00	-25%	307%	-10%	-61%	7%
23	300310	Medicaments Cont Penicillins Or Derivatives Etc	21,152.00	0	92,750.00	263,620.00	312,336.00	-100%	0%	184%	18%	1377%
24	300220	Vaccines For Human Medicine	254,545.00	40,745.00	561,510.00	85,373.00	117,409.00	-84%	1278%	-85%	38%	-54%
25	300339	Medicament Cont Hormones, No Antibiotics, No Doses	0	137,486.00	53,122.00	26,415.00	50,914.00	0%	-61%	-50%	93%	0%

APPENDIX

The "Medical Devices" data criteria for the next two charts includes products and instruments classified under the following HS Codes:

900220	Filters & Parts & Accessories For Instr & Appratus		901849	Inst & Appln For Dental Science, & Pts & Acc,Nesoi
900311	Frames And Mountings For Spectacles Etc, Plastic		901850	Other Ophthalmic Instruments & Appliances & Parts
900319	Frames And Mountings For Spectacles Etc, Nesoi		901890	Instr & Appl F Medical Surgical Dental Vet, Nesoi
900390	Parts For Frames And Mountings, Spectacles, Etc		901910	Mech-Thrpy Appl;Mssg Appr;Psych Apt-Test;Appr; Pts
900490	Spectacles, Etc, Corrective, Protective, Nesoi		901920	Ozone,Oxygen,Etc Therapy, Respiration Apparatus,Pt
900630	Cameras For Underwater, Aerial Survey, Medical Etc		902110	Orthopedic Or Fractre Appliances, Parts & Accessor
901110	Stereoscopic Microscopes		902111	Artificial Joints And Parts And Accessories
901120	Microscopes, For Photomicro, Cinephoto & Microproj		902119	Orthpdc/Fractr Appl (Ex Art Joint/Pt),Pt & Access
901180	Compound Optical Microscopes, Nesoi		902121	Artificial Teeth And Parts And Accessories
901190	Pts & Accessories For Compound Optical Microscopes		902129	Dental Fittings And Parts And Accessories
901210	Microscopes, Exc Optical; Diffraction Apparatus		902130	Oth Artifical Pts Of The Body & Pts & Accessories
901290	Pts For Microscopes, Exc Optical; Diffraction		902131	Artificial Joints And Parts And Accessories Therof
901811	Electrocardiographs, And Parts And Accessories		902139	Artificial Joints & Parts & Accessories Therof,Nes
901812	Ultrasonic Scanning Apparatus		902140	Hearing Aids
901813	Magnetic Resonance Imaging Apparatus		902150	Pacemakers For Stimulating Heart Muscles
901814	Scintigraphic Apparatus		902190	Oth Artifical Pts Of The Body & Pts & Accessories
901819	Electro-Diagnostic Apparatus Nesoi, And Parts Etc.		902213	Appts Base On X-Ray For Dental, Uses, Nesoi
901820	Ultraviolet Or Infrared Ray Apparatus, & Pts & Acc		902214	Appts Base On X-Ray, Medical,Surgical,Vetnry,Nesoi
901831	Syringes, With Or Without Needles; Pts & Access		902221	Appts Base On Alpha,Beta,Etc Radiation,Medical,Etc
901832	Tubular Metal Needles & Needles For Sutures &Parts		902720	Chromatographs And Electrophoresis Instruments
901839	Med Needles. Nesoi, Catherers Etc And Parts Etc		902730	Spctmtr Spctrphtmtr Etc Using Optical Radiations
901841	Dental Drill Engines And Parts And Accessories		902750	Instruments Etc Using Optical Radiations Nesoi

APPENDIX

Top Exporters of Medical Devices to Singapore (USD\$)											
Rank	Description	2005	2006	2007	2008	2009	%2005-2006	%2006-2007	%2007-2008	%2008-2009	%2005-2009 Total
	TOTAL COUNTRIES OF ORIGIN	1,308,855,597.00	1,512,978,167.00	1,686,648,730.00	1,661,271,519.00	1,574,021,055.00	16%	11%	-2%	-5%	20%
1	USA	296,492,197.00	383,301,653.00	486,667,783.00	465,024,124.00	456,317,604.00	29%	27%	-4%	-2%	54%
2	Japan	112,638,715.00	133,450,367.00	163,157,522.00	186,484,234.00	169,678,554.00	18%	22%	14%	-9%	51%
3	China	109,999,959.00	147,205,327.00	155,751,956.00	165,154,654.00	153,395,936.00	34%	6%	6%	-7%	39%
4	Indonesia	69,512,320.00	63,500,741.00	91,545,272.00	113,544,689.00	135,595,227.00	-9%	44%	24%	19%	95%
5	Germany	90,923,698.00	104,169,794.00	144,432,352.00	174,683,633.00	133,758,596.00	15%	39%	21%	-23%	47%
6	Ireland	17,882,487.00	19,976,720.00	28,683,029.00	36,457,465.00	58,298,660.00	12%	44%	27%	60%	226%
7	Malaysia	33,935,209.00	43,314,217.00	47,775,643.00	63,852,075.00	57,956,854.00	28%	10%	34%	-9%	71%
8	Switzerland	26,867,673.00	25,448,959.00	33,483,305.00	37,182,510.00	40,622,737.00	-5%	32%	11%	9%	51%
9	France	28,927,849.00	47,911,606.00	55,250,887.00	44,531,725.00	35,709,670.00	66%	15%	-19%	-20%	23%
10	Netherlands	106,340,836.00	117,476,812.00	113,551,195.00	43,014,289.00	33,074,874.00	10%	-3%	-62%	-23%	-69%
11	United Kingdom	204,902,904.00	196,056,087.00	80,951,484.00	31,680,905.00	31,126,046.00	-4%	-59%	-61%	-2%	-85%
12	Italy	20,205,127.00	27,327,150.00	34,118,960.00	35,840,234.00	26,984,511.00	35%	25%	5%	-25%	34%
13	India	20,148,865.00	28,148,515.00	30,650,725.00	41,256,099.00	26,168,559.00	40%	9%	35%	-37%	30%
14	South Korea	21,310,290.00	25,589,377.00	21,679,114.00	25,392,976.00	25,394,669.00	20%	-15%	17%	0%	19%
15	Hong Kong	22,759,455.00	19,496,572.00	29,877,735.00	28,802,777.00	22,681,545.00	-14%	53%	-4%	-21%	0%
16	Australia	9,138,592.00	9,017,633.00	9,752,926.00	10,635,704.00	19,674,669.00	-1%	8%	9%	85%	115%
17	Thailand	60,802,440.00	43,222,830.00	60,613,204.00	29,534,137.00	16,881,665.00	-29%	40%	-51%	-43%	-72%
18	Austria	6,558,403.00	8,459,417.00	10,902,984.00	15,030,428.00	15,099,734.00	29%	29%	38%	0%	130%

APPENDIX

Top U.S. Medical Device Export Destinations (USD\$)											
Rank	Description	2005	2006	2007	2008	2009	%2005-2006	%2006-2007	%2007-2008	%2008-2009	%2005-2009 Total
	TOTAL PARTNER COUNTRIES	23,407,878,184.00	26,228,837,296.00	29,116,435,875.00	33,642,922,960.00	33,849,131,254.00	12%	11%	16%	1%	1%
1	Netherlands	2,574,157,587.00	3,110,455,101.00	3,038,534,080.00	3,893,350,953.00	3,923,853,322.00	21%	-2%	28%	1%	1%
2	Japan	2,821,565,969.00	2,936,736,459.00	3,178,092,846.00	3,799,176,934.00	3,560,228,661.00	4%	8%	20%	-6%	-6%
3	Canada	2,094,562,251.00	2,371,005,009.00	2,676,189,028.00	2,964,874,966.00	2,895,002,160.00	13%	13%	11%	-2%	-2%
4	Germany	2,046,804,139.00	2,409,141,070.00	2,622,053,238.00	2,819,460,113.00	2,677,162,170.00	18%	9%	8%	-5%	-5%
5	Belgium	865,028,546.00	1,111,053,981.00	1,545,514,347.00	2,289,605,635.00	2,248,223,227.00	28%	39%	48%	-2%	-2%
6	Mexico	1,237,795,696.00	1,411,980,307.00	1,483,881,479.00	1,787,239,422.00	1,791,083,498.00	14%	5%	20%	0%	0%
7	China	706,232,479.00	730,730,365.00	937,110,465.00	1,172,949,696.00	1,402,018,089.00	3%	28%	25%	20%	20%
8	United Kingdom	1,287,857,198.00	1,325,300,965.00	1,374,273,034.00	1,499,002,516.00	1,231,348,458.00	3%	4%	9%	-18%	-18%
9	Australia	786,531,244.00	920,522,886.00	981,166,014.00	1,187,195,963.00	1,204,095,151.00	17%	7%	21%	1%	1%
10	France	989,405,681.00	1,112,663,908.00	1,151,727,802.00	1,254,760,538.00	1,198,965,178.00	12%	4%	9%	-4%	-4%
11	Ireland	1,412,847,937.00	1,077,099,904.00	1,144,850,054.00	970,213,857.00	1,030,689,964.00	-24%	6%	-15%	6%	6%
12	Switzerland	597,302,632.00	718,080,764.00	853,428,825.00	923,369,047.00	951,325,165.00	20%	19%	8%	3%	3%
13	Brazil	359,048,425.00	450,525,269.00	584,071,513.00	735,828,523.00	730,040,374.00	25%	30%	26%	-1%	-1%
14	Italy	615,630,824.00	676,192,943.00	673,216,580.00	696,535,490.00	719,845,674.00	10%	0%	3%	3%	3%
15	South Korea	514,633,718.00	596,879,225.00	683,166,207.00	700,104,524.00	715,843,537.00	16%	14%	2%	2%	2%
16	Sweden	390,080,744.00	519,027,951.00	581,144,678.00	599,294,927.00	711,448,196.00	33%	12%	3%	19%	19%
17	Hong Kong	366,085,914.00	370,953,720.00	375,818,736.00	440,938,905.00	501,934,714.00	1%	1%	17%	14%	14%
18	Singapore	225,179,174.00	295,480,018.00	384,889,963.00	404,851,831.00	447,917,293.00	31%	30%	5%	11%	11%
19	Spain	347,529,545.00	418,086,711.00	483,839,855.00	474,001,489.00	438,292,936.00	20%	16%	-2%	-8%	-8%
20	Luxembourg	3,666,834.00	6,987,877.00	10,147,699.00	3,241,858.00	403,295,767.00	91%	45%	-68%	12340%	12340%
21	India	219,218,397.00	259,507,319.00	331,155,307.00	370,275,475.00	396,754,520.00	18%	28%	12%	7%	7%
22	Denmark	161,288,557.00	193,896,369.00	248,477,794.00	298,648,967.00	326,511,393.00	20%	28%	20%	9%	9%
23	Taiwan	248,972,398.00	256,153,025.00	294,837,883.00	286,054,332.00	270,394,934.00	3%	15%	-3%	-5%	-5%

APPENDIX

Medical Device Exports from Maine (USD\$)											
Rank	Description	2005	2006	2007	2008	2009	%2005-2006	%2006-2007	%2007-2008	%2008-2009	%2005-2009 Total
	TOTAL COMMODITIES	12,389,025.00	20,891,854.00	25,534,095.00	19,461,244.00	35,443,447.00	69%	22%	-24%	82%	186%
1	Instruments Etc Using Optical Radiations Nesoi	5,257,972.00	11,348,672.00	17,344,049.00	13,823,383.00	29,222,540.00	116%	53%	-20%	111%	456%
2	Compound Optical Microscopes, Nesoi	834,770.00	470,009.00	1,185,680.00	1,358,906.00	2,132,096.00	-44%	152%	15%	57%	155%
3	Oth Artificial Pts Of The Body & Pts & Accessories	3,713,450.00	5,743,566.00	3,704,134.00	1,601,415.00	1,281,415.00	55%	-36%	-57%	-20%	-65%
4	Inst & Appl F Medical Surgical Dental Vet, Nesoi	1,542,200.00	1,972,338.00	1,505,977.00	1,230,735.00	1,262,326.00	28%	-24%	-18%	3%	-18%
5	Filters & Parts & Accessories For Instr & Appratus	38,845.00	59,801.00	18,654.00	51,910.00	505,052.00	54%	-69%	178%	873%	1200%
6	Syringes, With Or Without Needles; Pts & Access	11,241.00	249,567.00	184,510.00	278,817.00	314,498.00	2120%	-26%	51%	13%	2698%
7	Electro-Diagnostic Apparatus Nesoi, And Parts Etc.	104,638.00	357,045.00	1,137,014.00	306,343.00	176,000.00	241%	218%	-73%	-43%	68%
8	Spctmtr Sptrphtmtr Etc Using Optical Radiations	502,414.00	122,925.00	26,282.00	135,085.00	114,783.00	-76%	-79%	414%	-15%	-77%
9	Ozone,Oxygen,Etc Therapy, Respiration Apparatus,Pt	14,668.00	57,279.00	37,058.00	10,622.00	91,167.00	291%	-35%	-71%	758%	522%
10	Med Needles. Nesoi, Catherers Etc And Parts Etc	37,736.00	0	98,791.00	49,389.00	74,731.00	-100%	0%	-50%	51%	98%
11	Cameras For Underwater, Aerial Survey, Medical Etc	0	0	5,903.00	4,026.00	65,491.00	0%	0%	-32%	1527%	0%
12	Chromatographs And Electrophoresis Instruments	73,973.00	72,037.00	103,890.00	148,298.00	49,117.00	-3%	44%	43%	-67%	-34%
13	Appts Base On Alpha,Beta,Etc Radiation,Medical,Etc	7,104.00	0	0	0	47,602.00	-100%	0%	0%	0%	570%
14	Inst & Appln For Dental Science, & Pts & Acc,Nesoi	20,841.00	97,744.00	0	9,717.00	46,710.00	369%	-100%	0%	381%	124%
15	Orthopedic Or Fractre Appliances, Parts & Accessor	3,274.00	3,702.00	62,743.00	101,836.00	19,324.00	13%	1595%	62%	-81%	490%
16	Tubular Metal Needles & Needles For Sutures &Parts	0	0	10,007.00	20,196.00	8,825.00	0%	0%	102%	-56%	0%
17	Scintigraphic Apparatus	0	0	0	0	7,155.00	0%	0%	0%	0%	0%
18	Other Ophthalmic Instruments & Appliances & Parts	13,231.00	73,367.00	3,524.00	15,067.00	6,725.00	455%	-95%	328%	-55%	-49%
19	Artificial Teeth And Parts And Accessories	0	2,594.00	0	10,460.00	6,546.00	0%	-100%	0%	-37%	0%
20	Mech-Thrpy Appl;Mssg Appr;Psych Apt-Test;Appr; Pts	0	0	13,682.00	56,808.00	4,844.00	0%	0%	315%	-91%	0%
21	Appts Base On X-Ray, Medical,Surgical,Vetryn,Nesoi	0	204,082.00	53,147.00	85,793.00	3,650.00	0%	-74%	61%	-96%	0%
22	Ultraviolet Or Infrared Ray Apparatus, & Pts & Acc	0	0	15,354.00	45,000.00	2,850.00	0%	0%	193%	-94%	0%

APPENDIX

Medical Device Exports from U.S. to Singapore (USD\$)										
Rank	Code	Description	2005	2006	2007	2008	2009	%2005-2006	%2008-2009	%2005-2009 Total
		TOTAL COMMODITIES	225,179,174.00	295,480,018.00	384,889,963.00	404,851,831.00	447,917,293.00	31%	11%	99%
1	901890	Instr & Appl F Medical Surgical Dental Vet, Nesoi	55,455,410.00	70,923,846.00	89,145,573.00	95,742,345.00	109,684,611.00	28%	15%	98%
2	901819	Electro-Diagnostic Apparatus Nesoi, And Parts Etc.	42,544,520.00	64,942,817.00	72,944,034.00	79,914,157.00	87,993,253.00	53%	10%	107%
3	902750	Instruments Etc Using Optical Radiations Nesoi	22,938,082.00	25,331,080.00	31,590,135.00	44,667,496.00	40,778,292.00	10%	-9%	78%
4	902720	Chromatographs And Electrophoresis Instruments	14,254,524.00	18,734,000.00	28,701,746.00	31,227,623.00	35,610,841.00	31%	14%	150%
5	901839	Med Needles. Nesoi, Catherers Etc And Parts Etc	14,965,212.00	19,235,377.00	27,753,228.00	24,995,758.00	29,231,368.00	29%	17%	95%
6	902730	Spectmtr Sctrphtmr Etc Using Optical Radiations	7,479,614.00	17,706,939.00	33,230,487.00	28,530,703.00	26,472,650.00	137%	-7%	254%
7	902139	Artificial Joints & Parts & Accessories Therof,Nes	5,897,838.00	6,850,678.00	11,708,767.00	11,802,274.00	15,360,686.00	16%	30%	160%
8	901813	Magnetic Resonance Imaging Apparatus	843,077.00	1,930,537.00	8,080,733.00	9,205,017.00	14,350,932.00	129%	56%	1602%
9	901920	Ozone,Oxygen,Etc Therapy, Respiration Apparatus,Pt	4,166,238.00	6,781,460.00	6,727,901.00	6,810,975.00	13,221,857.00	63%	94%	217%
10	901812	Ultrasonic Scanning Apparatus	5,422,952.00	6,081,440.00	5,794,641.00	7,384,662.00	11,934,945.00	12%	62%	120%
11	901811	Electrocardiographs, And Parts And Accessories	5,068,183.00	4,182,940.00	8,159,770.00	6,645,504.00	8,031,040.00	-17%	21%	58%
12	901831	Syringes, With Or Without Needles; Pts & Access	4,112,138.00	5,838,722.00	9,736,779.00	9,895,066.00	7,146,708.00	42%	-28%	74%
13	901850	Other Ophthalmic Instruments & Appliances & Parts	4,413,942.00	3,813,171.00	4,653,471.00	5,709,828.00	7,084,879.00	-14%	24%	61%
14	901180	Compound Optical Microscopes, Nesoi	389,094.00	2,906,647.00	5,759,311.00	3,070,319.00	5,609,193.00	647%	83%	1342%
15	902131	Artificial Joints And Parts And Accessories Therof	6,670,667.00	6,512,015.00	5,341,551.00	4,233,769.00	3,770,632.00	-2%	-11%	-43%
16	902110	Orthopedic Or Fractre Appliances, Parts & Accessor	2,138,380.00	2,808,167.00	2,388,941.00	2,655,197.00	3,730,577.00	31%	41%	74%
17	900220	Filters & Parts & Accessories For Instr & Appratus	937,070.00	993,203.00	948,644.00	2,004,349.00	2,874,530.00	6%	43%	207%
18	902190	Oth Artifical Pts Of The Body & Pts & Accessories	2,759,348.00	4,025,448.00	1,097,450.00	1,889,406.00	2,435,737.00	46%	29%	-12%
19	901210	Microscopes, Exc Optical; Diffraction Apparatus	2,015,352.00	3,193,019.00	3,132,534.00	4,469,608.00	2,361,922.00	58%	-47%	17%
20	901290	Pts For Microscopes, Exc Optical; Diffraction	1,082,355.00	1,539,344.00	1,483,284.00	1,199,904.00	2,232,740.00	42%	86%	106%
21	902140	Hearing Aids	1,149,623.00	3,916,575.00	3,891,594.00	2,741,915.00	2,091,402.00	241%	-24%	82%
22	901820	Ultraviolet Or Infrared Ray Apparatus, & Pts & Acc	1,009,380.00	1,529,339.00	857,796.00	1,169,261.00	2,063,472.00	52%	76%	104%

APPENDIX

23	902129	Dental Fittings And Parts And Accessories	1,350,106.00	1,484,968.00	1,990,879.00	1,700,073.00	1,310,244.00	10%	-23%	-3%
24	902214	Appts Base On X-Ray, Medical,Surgical,Vetnry,Nesoi	3,674,160.00	2,267,225.00	4,140,180.00	2,289,787.00	1,301,350.00	-38%	-43%	-65%
25	902121	Artificial Teeth And Parts And Accessories	1,286,542.00	1,335,099.00	1,741,338.00	1,613,372.00	1,288,548.00	4%	-20%	0%
26	901849	Inst & Appln For Dental Science, & Pts & Acc,Nesoi	2,989,847.00	2,159,996.00	3,248,205.00	2,742,017.00	1,259,405.00	-28%	-54%	-58%
27	901190	Pts & Accessories For Compound Optical Microscopes	473,308.00	603,097.00	789,971.00	612,997.00	1,249,612.00	27%	104%	164%
28	900490	Spectacles, Etc, Corrective, Protective, Nesoi	1,295,311.00	823,770.00	721,777.00	658,253.00	1,183,524.00	-36%	80%	-9%
29	901814	Scintigraphic Apparatus	61,333.00	276,506.00	129,392.00	2,556,750.00	1,082,146.00	351%	-58%	1664%
30	901832	Tubular Metal Needles & Needles For Sutures &Parts	1,679,632.00	3,086,680.00	4,303,056.00	1,238,882.00	870,866.00	84%	-30%	-48%
36	901120	Microscopes, For Photomicro, Cinephoto & Microproj	68,487.00	244,051.00	199,042.00	466,580.00	225,895.00	256%	-52%	230%