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At the expense of the poor?

Examination of the business behaviour of Boehringer Ingelheim, Bayer and Baxter in Brazil

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Oxcart in a pretty street of Bahia, Brazil.
Photo: André Koehne, Wikimedia Commons

I Brazil: Land of contrasts

Brazil is a land full of contrasts – if only for its landscape and the climates of its five regions. The enormous and most populous state of South America also unites gross social and economic extremes. Whereas royally paid company directors are picked up for lunch by helicopters from the platforms of the sky scrapers in São Paulo, roughly 64 million Brazilians still live in poverty.[1,2] More than 190 million people live in 26 federal states. Almost half of the population live in the southeast. The north – mainly covered by rain forest – is only thinly populated and considered to be the poorest region.[3]

Take only the most differing rates of infant mortality of the individual regions as an indication of the large differences in health care: in the south of the country, about 13 infants per 1,000 live births die whereas 23 babies in the north do not live to see their first birthday anniversary.[4]

More than a fourth of the Brazilian population are children. Photo: Adam Jones, Wikimedia Commons

1. The Brazilian health system

Health in figures[5]		
Total population	2011	196,655,014
% under 15	2011	25%
% population living in urban regions	2010	86.5%
Live expectancy at birth	2009	
Men		70 years
Women		77 years
Maternal mortality per 100,000 live births	2010	56
Infant mortality (under 5 years) per 1,000 live births	2010	19.4
Literacy rate of adult population	2008	90%
Proportion of population with access to improved drinking water supply	2010	98%

Sources: WHO and World Bank

Since 1988, health has been anchored as a fundamental right in the Brazilian constitution. On this legal basis, the construction of the Brazilian health system SUS (Sistema Unico de Saude) started in 1990.[6] It grants all citizens unrestricted access to free medical care. This is based on the principle of social equality. SUS is meant to equally serve all levels of the population and, for that reason, it is financed by taxes and not by contributions, since a large proportion of the Brazilian population works in informal jobs. These employees would not have a claim to medical care through insurance contributions coupled to wages and would thus be excluded from public health care.[7]

Brazilians having a chat. The government invests annually about 1,000 US dollars per head in their health. In Germany, this amount is almost fivefold. Photo: Adam Jones, Wikimedia Commons

Decentralized and in touch with the people

In addition to universal access and just participation, the Brazilian health system is also based on decentralization and participation of the population. Communities and federal states participate in the administration and organization of the health system; still, the population is also included in decision-making processes in the health system. There are, for example, health councils on various levels in which citizens can participate in health issues. SUS is furthermore aimed at an integral provision with an extensive service spectrum covering measures for health promotion, prevention and treatment of patients as well as rehabilitation possibilities.[8]
On the one hand, this health system can already show considerable success in the fight against infectious diseases and in particular against HIV/Aids. On the other hand, it also exhibits weaknesses. The SUS is clearly underfinanced. Its funding is primarily based on social contributions of companies which have to pay taxes on their profits and proceeds. Taxes are also

Health posts are the first points of contact for patients. Photo: Paulo RS Menezes, Wikimedia Commons

raised on financial transactions, which then finance the health sector.[9] In 2006, the health sector merely obtained 40% of the revenue of these taxes. The majority of the revenues was used for paying off public debts.[10]

The federal government distributes the money available to the federal states in proportion to their number of inhabitants.[11] This capitation fee is not unproblematic since it neither considers the potentially varying health risks in the individual regions nor the varying demographical or social conditions in the individual federal states.

In total, roughly 990 US dollars are spent for medical care per citizen in Brazil; in Germany it is almost fivefold, i.e. 4,668 dollars per head and year. The proportion of the expenditure for health in the gross domestic product is around 9% in Brazil and 12% in Germany.[12]

Basic medical care

One pillar of the medical care through the SUS is the family health program (Programa de Saúde da Família, PSF). Within this program, the population receives medical care by so-called health teams at a local level. Each of the teams consists of a physician, a nurse, an auxiliary nurse as well as 4-6 social health workers. In 2010, more than 33,000 teams were busy in Brazil and cared for more than 98 million people.[13]

The health teams are the first point of contact for the patients and, if necessary, they organize any further treatments by specialists. The team members work in local health centers or visit the families at home. They give information on preventive measures, weigh the children, monitor preventive vaccinations, attend to pregnant women, diabetics and other patients. As a result of the work of the health teams, infant mortality was reduced in Brazil since the deaths resulting from diarrhea and respiratory infections were reduced because of improved counseling.[14]

Supply of medicinal products

In Brazil, there are approx. 15,000 public popular pharmacies (Farmácias Popular do Brasil and Aqui tem Farmácia Popular) and about 57,000 private pharmacies. Whereas the Farmácias Popular are completely public, private pharmacies are also registered as popular pharmacies in the program Aqui tem Farmácia Popular. The SUS buy the medicines and make them available to the population in those two programs. However, the Farmácias Popular usually only provide a small selection of roughly 100 frequently needed pharmaceuticals, among them drugs against high blood pressure, diabetes or contraceptives.

The Ministry of Health furthermore published a positive list of 95 active agents which can be prescribed in the public health system. In the popular pharmacies, these drugs are up to 90 percent cheaper (Aqui tem Farmácia Popular) than in other pharmacies or even free of charge (Farmácias Popular do Brazil). If an additional payment is at all necessary, it is never more than three Euros.[9]

Essential drugs shall be provided for all citizens at any time according to the Brazilian constitution. However, the reality if often different: on average, 40% of the medicinal products, which should be provided free of charge in the public health system SUS, are not available there and have to be bought in private pharmacies.[15] This situation is aggravated by the fact that even many private insurances do not cover the costs of medicines. Thus Brazilians have to pay for the lion's share of the costs for medicines out of their own pockets.

The situation of the physicians

Almost half of the Brazilian physicians have a side job since the wages are low in particular in the public sector. Physicians partly work simultaneously in the public and the private sector to safeguard their income. Whereas almost half of the physicians obtain their money solely from the private sector, merely 30% receive their salary exclusively from public sources.[16]

Physicians having a second job earn significantly more: about 4,600 R$ per month (converted 1,765 Euros). Brazilian physicians with only one job, however, earn a maximum of 2,700 R$ (1,036 Euros). Those physicians who are exclusively privately paid even earn about 4,935 R$ (1,893 Euros) per month. Seen against this background, it is hardly surprising that there is a shortage of physicians in the public sector which results in long waiting periods.

VIP facilities at a private hospital in São Paulo.
Photo:Hosppaulistano, Wikimedia Commons

Rich and poor are often close together in Brazil. Adjacent to the Favela do Moinho in the center of São Paulo, there are modern high rise buildings.
Photo: Milton Jung, Wikimedia Commons

Secondary specialist care is firmly in private hands

Secondary care in the SUS comprises all hospital services as well as the treatment by specialists. Inpatient care, however, is firmly in the hands of private providers in Brazil. Roughly 70 percent of the clinics are private. The SUS is therefore dependent on contracts with private service providers in order to guarantee inpatient, therapeutic and diagnostic care of the population. Almost 40% of the private beds are thus also available to the public health system.[17] Depending on the federal state, however, the number of the publicly used hospital beds varies greatly. Whereas 1.6 beds per 1,000 people are provided in the northern parts of the Amazon, the more southern Rio de Janeiro has more than twice the number of beds.[18]

Brazil's mostly private hospital system has its price: almost half of the health care expenditure carried out by the government, by private insurance or by direct payers arrives in private hospitals in Brazil.[19] It is not only in respect of the hospital beds, but also as regards diagnostic possibilities that the SUS depends on the private sector. Only a relatively small proportion of the expensive instruments for CTs and MRTs is, for example, public property.[20]

Inequalities in the health system

The shortcomings of the secondary care in the SUS are long periods of waiting and, in part, a bad treatment quality.[21] Another weakness of the public health system is the lack of physicians and the precarious equipment of the health institutions.

A growing part of the more prosperous Brazilian population consequently takes out a private health insurance in addition to the public care. In 2008, as many as 26% of the Brazilians had a private insurance.[22] This leads to an increasing privatization of health care – which is encouraged by the government: anyone who takes out a private health insurance is eligible for tax benefits.[23] Inequalities in the access to health care is thus increased. Private patients have better access to preventive care, receive more vaccinations and more complex treatments. They also use offers to preventive health care measures more frequently and are sent to hospital wards with better equipment.[24]

The regional differences in public care are also grave. The medical infrastructure in the north and in the northeast is weaker, the proportion of underweight infants is particularly high and life expectancy is lower by a number of years as compared to the rest of the country. In contrast to the south and the southeast, there are fewer

Tangle of cables at a favela. The improved access to clean water and electricity has drastically forced back infectious diseases in Brazil.
Photo: Alicia Nijdam, Wikimedia Commons

Rubella vaccination in a public institution in Brazil.
Photo: Sandra Rugio, Wikimedia Commons

hospital beds and physicians per 1,000 inhabitants and the people are poorer. It will therefore not come as a surprise that private insurances are more often taken out in the south.[25]

A successful fight against infectious diseases

Infectious diseases were successfully forced back in Brazil. Only a scarce 5% of all deaths are caused by infections. In particular the cases of tuberculosis, polio, measles, mumps and diphtheria were significantly reduced, which was caused by better access to clean water and elec-

Dengue control in Brazil: Public health officers release Poecilia reticulata (guppy) fry into an artificial lake in Brasília, as part of dengue vector control activities
Photo: Fábio Rodrigues Pozzebom/AB (Agência Brasil)
Wikimedia Commons

tricity as well as the introduction of free public vaccination programs. In 2002, roughly 70% of the vaccines were manufactured by state-run producers (Butantan Institute and BioManguinhos). This lowered the costs considerably.[26]

HIV / AIDS and tuberculosis

Roughly 600,000 Brazilians are HIV positive.[27] For five years, however, the number of new incidents has remained stable, AIDS mortality decreased by 40% and life expectancy of the patients significantly increased.[28] Such positive changes predominantly result from the introduction of a public health program with free anti-retroviral therapy.[29] The carefully structured treatment program offers an extensive portfolio of drugs which are mainly produced locally and at an advantageous price. Preventive campaigns furthermore focus on the relevance of "safer sex" and of an early start of treatment. There still exists a need for action in smaller communities. Their resources of HIV-diagnosis and treatment are often not sufficient.[30]
With the introduction of free HIV therapy, the number of new tuberculosis incidents also decreased. TB is a frequent concomitant disease in AIDS patients. In Brazil, all tuberculosis treatments are documented in a data base in order to control the adequate use of antibiotics. 63% of the patients completely went through the treatment which lasted several months, 8% discontinued the treatment prematurely. Such discontinuations massively assist antibiotic resistances.[31]

Dengue fever, leishmaniasis and malaria continue to be problematic

Dengue fever, a viral infection transmitted by mosquitoes, is also a large health problem. Although the Brazilian government spend much money on the fight against this disease, the number of infections has been rising since 1986.[32] There is neither an effective therapy nor a vaccine.

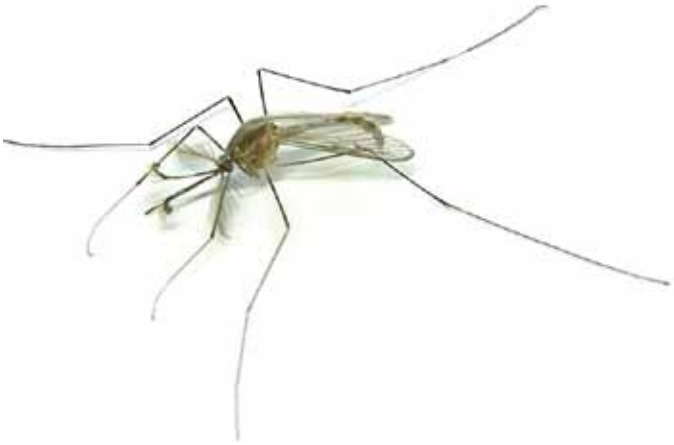
The visceral leishmaniasis is another widely spread infectious disease. Almost 70% of all leishmaniasis cases in South America occur in Brazil and the new incidents have been increasing since the 80ies. This dangerous pathogen is transmitted to the human by sandflies. All strategies and technologies to eliminate the sandflies have hardly been effective. In addition, the treatment of this disease is expensive and complex.

It was possible to force back malaria since the fifties; however, 300,000 new incidents per year are a considerable challenge for the Brazilian health system. 99% of the malaria cases are

reported from the Amazon region since the Anopheles mosquito, which transmits the Malaria pathogen to humans, is widely spread there.[33]

New challenges: non-communicable diseases

Non-communicable diseases such as cardiovascular diseases, cancer or diabetes are a growing health problem in Brazil. In 2007, 72% of all deaths were caused by these so-called diseases of civilization. Heart diseases are at the top of this list and cause high costs through expensive medicinal therapies and treatments. In 2006, 1.5 million hospitalizations were caused by heart diseases. More than four million people with diabetes and high blood pressure are registered in the national treatment program Hiperdia.[34] The rate of morbidity and mortality is high especially in the poorer sections of the population. This rise of the so-called diseases of civilization is caused by demographic, social and also economic changes. More than half of the Brazilians are now overweight according to the WHO. 18.8% are even obese.[35] This also causes an increase of diabetes and high blood pressure. In 2010, roughly 45,000 people died of their diabetes. Rio de Janeiro has a diabetes rate of just over six percent, which is one of the highest rates in Brazil.



A harmless mosquito bite with possible bad consequences. Malaria is transmitted by the female Anopheles mosquito. Photo: Photolia

The Brazilian government has meanwhile launched an extensive action plan. In 2006, programs for health education, for disease monitoring and for healthy nutrition were created on all federal levels. Free sports classes shall improve the general fitness of the population.[36] Since 2009, it has been determined by law that 30% of the food budget in school canteens has to be fresh food. Advertising of tobacco products has been prohibited since 2000 and a far-reaching national program for the prevention of alcohol abuse was started in 2007.[37]

Non-communicable diseases already present the SUS with an enormous financial challenge since their treatments are expensive and are paid for by the state.

	TOTAL	Região Norte	Região Nordeste	Região Sudeste	Região Sul	Região Centro-Oeste
Population	191,481,045	15,359,645	53,591,299	80,915,637	27,718,997	13,895,467
Life expectancy	73.3	72.1	70.5	74.7	75.3	74.2
% Illiteracy	9.70	10.57	18.69	5.68	5.46	7.99
Average household income in R$ per capita per month	767.02	494.11	458.63	943.34	919.9	935.06
% Infant mortality (under 5)	20.5	27.4	25.2	16.4	14.8	19.8
Infant mortality/ 1,000 live births	17.6	23.1	21.7	14.2	12.7	17.0
Dengue fever (cases)	2,711	407	739	513	5	1,047
Underweight children <5 years/100 children (2006)	1.9	3.3	2.0	1.4	1.9	1.6
Hospital beds/ 1,000 inhabitants	2.26	1.84	2.02	2.35	2.65	2.32
Medical personnel/ 1,000 inhabitants	1.84	1.00	1.12	2.37	2.10	1.96

Quelle: http://tabnet.datasus.gov.br [Ministério da Saúde 2010]

Drogaria in Rio de Janeiro. Photo: Eduardo P, Wikimedia Commons

2. The pharmaceutical market in Brazil

Following the USA, Germany and France, Brazil is the fourth largest market for pharmaceuticals. Its growth rate has clearly been a two-digit figure since 2005, in 2011 it was even 19 percent.[39] 2.3 billion pharmaceutical products having a value of 26 billion US dollars were sold. This makes Brazil an interesting market for international pharmaceutical companies.[40]

A large number of pharmacies without good control

Brazil, with more than 60,000 Drogarias, is the country with the most pharmacies in the world. A pharmacy in Brazil provides pharmaceutical products to about 3,000 inhabitants; in Germany it is about 3,800.[41] However, the supervision of the trade with pharmaceuticals is inadequate; grave gaps are above all in the control of private Drogarias. Although it is clearly specified which pharmaceuticals can be sold over the counter and for which pharmaceutical a prescription is needed, these regulations are often ignored. Consumers themselves can buy antibiotics, drugs against high blood pressure or diabetes without prescriptions. Moreover, it is often the case that no pharmacist is present in private Drogarias although this is also prescribed by law.[42]

Anvisa[43], the National Agency for health surveillance (Agência Nacional de Vigilância Sanitária), is responsible for the supervision of the Brazilian pharmaceutical market. It was founded in 1999 and is bound to the Brazilian Ministry of Health via a management contract but it is administratively and financially independent.[44] The regulatory authority is responsible for the supervision of all economic sectors, products and services, which can have effects on the health of the population. This includes monitoring the production, marketing and sales of pharmaceutical products as well as their prices. Anvisa is also

responsible for the approval of pharmaceuticals, coordinates various national programs (e.g. the program relating to blood and blood products) and examines patent applications. It is interesting that the Brazilian Institute for Industrial Property (INPI) needs the Anvisa's consent if it wishes to grant patents on pharmaceutical products.[45,46] The agency has about 5,600 local offices on the state and community levels. The main administration employs about 2,100 people, 130 of whom are experts in the pharmaceutical field.[47] Specialists are scarce but an even greater challenge for the Brazilian health supervision are existing conflicts of interest. In some communities, leading employees of the public health system are also the owners of private clinics or pharmacies.

Patent law with protective clauses

In May 1997, Brazil introduced a patent law which takes the international minimum standards on the protection of intellectual property into account. Such standards are prescribed by the TRIPS Agreement (Agreement on Trade Related Issues of Intellectual Property Rights) of the World Trade Organization (WTO). Since then, Brazil has to grant patents on real innovations and may no longer cheaply copy patented drugs and produce them locally. Certain protective clauses exist which are to ensure that the poor continue to have access to these drugs. In Articles 68 to 74 of the Brazilian Patent Law[48] e.g. compulsory licenses are provided if a company abuses their economic power or if a national health emergency exists.[49] Under a compulsory license, a patented pharmaceutical can be generically produced at a favourable price. The patentees do receive license fees, however, they cannot enforce their patent claims.

At the end of the nineties, Brazil's government threatened international companies with compulsory licenses several times and achieved large price reductions in negotiations. Still, that sword lost its edge over time and those price reductions were only in the lower one-digit region. In 2007, Brazil took the gloves off and, for the first time, granted a compulsory license on the Anti-Aids drug Efavirenz – the price then dropped by almost fifty percent.

Restricted patentability

Article 8 of the Brazilian Patent Law only grants a patent on a product if it is novel and can be manufactured industrially and contains an inventive step.[50] This wording – which is also specified by TRIPS – leaves plenty of room for interpretation and repeatedly resulted in court suits. As a result, there have been various legislative initiatives since 2006 to further restrict patentability.[51] As a model, Section 3(d) of the Indian Patent Law was used. There, "discoveries of a new form of a known substance" are excluded from patentability if no new therapeutic advantage („enhancement of the known efficacy") can be proven.[52] As a consequence, there are fewer patents, a stronger generic competition and thus, as a rule, lower prices.[53]
Brazilian citizens moreover can file an opposition before as well as after the patent is granted.[54] In the case of Lopinavir/Ritonavir, an important Anti-Aids drug of the second therapeutic line, the opposition of civil society groups was particularly successful.[55] The patent was declared invalid in 2012[56] – a far-reaching decision since the drug of the Abbott company devoured 30% of the health budget for HIV/Aids and venereal diseases until then. Brazil had priorly declared the patent for Tenofovir to be invalid and graded the Anti-Aids drug as not sufficiently inventive to qualify for a patent.[57]

A favourite research market

Brazil is not only interesting for pharmaceutical companies as a market for sales but also as a booming research market. In 2011, 139 million US dollars were invested in research.[58] According to Interfarma, the Brazilian association of pharmaceutical industries, this research includes above all studies on cancer, cardiovascular diseases, diabetes or Alzheimer's disease.[59] The reason for those numerous research projects is a good infrastructure at medical research institutions and well qualified personnel at comparatively low costs. What is also decisive is the

HIV-positive prostitute in Rio de Janeiro. She profits from Aids therapies which Brazil produces under compulsory licenses and provides free of charge in the public health system. Photo: By Daniel Seiffert, Wikimedia Commonse

large and quickly growing population, short periods of obtaining approval as well as a high proportion of patients with diseases caused by civilization.

National ethics committees monitor the execution of clinical trials. The national health agency Anvisa defines their evaluation criteria. A company has to prove, among other things, that the clinical trial is registered on the International Clinical Trials Registration Platform, the Platform of the World Health Organization (ICTRP / WHO) or at the International Commit of Medical Journals Editors (ICMJE).[60] According to the Resolution 196/96 of the National Health Council, every clinical trial has to be approved by the local (CEP) and the national (CONEP) ethics committee and has to be presented to the Brazilian Committee for Ethics and Research (CER) of the Brazilian National Health Council.[61] Since 15th Jan. 2012, each new trial also has to be registered at the CEP/CONEP "Plataforma Brasil".[62] In addition, companies can register their trials at the Brazilian Register (ReBEC) for Clinical Trials on a voluntary basis.[63] In fact, only few trials are registered there.

3. The companies examined

Boehringer Ingelheim

„Generating value through innovation“ is the motto of the company Boehringer Ingelheim. The German family business research and produce pharmaceutical products and is present in 13 countries at 20 locations. The emphasis of the company lies on respiratory and cardiovascular diseases, oncology, neurologic disorders, immunology and infectious diseases.[64]
In 2011 Boehringer Ingelheim generated a sales revenue of 13 billion Euro, almost half of it was obtained in North and South America. According to the company's own information, they invested 2.5 billion Euro into the research and development of new drugs during that same year.[65]
Boehringer Ingelheim have been present in Brazil for over 55 years. 350 employees work in the Brazilian subsidiary in Itapecerica da Serra, not far away from São Paulo. About 84 million packaging units are produced there annually.[66]
In 2011, the company generated a turnover of 557 million US$ in Brazil. Boehringer Ingelheims bestsellers there are the painkillers Anador® and Buscopan® Composto.

Baxter

Baxter International Inc. develop, produce and market pharmaceuticals and vaccines which are biotechnologically manufactured and obtained from blood plasma. In the company's portfolio there are in particular drugs for treating blood clotting disorders (hemophilia), immune deficiencies, infectious diseases, cancer and kidney diseases. The company is the largest manufacturer worldwide of infusion solutions and systems for intravenous administrations. Products for artificial nourishment and infusion systems were not considered in this study. Baxter produce in 27 countries and employ 48,500 people worldwide.[67]
In 2011 Baxter generated an annual turnover of 13.9 billion US dollars. 946 million US dollars were invested in research and development, according to their own information.[68]
In 1977, Baxter opened their first factory in São Paulo, Brazil. In the meantime, the company employs more than 1,000 people there. The annual turnover in Latin America was around one billion dollars.[69] The Baxter product with the highest turnover is Advate®, a blood substitute for treating hemophilia, which the company also offer in Brazil.

Bayer HealthCare

Science for a better Life – is the motto of Bayer AG with headquarters in Leverkusen, Germany. With their group Bayer HealthCare, they count among the big ones in pharmaceutical business (place 10). In 2011, this business segment achieved a worldwide turnover of roughly 17 billion Euro and employed 55,700 people in 100 countries. During the same year, almost two billion Euro were invested in research and development.[70]
Among the medicines with the highest turnover in 2011, there were Betaferon® for treating multiple sclerosis, Kogenate® as solution with blood coagulation factors and the contraceptive Yasmin® / Yaz® and Yasminelle®.[71] Only Betaferon®, Yasmin® and Yaz® were also on the Brazilian market at the time of our study. Kogenate® is not approved in Brazil.
For 114 years, the Bayer company have been active in Brazil and employ 4,000 people at two production sites in São Paulo and in Belford Roxo.[72] Brazil is the most important market for Bayer in South America and is responsible for almost 40% of their overall turnover.[73]

Endnotes

1 *According to the definition of the Brazilian Government, families are considered poor with a per capita income of below 140.- R$ (56.50 € per month). 63,751 households are supported by the public welfare program "Bolsa Família". Ministério do Desenvolvimento Social e Combate à Fome. Relatórios de Informações Sociais. RI Bolsa Família CadÚnico. Available from: http://aplicacoes.mds.gov.br/sagi/RIv3/geral/index.php. [accessed: Nov. 13, 2012]*

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9 *Ibid*

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II Methods of the study

This study examines the business behaviour of Boehringer Ingelheim, Bayer HealthCare and Baxter in the Brazilian federal state of Goiás and in the federal district Distrito Federal. This supplements a research project examining the same companies, which we had already carried out in India in 2010. Then, the portfolio of pharmaceutical products, price policy and marketing of the three companies were examined in two Indian federal states.[1] The current collection of data from Brazil uses the same methods of study in order to guarantee comparability of the results. However, since there are hardly any health care facilities in Brazil which are run by non-governmental organizations or the church, the non-commercial sector is not considered in this survey.

As in the Indian survey, the ethical evaluation of the business practices was based on the Declaration of Human Rights of the United Nations, the Helsinki Declaration of the World Medical Association as well as the companies' own Corporate Social Responsibility Codices. The data-collecting in Brazil, during 2011 and 2012, was coordinated by Rogério Hoefler, a pharmacist from Centro Brasileiro de Informação sobre Medicamentos (Cebrim), Conselho Federal de Farmácia (CEF). This organization is an equal project partner and was included in the development of the study design as well as in the processing and distribution of the results. The competent ethics commissions consented to the collection of data.

Why Brazil?

As an emerging nation with a growing upper and middle class, Brazil represents a lucrative market for the international pharmaceutical companies. Leading international companies carry out research and manufacture in Brazil and plan to extend their respective activities there. In addition, numerous national manufacturers produce cost-effective drugs for the local market and also for export. Most of them are publicly owned and mainly supply the public health system SUS. This survey is to examine which consequences the process of globalization has for Brazilian patients. There are still 64 million Brazilians who live in poverty and who depend on affordable health care services and cheap medicines.[2] So, which effects do the advertising strategies, research efforts and business policies of international pharmaceutical companies have on the access to and availability of essential drugs? Which role does the patent policy and product portfolio of the manufacturers play for public health?

Quantitative methods

The present survey uses quantitative as well as qualitative methods (semi-structured interviews). It combines the results and thus increases their validity and reliability. The quantitative surveys and literature research provide figures and facts as regards the amount of the branded medicines available, as regards the proportion of essential, rational and irrational products in the company's portfolio, as regards the price and availability of the pharmaceuticals offered and as regards clinical trials of the three manufacturers.

The data were predominantly collected in Brazil

and compared to the companies' own information as well as to information obtained by literature research – for example with data from Anvisa (Agência Nacional de Vigilância Sanitária),[3] the national authority, which is also responsible for the approval of drugs. This was supplemented by internet databases or the official US and WHO registers on clinical trials.[4] All three companies were informed of the study beforehand. During the collection of data, we repeatedly requested comments and information on specific questions.

Qualitative methods

Semi-structured interviews were used as a qualitative method. They are intended to show which personal consequences result from the business behaviour of the companies for health managers, doctors, pharmacists and patients. Since it was only in the Distrito Federal that an ethical approval existed in time, all 22 interviews were carried out there. An open questionnaire served as a conversation guideline. The interviews offer a deeper understanding of the matter beyond figures and facts. 7 doctors, 10 pharmacists and 5 patients from the public and the private health sector were interviewed. Only one representative of Boehringer Ingelheim and one public health manager from Distrito Federal Government were prepared to be interviewed. The representatives of the other two companies could not be convinced to take part, as was the case with interview partners from national public health authority.

The interviews were conducted in Portuguese and stored on audio data media. In addition, the interviews were recorded directly afterwards from memory to record relevant information in condensed form. When possible, the patients were interviewed at their homes since their living conditions also supplied important background information on their economic situation. The condensed statements of the interviews were interpreted with a thematic text analysis. Important topics were worked out and included in the discussion of the quantitative results of the study.

The collection of data

The collection of data only refers to medicines which are available in Brazil and to clinical trials Bayer, Baxter or Boehringer Ingelheim are carrying out in Brazil or carried out at the time of data collection and which were listed in freely accessible databases and/or in information provided by the company. The data collection took place from January 2011 to June 2012. All data relating to the study, audio files, memory protocols as well as questionnaires and interview guidelines can be inspected at BUKO Pharma-Kampagne. However personal data of all interview partners is strictly confidential. In the following, important sources are listed, which we used to find answers to the research questions.

1. Which medical drugs are on the market?

There is no standard work in Brazil which lists all available drugs, such as e.g. the Rote Liste in Germany. Thus various data sources were used to determine the companies' portfolios:

- The database of the national authority for health surveillance (Anvisa) for the medicines registered in Brazil.[5]
- The I-Helps database[6], which collects all relevant information on pharmaceuticals, data about their registration in Brazil, including dates, manufacturer, ingredients and dosage form.
- The drug database of Anvisa referring to package leaflets.[7]
- List of drugs (Componente Especializado) which are available in the public sector free-of-charge.[8]
- Aqui Tem Farmácia Popular do Brasil: list of very low-cost drugs which are sold in public pharmacies.[9]
- Saúde Não Tem Preço: list of drugs which can be obtained at private pharmacies since they are refunded by the Ministry of Health.[10]
- List of drugs which are subsidized by the state.[11]
- Information provided by the companies (websites, package leaflets, specialized information).[12]

In addition, there are drugs on the market which are not listed in any of these databases. We tried to record those drugs by doing research in Brazilian pharmacies (hospital pharmacies and private pharmacies). Moreover, we requested all companies to check the product lists prepared. Baxter denied cooperation, the two other companies confirmed our data.

The following information was determined:

- Name of the manufacturer
- Dosage, type of application, packaging size, generic name, brand-name
- Is the drug essential?
- Is the drug rational or irrational?
- Price in Brazilian Reais (R$)
- Availability via the public health system in Distrito Federal and Goiás.
- Is it an innovation?
- Is the innovative drug also essential?

1. Which drugs are essential?

Essential drugs were identified with the Model list of essential medicines of the WHO of 2011.[13] This list contains about 350 active agents which are essential for health care. With the pharmaceuticals listed there, 90% of all treatable diseases can be cured or at least treated sensibly. Since Brazil also has a good national list of essential medicines,[14] this list was also taken into consideration. A drug was classified as essential (e) which can be found on one of those two lists or even on both.

2. How good are the portfolios of the companies?

Medicines which are not essential may still be safe, harmless and of medicinal utility. In order to be able to evaluate the respective company portfolio as regards its quality, that means as regards the efficacy and safety as well as the medicinal utility, each pharmaceutical was evaluated by a male and a female pharmacist. All drugs underwent a uniform evaluation process and were examined on the basis of clinical-pharmacological criteria. Pharmaceuticals which are effective and harmless according to current scientific knowledge and which are as effective as the standard therapy, were graded as rational (r), all other as irrational (i). Our evaluation uses the scientific criteria for rational drug therapy, which are based on clinical evidence.

In the evaluation process, the drugs were divided into two main groups and several sub-groups. The two main groups separate positive (r - rational) from negative (i - irrational) drugs. The respective sub-groups state the most important reason for the classification (see illustration on the right). We have tried to make each decision on the basis of the acknowledged international specialist literature providing reliable information on the current state of the international scientific discussion. However, we are conscious of the fact that both objective facts as well as subjective values enter into the evaluation. Nevertheless, on the basis of the clearly defined evaluation criteria of the study, a good insight into the quality of the examined drugs can be achieved.

The evaluation process which eventually resulted in the classification into positive and negative drugs is documented by the following "decision diagram". Each drug was subjected to each of the individual evaluation issues in turn. If the examination relating to one criterion resulted in a negative evaluation, the drug was sorted into the corresponding evaluation group and no further criteria were examined.

4. Price and availability

This part of the research examines if essential drugs are available and if their price is affordable for poor people. To collect the date, the established WHO/HAI methodology was used.[15] Since there are hardly any NGO clinics in Brazil, private pharmacies were included in the survey. Thus, a selection of 113, or 111 medical drugs, respectively, was examined in 5 public and 5 private clinics, as well as in 5 private pharmacies in both federal states of Goiás and Distrito Federal (a total of 30 institutions). (The different numbers of the drugs examined is explained by vary-

Classification of the drugs in accordance to the grounds for evaluation

Positiv	**Drug of first choice**	Drugs of proven efficacy and an adequate risk-benefit-ratio, which represent the best treatment for most patients in specific fields of application.
	Drug of other choice	Products for a smaller number of patients not profiting from a first-choice medicinal product. The risk-benefit-ratio is often more unfavourable than for the drugs of first choice.
	Drugs for specialists	Drugs the use of which necessitates particular prerequisites, e.g. special diagnostics, instruments or special therapeutic experience. If they are used without control, they bear a high potential risk (e.g. anti-cancer drugs).
Negativ	**Irrational combination**	Combinations of different active agents are problematic on principle since the interaction of the individual substances as well as desirable and undesirable effects cannot be calculated. Different substances moreover have different profiles as regards bio-availability and pharmacokinetics: one substance is often more rapidly reabsorbed or decomposed than the other. In addition, the dosage of one of the active agents cannot be individually adapted without changing the dosage of all other substances as well. It is not only the desired effects of the medicinal agents, which are combined, but also their side effects and risks. Combination preparations are evaluated as irrational if they contain more than three active agents, if they contain an ineffective or incorrectly dosed active agent, or if the active agents have mutually exclusive efficacy profiles.
	Ineffective drugs	Drugs the efficacy of which could not be proven although several trials have been carried out.
	Controversial effectiveness	Controversial information has been given on these drugs. As long as no unequivocal data is provided, these drugs should not be used but be replaced with a reliable drug.
	Insufficient testing	This drug has not been tested sufficiently and should be replaced by a better tried and proven drug.
	Alternative with fewer risks available	Although these drugs are effective, they also include a higher risk than others and thus a worse risk-benefit ratio than alternative products.
	More effective alternative available	It is not justified to use drugs which are less effective than alternative products. Patients have the right to receive the most effective medicine.
	Wrong amount of active agent	These medicinal products obtain active agents in an amount that is either too large or too small. They should therefore not be used.
	Wrong form of dosage	Medical drugs must be applied in a suitable form of dosage for them to be effective and harmless. There are substances which are more dangerous as an injection than in tablet form. E.g. if a drug has to be taken at varying intervals during the day, a time-release capsule is not a suitable form of dosage.

ing forms of dosage and formulation.) The prices were recorded in Reais (R$) , but they can be converted into international Dollars (Purchasing Power Parity, PPP) in order to allow comparisons between countries.

5. Which of the companies' innovations are on the market?

The term innovation does not give any indication on the fact if a new medicine is better than an existing alternative. It merely expresses that it is patentable under Brazilian law. However, since information on the patent status is not

accessible in Brazil, we could ascertain without doubt only for few drugs at the time of data collection whether those are patented in Brazil. Despite our several inquiries, Baxter did not give any corresponding information; Boehringer Ingelheim and Bayer provided us with the respective information only shortly before this brochure was going to be printed. Therefore a proxy parameter turned out to be the best alternative. Accordingly, we defined innovation to be a drug which came onto the Brazilian market after 15th May, 1996 and to which no generic alternative is available. The Brazilian Patent Act did in fact enter into force on 14th May, 1997, however, patent applications could already be filed as of May 1996 under Article 230 of the Patent Act.[16]

6. How good is the health care of the poor?

Interviews with doctors (public and private clinics) and patients are intended to give information whether sick people without means have access to necessary therapies. Are the prescription patterns of doctors different in case of poor or rich patients? A patient was considered poor if he or she was included in the public welfare program "Bolsa Família".[17] This program supports families with a per capita income of below 140.- R$ (56,50 € per month).

7. Research projects of the companies

Particular interest was focused on the question whether neglected diseases such as TB, malaria, chagas disease, yellow fever and leprosy, or other diseases common in Brazil, such as pneumonia, bronchitis, diarrhea and HIV, were part of the research portfolio of those companies. We have determined the research activities of the companies partly by correspondence with the companies, their websites and by correspondence with the Brazilian ministry of research. Above all, however, with the aid of public databases[19] of the WHO and the national US health authority NIH.
According to Resolution 196/96 of the National Health Council, every clinical trial has to be approved by a local (CEP) and national (CONEP) ethics committee and the Committee for Ethics and Research (CER) of the National Health Council of Brazil.[19] Moreover, companies have to prove that trials are registered on publicly accessible databases such as the International Clinical Trials Registration Platform, the platform World Health Organization (ICTRP / WHO) or at the International Committee of Medical Journals Editors (ICMJE).[20] Since 15th Jan. 2012, every new trial also has to be registered at CEP/CONEP "Plataforma Brasil".[21]

8. General business behaviour of the companies

The marketing behaviour of Bayer, Baxter and Boehringer Ingelheim was determined in three areas:

Advertising:

Promotional practices were determined by actual examples of product advertising. The sources of information were educational and promotional material of the companies for doctors and students, moreover press articles as well as written correspondence and interviews with companies and doctors.

Partnerships:

Furthermore, so-called partnership projects of the companies (e.g. with the Brazilian government or Brazilian patient groups) as well as donation and health programs were examined. As sources of information we used written correspondence to and interviews with companies, doctors and government authorities, which are responsible for such programs and, in addition, company websites and literature research.

Disease awareness and sponsoring:

Important marketing strategies, like disease awareness campaigns (which are intended to educate the public on particular diseases) or the sponsoring of public events and of patient groups were also examined. As sources of information we used semi-structured interviews with doctors (public and private sector), pharmacists as well as the companies' websites[22] and written correspondence with the companies.

Favela in Salvador. The high costs of the pharmaceuticals bar the access of the poor to innovative therapies. Photo: AlmostBrazilian, Wikimedia Commons

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III Study results

1. The companies' product portfolios

The companies Bayer HealthCare, Boehringer Ingelheim and Baxter examined in this study sell a total of 324 different medicinal products in Brazil.[1] 209 of these preparations are also offered by these companies on the German market. In total, however, there are 255 of these products available in Germany, be it as a generic or as the product of another manufacturer.

Boehringer Ingelheim:

successful brands without potential

Boehringer Ingelheim offer 104 medicines in Brazil. 49 (47.1%) medicines are rational and 10 (9.6%) are even essential. Another 55 (52.9%), we graded as irrational. Only 84 of the preparations sold in Brazil are also available in Germany.[2] Four of Boehringer Ingelheim´s products were costly, two of those are irrational. 32 products of the company were graded as innovative[3], almost two thirds of which (20) had to be graded as irrational.

We consider the anti-AIDS medication Elodius® (tipranavir) to be an essential innovation. The essential anti-AIDS drug Viramune® (nevirapine) can be obtained in tablet form as a generic in Brazil and can thus not be graded as an innovation. It is only the formulation for children which is exclusively offered by Boehringer Ingelheim since 2008. Until then, the drug was also on the market as a generic.[4]

Metalyse® (tenecteplase), which is used in case of an acute myocardial infarction, was graded as a pseudo-innovation. The drug is rational; however, it has no superior efficacy as compared to Actilyse® (alteplase) which was graded as essential. However, it is significantly more expensive and costs the equivalent of about 2,000 €.[5]
In the Metalyse® promotion, Boehringer Ingelheim argues its better practicability since it is possible to administer Metalyse® not only as an infusion but also as bolus. That means that in a relatively short time, a patient can be injected with an exactly determined amount of the drug. This possible advantage is, however, countered by an increased risk of cerebral hemorrhage.[6]

Essential against AIDS and myocardial infarction

In addition to the anti-AIDS drugs Viramune® (nevirapine) and Elodius® (tipranavir), the urinary tract antibiotic Infectrin® (sulfamethoxazole and trimethoprim) is also essential, as are the anti-asthmatic drugs Atrovent® and Atrovent N® (ipratropium bromide) as well as Actilyse® (alteplase), which is used in case of an acute myocardial infarction. The latter is in fact very expensive and thus hardly available in the public health sector.

Positively graded products

Rational Boehringer products are, for example, the laxative Dulcolax® (bisacodyl), which has been on the market in Germany for more than 50 years, or the antihypertensive Atensina® (clonidine hydrochloride). In addition, the cardiac medicine Cardizem® (diltiazem hydrochloride) and the cardiovascular agent Efortil® (etilefrine hydrochloride) were graded as rational, as well as the antipyretic and anti-inflammatory drug Buscofem® (ibuprofen), the antiasthmatic Combivent® (ipratropium bromide and salbutamol sulfate), the anti-arthrosis drug Movatec® (meloxicam) in tablet form and Secotex® (tamsulosin hydrochloride), a drug against the benign enlargement of the prostate.

Questionable pills against restless legs

The advantages of the pharmaceutical Sifrol® (pramipexole dihydrochloride) are ambivalent. This drug is useful, and thus rational, for the treatment of Parkinson's disease. But we

Poor people – not a point of focus of the pharmaceutical portfolio of Boehringer, Baxter und Bayer. Photo: Cauan Kaizen, Wikimedia Commons

consider it problematic that the manufacturer offers it also for treatment of the restless-legs-syndrome in Brazil (as is also the case in Germany).[7] Sifrol® can cause heavy side effects like impaired vision.[8] Very common are also vertigo and incalculable sleep attacks with suddenly falling asleep during every day activities such as driving a car. Oedema, nausea, impaired thinking and movement and behavioural disorders occur frequently. Moreover there is only weak proof for the efficacy of pramipexole regarding restless-legs-syndrome: pramipexole only offered a slight additional advantage, compared to placebo in a 12-week trial. The complaints may even worsen under pramipexole.[9] Long-term data and comparative trials with other active agents are not available.

Forbidden in Germany – a blockbuster in Brazil

The painkiller Buscopan® (scopolamine butylbromide) is only rational as an intravenous vial or as a short-term infusion. In the form of tablets or suppositories, the drug is poorly effective. In this dosage form, Buscopan® therefore has to be considered as irrational. Likewise, the combination of scopolamine butylbromide with paracetamole: Buscoduo® or – even worse – the combination with the dangerous metamizole in Buscopan® Composto. The painkilling and anti-pyretic active agent metamizole can cause severe allergic shocks and result in a so-called agranulocytosis. That means the drastic reduction of white blood cells which are important for disease defense. Without treatment, half of those patients die and even with intensive medical treatment mortality lies at roughly 20 percent. One out of 1,000 to 3,000 patients taking metamizole is likely to suffer from an agranulocytosis.[10] As a result, the drug is forbidden in numerous countries, among them the USA, Great Britain, Australia, Canada and Sweden.[11]

In order to limit the use of metamizole and to minimize the risks, all metamizole combinations were taken from the market in Germany in 1987. In 1990, the approval of these drugs was withdrawn once and for all. The fields of application for the individual substance was likewise drastically limited.[12] At that time, BUKO Pharma-Kampagne requested that German companies should also stop selling those drugs in the so-called Third World. The company Boehringer Ingelheim informed us then that they would continue to market their metamizole combination preparation where "the respective drug

Fresh fruit: Much healthier than any vitamin-mixture. Photo: © guentermanaus - Photolia.com

approval authority wished this after receiving all information".[13] This irresponsible attitude didn´t change until today.

Why Boehringer Ingelheim does not likewise take the dangerous combination Buscopan® Composto from the Brazilian market can only be explained by economic interests. The drug (as drops and tablets) can be obtained without prescription in Brazil and is one of the big sellers of the company. On their company's website, Boehringer themselves use the term "strong brand". Buscopan® Composto takes place 9 on the list of the drugs most sold in Brazil and the company generate 11.1 percent of their turnover with this preparation in that South-American country.[14]

Even the marketing of the mono-preparation Anador® with the active agent metamizole is highly problematic. Whereas, in Germany, the drug is only approved for the treatment of particularly strong pain – for example after surgery or in case of tumors – or in case of fever which cannot be treated otherwise, Brazilians can buy it over the counter. The painkiller and anti-pyretic is intensively promoted for all kind of aches and pains and can be found in many Brazilian medicine cabinets.

Inutile vitamin mixtures

Pharmaton® for children (Kiddi®), just like the capsule of the same name for adults, is an irrational vitamin mixture. The orange-flavoured syrup for children is supposed to encourage healthy growth. The mixture for adults is to improve their physical wellbeing, mental health and cognitive performance. Pharmaton® – according to the Brazilian product website – contains a unique and synergetic mixture of vitamins, minerals and trace elements and effective standardized ginseng extract.[15] The evidence of the efficacy of this product is poor, among other things, a clinical trial with nurses is mentioned who filled in a questionnaire each after three consecutive night shifts. After twelve weeks of treatment with Pharmaton®, the nurses were significantly less tired after their night shifts.[16] In the German Rote Liste (drug directory) it says simply as regards Pharmaton®: "Traditionally used to improve general well-being."[17] That means the manufacturer has shunned an official examination of the mixture's efficacy in Germany.

For vitamin mixtures such as Pharmaton® there is no sensible application. People in poor countries waste their limited money for buying such a product. What is particularly tragic is

Photo: Dr. Rogério Hoefler

the fact that symptoms such as tiredness and lack of concentration are often the result of malnutrition in poor countries. Pills, however, cannot replace a balanced and sufficient diet. Likewise, grave vitamin deficiencies cannot be treated with Pharmaton® and similar preparations. Nevertheless, advertising makes guileless people believe that the taking of such chemical cocktails would be good for their health.

Risk of myocardial infarction

Persantin® (dipyridamole) as a mono-preparation was taken from the market by Boehringer in Germany as early as 2001. The active agent is used for preventing thrombosis but it can deteriorate cardiac circulation and result in myocardial infarction or cardiac arrhythmias in cardiac patients. Since 2005, this active agent is no longer on the market as a mono-preparation and is only supplied in combination with ASS (Aggrenox®).[18] In Brazil, the drug continues to be available as a mono-preparation.

There is no relevant therapeutic benefit for the antihypertensive Micardis® (telmisartan).[19] Although it lowers the blood pressure, it does not show an advantage over the placebo in preventing cardiovascular incidents.[20]
Pradaxa® (dabigatran etexilate) is supposed to protect patients after hip and knee surgery against thromboembolism. According to the medical journal arznei-telegramm, however, there are concerns regarding its safety. Whether it is as effective as the standard therapy is not completely clarified.[21]

Although the cough mixture Bisolvon® (bromhexine hydrochloride) is sold at a low price, it is ineffective. Sufficient evidence of a relevant clinical benefit cannot be found.[22] The same applies to the expectorant Mucosolvan® (ambroxol hydrochloride). The efficacy of the lozenge Mucoangin® (ambroxol hydrochloride) against a sore throat is likewise doubtful.

Bad choice for asthma and rheumatism

Berotec® (fenoterol hydrobromide) and Duovent® (fenoterol and ipratropium bromide) are old antiasthmatics which are being prescribed less frequently in Germany. Since 1990 there has been the suspicion, which has never been dispelled, that asthmatics who inhale fenoterol have an increased risk to die of their disorder.[23]
The antirheumatic Movatec® (meloxicam) in vial form was also downgraded since it does not have an advantage over other antirheumatics but its risk potential is higher. Meloxicam was introduced in 1996 as the allegedly first Cox-2-inhibitor and supposed to be particularly gentle to the stomach. Only few months after the market launch, the Boehringer subsidiary Thomae had to give a warning because of severe damages to the stomach and the intestines including bleeding and perforation.[24] The injection offered by Boehringer in Brazil was taken from the German market in 2007; in tablet form the drug is also available in Germany.

The outdated antirheumatic Butazona Cálcica® (phenylbutazone and calcium), which Boehringer offers as tablets in Brazil is also problematic. As a result of the negative risk-benefit-ratio, the arznei-telegramm concludes: "The application of phenylbutazone should be completely abandoned in particular since effective alternatives such a naproxen are available."[25] Boehringer consequentially does not offer the drug in Germany.

Conclusions:

Among the companies examined in our study, Boehringer Ingelheim has the worst pharmaceutical portfolio in Brazil. The portfolio does in fact have a larger proportion of rational products than in India and with a significantly higher number of products. However, the Brazilian portfolio contains some highly problematic preparations which should be taken from the market immediately.

Bayer HealthCare:

ranging from inutile to lifestyle

In 2011 the company Bayer offered 167 medicinal products in Brazil. Most of those preparations (103) are also sold in Germany, another 19 can be obtained here from other manufacturers or as a generic. The remaining 45 drugs are not on the market in Germany. 62.9 percent of the Brazilian product portfolio are rational (105 drugs). Among them are 34 essential drugs (20.4%). We graded 62 medicines (37.1%) as irrational. 46 drugs were innovative with 15 of those being graded irrational.

Essential Bayer products

As essential innovations we valued the costly Betaferon® (interferon beta) for the treatment of multiple sclerosis as well as two antibiotics with the active agent moxifloxacin, i.e. Avalox® and Promira®. The active agent moxifloxacin is currently also tested in the treatment of tuberculosis. So far TB patients have to take a combination of three antibiotics for a period of three months. Experts hope that moxifloxacin will reduce the duration of treatment to two months. That would also reduce the risk of resistance being developed. Although Bayer advertises the fact that the drug is being examined in a large phase III examination together with the TB Alliance, their contribution to the research costs is only limited.[27]
Other essential drugs are old preparations such as Adalat® (nifedipine), the use of which in treating hypertension has become limited. But second generation contraceptives such as Mesigyna® (estradiol valerate + norethisterone enantate) are also essential, just as Cipro® (ciprofloxacin), an important antibiotic.

Anti-cancer and anti-leukaemia drugs only for the rich

Some of the products graded as rational are costly and are rarely used since they are unaffordable even for the middle class: Nexavar® (sorafenib) is, according to the arznei-telegramm, the drug of choice against liver cancer but costing 6,952 R$ (2,934 €) per month, it is also too expensive for the middle class. The same holds true for the pharmaceutical Campath® (alemtuzumab) for treating a specific form of leukaemia (B-CLL). At the time of data collection, this preparation cost an unaffordable 6,305 R$ (2,386 €) for three infusions. Since 1st October 2012 it is not available at all in Brazil since Bayer has withdrawn their approval for this drug. In 2009 the manufacturer already sold the marketing licence for their complete blood cancer portfolio to the US company Genzyme (meanwhile part of the Sanofi group).[28] They have now also stopped the sale of alemtuzumab in Europe.[29] For purely commercial reasons, that is what critics say. Since Bayer and Genzyme now wish to concentrate on the research of an active agent for treating multiple sclerosis (MS) – which is a much more profitable disease that the very rare B-CLL leukaemia.[30] The treatment of patients suffering from leukaemia is thus significantly complicated since, for a part of those patients, there is no treatment alternative to alemtuzumab.[31]
What is also too expensive is the X-ray contrast medium Ultravist® (iopromide) and Magnevistan® (dimeglumine gadopentetate) as well as the anti-leukaemia drug Fludara® (fludarabine phosphate 50 mg).

Risky contraceptive pills

What has to be criticized is in particular the marketing of the disputed and irrational drospirenone-containing contraceptives made by Bayer. The active agent drospirenone belongs to the more recent third-generation pills. Com-

Young women in Salvador. They are badly served by Bayer's contraceptive pills Yaz and Yasmin.
Photo: Adam Jones, Ph.D. Wikimedia Commonse

pared to the older contraceptives of the second generation containing levonorgestrel, the risk of thrombosis for the user is doubled.[32] The manufacturer Bayer does in fact try to downplay the risks. Schering-Jenapharm, today Bayer, advertised their drospirenone-containing contraceptives Aida® and Yasminelle® with having a beauty effect and causing loss of weight right from their market launch in 2006. Consequently they violated the ban on advertising prescription medicines to lay people in Germany. Yasmin® is also popular among young German women. However, the arznei-telegramm clearly advises against its use. The European Medicines Agency EMA rejected Bayer's application to extend its application to the treatment of moderately severe acne in women who also wish to prevent pregnancies. Since acne is common in young women, the Committee for Medicinal Products of the EMA fears that women who do not wish to use hormonal contraception are also treated with this medicine although other anti-acne drugs are available.[33] In 2010, Yasmin took place 15 on the list of the best-selling pharmaceutical products in Brazil.[34]

The company advertises the preparation Angeliq®, which also contains drospirenone, only for hormone substitution during menopause. According to arznei-telegramm, this drug should also be used sparingly: "Due to severe risks, such as an increased risk of breast cancer, myocardial infarction and thromboembolisms, hormones should be avoided as far as possible in the case of adverse menopausal symptoms.[35]

Bayer acts in accordance with the legal situation in Brazil and promotes Diane 35® (cyproterone acetate and ethinylestradiol) – unlike in India – only for severe acne and androgenization in women in accordance with its indication and not as an anti-baby-pill. Diane 35® has not been registered as a contraceptive since the nineties when the German Federal Institute for medicines and medicinal products had the suspicion of liver tumors in 1994. Since that time, the application is restricted to androgenization symptoms and severe acne in women.[36] In addition Diane 35® bears a high risk of thrombosis.[37]

The contraceptive Qlaira® (Estradiol valerate + dienogest) is promoted in Brazil, as well as in Germany, to be "the first anti-baby-pill with natural hormones".[38] But even if something comes along as natural, it will not have to be harmless. Since the efficacy and safety of this preparation are only insufficiently proven, the arznei-telegramm strongly advises against its use.[39] Private pharmacies in Brazil are the main selling locations for such controversial products.

Irrational products for men

Bayer also offers something irrational for men: the medicinal product Proviron® (mesterolone) is promoted in Brazil for the treatment of blood formation disorders and performance degradation in men. The treatment with the sexual hormone mesterolone is considered an outdated therapeutic principle. The benefits of the drug have not been proven and it has not been on sale in Germany since 2003. Mesterolone was marketed by Schering in the Sixties among other things as "active agent complex for men" in combination with vitamin E, yohimbine and strychnine.[40] When taking over the company Schering, Bayer adopted this irrational active agent into their portfolio.

Levitra® (vardenafil) is one of the bestselling drugs against erectile dysfunction in men and was graded a lifestyle drug. The drug bears a potential high risk and should only be used after a strict evaluation of the benefits and the risks involved.[41] Levitra® can, in fact, also only be dispensed on prescription in Brazil, but some drogarias sell it without prescription as our Brazilian partners have informed us. The further away from the capital, the poorer is the control of the pharmacies to the profit of the Bayer company and other manufacturers. 12% of the turnover resulting from drugs against erectile dysfunction is accrued by Bayer's Levitra® in Brazil; the largest market share goes to Pfizer with Viagra® (sildenafil, 36.2%) and Elli Lily with Cialis (tadalafil, 41.6%).[42] Until 2003, Bayer publicly promoted the drug in Brazil although the health authority Anvia had already prohibited such advertising in 2001.[43]

Dubious mixtures and vitamin cocktails

In addition to irrational combinations such as Cafiaspirina® (acetylsalicylic acid and caffeine), Alka-Seltzer® (acetylsalicylic acid and sodium bicarbonate and citric acid) or Redoxon® (ascorbic acid and zinc), Bayer offers as large number of useless vitamin mixtures in Brazil, among them Beneroc®, Beroccal®, Elevit®, Ephynal®, Natele®, Protovit Plus®, Supradyn®. The preparation Supradyn Pré Natal® even contains 25 different active agents. In Germany, combination drugs containing more than three active agents were considered irrational as early as 1991 and will therefore not be paid for by the public health insurances.[44]

These kind of active-agent-cocktails are above all problematic because the interactions of the individual components in the body cannot be anticipated. Unwanted effects of the individual active agents add up and can even multiply. Grave deficiencies can only be selectively treated with mono-preparations. The Bayer cocktails are mainly aimed at children and pregnant women. Those dubitable mixtures are promoted as "restoratives" before doing sports or to improve school achievements. They fill the manufacturer's coffers but do not bring a health bonus to the user.

Nothing good for diabetics

We also consider Bayer´s irrational antidiabetic preparation Glucobay® (acarbose) questionable. Bayer tried to proof the benefits of acarbose by a large-scale STOP-NIDDM trial. This was not successful. Bayer staff took part in carrying out that trial. The arznei-telegramm arrives at the conclusion: "A benefit of acarbose (Glucobay®) for lowering the risk of cardiovascular diseases in patients with an increased blood sugar level is not proven. The alleged evidence of benefits shown in the STOP-NIDDM trial is based on data manipulation favouring acarbose."[45]

Conclusions:

Bayer's portfolio with 105 (62.9%) rational drugs is better than the one of Boehringer Ingelheim. 18% of their products are even essential drugs. Nevertheless, Bayer also offers many problematic drugs in Brazil, among them the inherited problems from the company Schering which was taken over by the Bayer group in 2006.

Baxter:

quality with a hefty price tag

In 2011, Baxter offered a relatively small portfolio with 53 drugs in Brazil and sold there even fewer drugs than in India (77). Almost all products (49) are also available in Germany though the company's portfolio here is almost twice as large (Germany: 94). All Baxter products sold in Brazil are rational, 39 (73.6%) are even essential. We furthermore graded six drugs as innovative. Mitexan ® (mesna) which is used in cancer treatment was graded as an essential innovation.

Much is sensible and essential

As is the case in other countries, Baxter predominantly concentrates on infusion solutions (glucose, ringer). In addition, the company offers blood substitute products, a narcotic and two vaccines for influenza A and meningococci, as well as some anti-cancer drugs (Baxter Oncology). Antibiotics are not included in the portfolio in Brazil. Only nine Baxter preparations are offered in the middle price range. 15 products, that is about a quarter, are costly: the blood substitute product Immunine® (coagulation factor IX), the influenza A vaccine and the blood substitute products Prothromplex-T® (coagulation factors, II, VII, IX and X) and Advate® or Feiba® (coagulation factor VIII), Endobulin KIOVIG® and Endobulin S/D® (immunoglobulin G) as well as the anti-cancer drug Holoxane® (ifosfamide) and also the narcotic Isothane® (isoflurane). Although these drugs are also considered essential in Brazil and should be paid by the public health system SUS, drugs against rare diseases are not always available at the popular pharmacies. On a private basis, hardly anybody can afford these medicines. For example, a worker in Brazil earns an average monthly wage of 1,400 R$. If they are hemophiliacs, they will need a dose of the blood coagulation factor Advate® for 4,115.25 R$ several times per week. For patients not living in the capital with numerous easily available health institutions, which are quite well equipped, this means certain death.
Accordingly, many important but expensive drugs are poorly accessible for the poor. This is even more alarming, since most (11) are also essential, such as the anti-cancer-drugs or the blood substitute products.

Many of Baxter's infusion solutions are expensive. Photo: U.S. Navy photo by Mass Communication Specialist 1st Class David G. Crawford, Wikimedia Commons

Conclusions:

On the whole, the portfolio is good but it is not oriented at the diseases prevalent in Brazil. The pricing and the selection of the products allow the conclusion that Baxter (just like Bayer and Boehringer Ingelheim) are focused on the private sector and thus on the Brazilian middle and upper classes. High manufacturer´s prices exclude the poor from access to important drugs.

Endnotes

1 *Each different pharmaceutical form or dosage is counted as an individual pharmaceutical product. This concurs with the German approval authorities' way of proceeding.*
2 *Rote Liste (2011) Rote Liste Februar 2011. Frankfurt: Rote Liste® Service GmbH – Since the Brazilian data refer to the year 2011, the comparative data from Germany was also taken from the year 2011.*
3 *Medicinal products which have been on the Brazilian market since 15th May, 1996 and which have no generic alternative. Note: innovative in this definition does not automatically mean that a medicinal product is rational, s. methodology.*
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12 *With a letter from November 1986, the German Federal Ministry of Health informed pharmaceutical manufacturers of their intention to withdraw their approval from metamizole-containing combination products. The application of mono-preparations was also drastically limited and would then be only available on prescription. In April 1987, the prohibition of metamizole combinations was declared. (Pharma-Brief 4/1987, p. 3-4 and Deutsches Ärzteblatt 19.11.1986, year 83 , issue 47, p. 3267)*
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A man at a shoeshine stall in Curitiba, Brazil, is waiting for customers. The tax-financed public health system grants him free medical care. Photo: Adam Jones, Wikimedia Commons

2. Access to pharmaceutical drugs

In Brazil's public health institutions, medical care is free of charge for all citizens. Still, many Brazilians go to private institutions although they then have to pay the costs out of their own pockets. The reason for this is the long waiting period in the public sector, as patients reported in interviews. A patient's relative complained: "My sister had spent 30 days in a public clinic before a simple kidney stone was removed. So she lost a whole month's wages. Next time we will go to a private clinic." The private sector plays an important role especially for the health care of the upper and middle class.

Price and availability

Each hospital of the private as well as of the public sector has a list of pharmaceuticals which are used in the respective institution and which should also be on stock there. What are called positive lists are prepared by a committee of pharmaceutical experts.

We examined the availability of 111 (Distrito Federal) and 113 (Goiás) medicinal products of all three companies in those two federal states in five public and five private hospitals and in five pharmacies (Drogarias) each (a total of 30 institutions). Since partly differing dosage forms existed in the Distrito Federal and in Goiás, the selection of the drugs differed slightly in those federal states. We examined which drugs were used in the different sectors and whether the companies exceeded or even undercut the maximum price. One medicine – Baxter's human albumin – was only examined in Goiás; it was not

Goiâna is the capital of Goiás. Medical care is worse than in the Distrito Federal..
Photo: Aoaassis, Wikimedia Commons

used in any of the hospitals there; neither was it available in a private pharmacy.

Public sector

In the public sector, the physicians mainly use generic Brazilian products for their treatment. The drugs are free of charge for the patients and are mostly provided by the ministry of health under a generic name. As a result, physicians usually do not receive pharmaceutical representatives and they prescribe medicinal products under the name of their active agents and not under their brand names. The patients then obtain the respective preparations from the hospital's pharmacy. However, it may occur that a listed drug is not available and patients then still have to buy it in a private pharmacy. One patient reported that her eight-year-old son was treated for an asthmatic attack in a public clinic. A simple asthma inhaler was not available there. The doctor advised her to buy it in a private pharmacy.

The capital Brasilia in the Distrito Federal offers modern architecture but also good medical care.
Photo: Heitor C. Jorge, Wikimedia Commons

What was noticeable was the fact that four (out of seven) physicians worked simultaneously in the private and in the public sector since more money could be earned in the private field. Moreover, all physicians interviewed had seen a similar range of diseases: High blood pressure, malaria, pneumonia, urinary tract infections were frequent. Dengue fever, chagas, HIV-AIDS, cancer and leprosy occurred occasionally.

In six out of ten examined public clinics, only a total of six drugs were found. The prices of the few original drugs used in the public sector were all below the official company price. A public institution in Goiás used two medicinal products of the examined companies: a saline infusion solution of Baxter as well as the irrational and dangerous Buscopan® Composto (scopolamine butylbromide and metamizole) of Boehringer Ingelheim. In a public university clinic in the same federal state, the costly Actilyse® (alteplase) was available for 1,532 R$ (580 €) per short-term infusion. The drug increases the probability of survival in case of an acute myocardial infarction and is considered an essential drug in Brazil. Nevertheless, many heart attack patients in other public clinics in Goiás are treated neither with alteplase nor with other

febrinolytics – according to our Brazilian partners, since these drugs are just not available. As a result, those patients have to be transferred to the Distrito Federal, which is not infrequently a lethal loss of time.

Although alteplase is not protected by a patent in Brazil (as is the case in India and in Germany), it is only available as an original product. Since alteplase is a biopharmaceutically produced medicinal product, i.e. a drug produced using genetically modified (micro-) organisms. Imitation preparations of these highly complex proteins are termed biosimilars, not generics, since an identical copy is not possible. The production of a biosimilar is complex and, as a rule, coupled with additional clinical trials. So alteplase's monopoly will continue to exist even after expiry of the patent term and the drug will continue to be costly. Nevertheless, the public university clinic pays a good 300 R$ less than the company's official price for the product.

In the Distrito Federal, two hospitals used a Baxter glucose solution and one clinic a nifedipine capsule against acute high blood pressure. What is surprising is the fact that as many as four (!) out of five examined public clinics in the Distrito Federal had the Boehringer Ingelheim's overpriced pseudo-innovation Metalyse® (tenecteplase) for 4,418 R$ (1,867 €) per short-term infusion in their range of products but not the essential drug Actilyse® (alteplase) which is still expensive though clearly lower-priced. And Metalyse® (tenecteplase) does not even have an advantage over alteplase.[1] So it is only a small comfort that the clinic's price is more than 1,000 R$ below the official manufacturer's price. Tenecteplase is also a biopharmaceutical and not available as a generic in Brazil.

Private Sector

In private clinics and practices, physicians receive pharmaceutical representatives and, in addition to generics, also prescribe original preparations. Private medical practices are poorly controlled and in part not at all. In the interviews it was stated that pharmaceutical representatives are mainly received because of their samples and gifts.

The private Albert Einstein Hospital in São Paulo is considered one of the best hospitals in the city.
Photo: Lukaaz - Marcelo, Wikimedia Commons

As a rule, specialist conferences for physicians are heavily sponsored by pharmaceutical companies. A physician reports: "On conferences numerous satellite symposia are offered where a particularly good lunch or dinner is included in addition to advertisements. Advertisements are very important for many colleagues since a large number of them receive their information only through advertisements." This does have an effect on their prescription practices even if the physician interviewed considered himself free from any industrial influence. Instead of using the rational paracetamol or ibuprofen against fever and pain, he prescribed the risky metamizole to children. He also prescribed for his little patients the outdated antiasthmatic Berotec® (fenoterol) of Boehringer Ingelheim. Many physicians are willing to accept pharmaceutical samples and pass it on to their wealthy clients. Prescriptions received from private practices can only be dispensed in private pharmacies and have to be paid privately.

Lifestyle pharmaceuticals like the drug against impotence Levitra® (vardenafil) have to be paid

out of one's own pocket. A Brazilian urologist explained that he often received free samples, but also prescribed it frequently. The Bayer representative, who visited him in his medical practice at least once a month, provided him with information material, magazines, invitations to conferences and small presents – like a mouse pad with a table of dosage for testosterone. "Bayer is very active in the field of urology in particular because of vardenafil and their hormone therapy with testosterone."

In the private clinics examined there were significantly more preparations from original manufacturers. Physicians as well as patients from the middle and upper classes knew the respective brand names. The branded preparations are paid for privately by the patient or by their private health insurance. A pharmaceutical technical committee also provides each clinic of the private sector with their own positive list of available drugs. Physicians prescribe the drugs partly under their brand name and partly under the name of the active agents. The clinic's pharmacists may replace a prescribed original preparation with a generic (having the same active agent).[2]

The outdated antiasthmatic Berotec® (fenoterol) is quite often prescribed in the private sector. Pharmacists also report that many patients want to have e.g. medicines for lowering the blood fats since they think that physical exercises are less effective. Similarly, some patients prefer the branded drugs of Bayer, Boehringer and Co. since they consider those to be of higher quality than the Brazilian imitation products. The companies support this purchasing behaviour by giving up to 50% discount to the private pharmacies![3] The same applies to Bayer's risky contraceptive, as was reported by a pharmacist: "Bayer gives a discount on Yasmin® whereas the more sensible contraceptive Mesigyna® can be obtained free of charge in any popular pharmacy."

The selection of the medicinal products used in the private sector is a colourful mixture of rational, irrational and essential products. The private clinics in the Distrito Federal used 7 to 18 of the examined medicinal products. In Goiás, it was 2-19. The irrational products Buscoduo® (scopolamine butylbromide and paracetamol) and Binotal® (ampicillin trihydrate) were only available in Goiás. It was conspicuous that no private clinic in Goiás had a supply of the important drug Actilyse® (alteplase) for treating an acute myocardial infarction. Other treatments such as Metalyse® (tenecteplase) or comparable preparations such as streptokinase or urokinase were not on stock. The clinics in Goiás are obviously prepared for emergencies like an acute heart attack in a worse manner than those in the Distrito Federal, where the Brazilian capital is located. The reason for this should be i.a. the high price of alteplase.

In the Distrito Federal, three private clinics used Metalyse® (tenecteplase) for treating an acute myocardial infarction. The expensive pseudo-invention costs 4,418 R$ (1867 €) or 5,460 R$ (2,279 €) per short-term infusion. All five clinics in the Distrito Federal also used Actilyse® (alteplase) for 1,847 R$ (784 €) per injection.

The circulatory preparation Efortil® (etilefrine hydrochloride) as well as the drug Mitexan® (mesna) used in cancer therapy were only available in the Distrito Federal. In case of other drugs, no difference between the federal states was observed: As many as seven private clinics used the risky metamizol-mixture Buscopan® Composto (scopolamine butylbromide and metamizole) and in two clinics the preparation for the treatment of high blood pressure Micardis® (telmisartan) was available. It does not offer an advantage over other comparable substances,[4] however, it is significantly more expensive.

Fortunately, we did not find the disputed anti-acne product Diane 35® of Bayer-Schering in any of the clinics (it is often also used as a contraceptive) as well as the irrational vitamin mixture Kiddi Pharmaton®.

In one of the private clinics, a bulk pack Aspirin® (ASS) 500 mg with 100 tablets costs 94.16 R$ (36 €). Patients who buy the drug pay almost

Gotcha! Sick cow in front of a Brazilian Drogaria. The private pharmacies offer a large portfolio of brand products and are the main sales market for the companies examined. Photo: Andrevruas, Wikimedia Commons

twice the price of the official company price in Brazil, which is even somewhat higher than the price in Germany (16.48 €). Otherwise, the private clinics adhered to the official price.

Private pharmacies (Drogarias)

Most pharmacies in Brazil are private. The medicinal products obtained there have to be paid out of one's own purse. In addition to the Farmácias de Manipulação, in which mostly hand-made medicinal products, such as e.g. ointments are sold, numerous private Drogarias exist. Many belong to a chain of stores, e.g. Drogafuji[5] or Drogaria Rosário[6]. As the name suggests, the Drogarias are more like chemist's shops than pharmacies. In addition to finished medicinal products, cosmetics and hygienic articles are sold here. Although a pharmacist must be present, the rest of the staff does not have a pharmaceutical training as a rule. In fact, prescription drugs such as antibiotics, contraceptives, impotence treatment, and medication against high blood pressure or diabetes are often obtainable without prescriptions.[7]

It is not rare that important drugs are not available in public clinics and the patients have to buy those drugs in private pharmacies. It does not look much different in the public pharmacies, as a physician told us in an interview: "Sometimes the patients have to buy the medicines in private pharmacies since they cannot be obtained in the public ones." In theory, drugs which, although they are on the positive list, cannot be obtained from public clinics or popular pharmacies, can be bought privately and then be reimbursed later. This reimbursement, however, is hardly practicable and – according to our Brazilian partners - the patients often have to bear the costs.

In the private pharmacies, we found 12 to 32 of the examined medicines. The pharmaceuti-

Heart attack patients hardly have a chance for adequate treatment in Goiás.
Photo: AlexSP, Wikimedia Commons

cal portfolio is almost identical in both federal states. Almost all products useable in ambulatory care were available. As regards the price of sale, the official company price was almost always kept; in part, it was slightly below it.

Private Drogarias are the main market for the companies. They are visited correspondingly often by the companies' representatives: "The pharmaceutical representatives regularly come – at least twice a month – into the street of the pharmacies (the pharmacies are often located in one street) and visit us", says an interviewed pharmacist. The problematic drug Diane 35® and Yaz® are on offer here as well as the irrational vitamin mixture Pharmaton Kiddi® or the risky metamizole mixture Buscopan® Composto. There is hardly any state control of the private Drogarias.

Summary assessment

The pharmaceutical product portfolio and marketing strategies of the companies indicate that Boehringer, Bayer and Baxter are focused on the private sector, and above all on private practices and pharmacies; less on the clinics.

In the public sector, the medicinal products of the companies examined are hardly used with a few exceptions. The branded preparations selected for our study are mainly offered in the federal state of Distrito Federal and in private clinics. A rational prescription practice does not seem to be the main focus in the selection of the drugs. Since the capital with many rich inhabitants lies in the Distrito Federal, the private clinics strive to meet their patients' expectations in expensive branded products and also the physicians "taste" which is influenced by advertising. Four private clinics in Distrito Federal and one in Goiás offered more than ten preparations of the examined companies. The prices hardly differed from the officially recommended company price.

What is particularly remarkable is the relatively extensive availability of the irrational and expensive pseudo-innovation Metalyse® (tenecteplase), whereas the sensible and somewhat cheaper drug Actilyse® (alteplase) is used to a surprisingly small extent – in the public as well as in the private sector. In Goiás, Actilyse® was only available in one public university clinic and in no private clinic. In fact, Actilyse is on the list of essential drugs in Brazil and should be available in the public sector to 100%.[8] The extensive availability of Metalyse® (tenecteplase) especially in the public institutions of the Distrito Federal indicates a clever marketing strategy of the company. Boehringer presumably advertises the pseudo-invention Metalyse® (tenecteplase) massively in the pharmaceutical committees responsible for the selection of the drugs.

The selection of medicinal products of the private Drogarias contains anything that can be used for out-patient treatment and is pre-

scribed in private consulting rooms. The emphasis lies on medium-priced preparations, among them many irrational products such as Pharmaton® Kiddi or Buscopan® (scopolamine butylbromide) in tablet form or the metamizole mixture Buscopan® Composto. Since the sale in pharmacies is hardly regulated and many drugs can be bought without a prescription, this state is extremely alarming. Private pharmacies also offered the problematic acne preparation Diane 35® and the likewise problematic drospirenone containing contraceptive Yaz®. The companies encourage the purchase of such irrational products by granting high discounts on those preparations.

In theory, all citizens in Brazil are entitled to free treatment according to the constitution.[9] However, in reality it can take weeks until a person in fact gets the treatment that he or she needs. One patient described in an interview that she had been received into a public clinic for four times until a benign tumor was excised. Long waiting times cannot only be extremely painful and hazardous, they also result in an additional bitter loss of income for those concerned. Thus, disease can easily result in excessive debts for families in Brazil as well.

As a consequence, patients often prefer the private system to the public SUS but they make use of the latter when they cannot afford the private system. Some patients have a private health insurance but they go to the SUS to obtain their medicines since otherwise they would have to pay for them privately. One patient reports: "Although I do have a private health insurance, I obtain most of my medicine via the SUS since I cannot afford to pay from them privately. I think it is absurd if we have to pay for our medicines ourselves although we have a health insurance." Patients are often strongly focused on medicines, as physicians reported: "Patients almost always want medicines. They complain if they only get good advice. I have had one patient who denied treatment because he did not get any medication." Only one physician considered the patient relation and the consultation to be more important for the process of healing than

Complex examinations mostly have to be carried out in private clinics since the respective technical devices are not available in public institutions.
Photo: Hosppaulistano, Wikimedia Commons

medication: "Today patients wish to express themselves and to be heard. Medicinal therapy then comes second." Contrary to India, Brazilians are rather critical towards injections and therefore avoid shots: "I have seen patients who rejected insulin shots because they are painful. Many are afraid of invasive methods," according to one physician. These observations are confirmed by patients. In total, the trust placed in the physicians abilities is high, albeit not as absolute as in India. As a rule, prescriptions are hardly questioned.

3. Access to innovative drugs

Six Baxter drugs, 45 of Bayer and 32 of Boehringer Ingelheim were launched on the Brazilian market after 14th Mai, 1996. There are no generic alternatives to these products which is why we have graded them as innovative. 16 of the innovative Bayer drugs and 24 of the innovative Boehringer drugs, however, were graded

as irrational – they do not represent a sensible treatment.
The innovative anti-cancer drug Nexavar® (sorafenib) of Bayer is on the Brazilian list of essential drugs since it can prolong the lives of patients suffering from hepatic cancer by several months.[10] Interestingly, the patent application for this drug was rejected by the Brazilian patent office in August 2010.[11] The manufacturer filed an opposition against this decision, the proceedings have not yet been concluded. Consequently, sorafenib is not obtainable as a generic (imitation preparation) in Brazil.

- **Bayer irrational:** Fludara 10 mg® (fludarabine phosphate),
- **Bayer rational:** Fludara 50 mg® (fludarabine), Campath® (alemtuzumab), Magnevistan® (dimeglumine gadopentetate), Utravist® (iopromide)
- **Bayer rational and essential:** Nexavar® (sorafenib)
- **Boehringer Ingelheim rational:** Metalyse® (tenecteplase)
- **Boehringer Ingelheim rational and essential:** Elodius® (tipranavir), Actilyse® (alteplase)

Only Metalyse® (tenecteplase) and Actilyse® (alteplase) were available in the clinics of our study. Specialized HIV clinics in which Elodius® (tipranavir) could be available, however, were not examined. The costly drugs were not offered in Drogarias, either. It is, in fact, not uncommon in Brazil that patients who are treated in public clinics have to go to a private pharmacy to obtain the necessary medication. This is also confirmed by our interviews with Brazilian patients. The patients themselves or their relatives had to obtain medication against high blood pressure and anti-cancer drugs from Drogarias since they were not on stock at the clinic where they were treated.

Summary assessment

Rational innovations of Bayer, Baxter and Boehringer Ingelheim are difficult to obtain for the poor and often not available in the public health sector. The companies of this study don´t offer any innovative drug for the treatment of neglected diseases.

4. Clinical Trials

Boehringer Ingelheim: The company ran 41 clinical trials in 2011 in Brazil[12,13], among them 37 in the phases II-IV according to the company's information.[14] Seven of the research projects referred to HIV/Aids and to the drug tipranavir. Six trials are being carried out relating to diabetes. In addition there are trials relating to chronic lung disorders, apoplexy, myocardial infarction, cancer and to blood dilution.

According to national law, a drug that is being tested in Brazil also has to be made available to the population. The company Boehringer Ingelheim experienced that the Brazilian government is serious about this principle: They did not want to have their anti-Aids medication Elodius® (Tipranavir) registered in Brazil although it had been tested there. As a result the government threatened to sue the company and Boehringer conceded. If need be, HIV patients receive this reserve medication in specialized clinics.[15]

Bayer: At the time of the study, Bayer conducted 39 trials in different phases.[16] Among them are four trials relating to moxifloxacin, an antibiotic which is tested for its use in case of infections in the abdomen and for use against chronic bronchitis. Both are certainly grave diseases but the use of the antibiotic moxifloxacin which is not particularly well tolerated is rather questionable. The company further advertises the fact that they are testing moxifloxacin against tuberculosis together with the Alliance for TB Drug Development (TB Alliance). Bayer's participation, however, is restricted to provide the drug for study purposes and, in the event of positive results, to take over the costs for the drug approval. When asked how the drug could be made available to the poor, the company remained vague and was not willing to state a fixed price or to waive the patent. Bayer merely

stated that the drug should be sold at a reduced price. When asked about the use of the drug against multiresistant TB, Bayer only informed us that they supported the TB Partnership (Global Drug Facility) with it. The price agreed upon is subject to confidentiality. In 2011, Bayer provided 620,000 tablets in China and adhered to the contractual price,[17] with the contract not being publicly available. The Bayer trials predominantly refer to "lucrative" diseases: eleven to venous thromboses, embolisms and blood dilution, eight to the cancer treatment with sorafenib, three to X-ray contrast agents.

Baxter conducted five trials relating to haemophilia A and B in Brazil at the time of data collection in 2011.[16] As is the case with Boehringer Ingelheim and Bayer, the company is focused on fields in which money can be earned.

Summary assessment

The companies` research is strongly focused on lucrative fields. The most imminent fields are cardiovascular diseases, cancer and diabetes, with these diseases being also widely spread in Brazil. It is only Boehringer Ingelheim who conducts trials relating to HIV/Aids. Otherwise, only Bayer invests a little in the research of neglected diseases. The tuberculosis trial, however, is mainly financed by the TB Alliance; for the company it serves more to cultivate their image. The manufacturers use the market for numerous research projects relating to their blockbusters. In addition to a larger reservoir of test subjects and qualified personnel, Brazil offers a good infrastructure at comparatively low costs. Violations of the provisions of the Helsinki declaration, which governs the ethical standards for clinical trials, have not been found.

5. Patent policy

Since our access to information on the patent state of the medicinal products was hindered by companies and authorities in Brazil, we were only able to unambiguously ascertain the status of few drugs. It was different regarding the two Aids medications since the UNITAID Patent pool publishes all patents for Aids medication.[18] It was only shortly before the printing date of this brochure that the companies Bayer and Boehringer Ingelheim sent us a list of all patents and patent applications on the medicines sold in Brazil. Boehringer Ingelheim holds a patent on Pradaxa® (dabigatran etexilate). Bayer holds patents on the essential drug Avalox® (moxifloxacin), on Levitra® (vardenafil) which is mostly used as a lifestyle drug, the rational contraceptive Mirena® (levonorgestrel) as well as the irrational drospirenone containing contraceptives Yaz® and Yasmin®.

In addition, a patent application has been filed for the anti-cancer agent Nexavar® (sorafenib).[19] In Brazil the patent application was initially rejected. However, Bayer filed an opposition and the final decision of the court has not yet been made.[20] The manufacturer argues for the excessive price for the anti-cancer agent with its

Increasing wealth and a change in living conditions caused the number of cardiovascular and diabetic disorders to rise rapidly in Brazil. Photo: Marcello Casal Jr/ABr, Wikimedia Commons

Favela and Skyscraper; Photo: Adam Jones, Ph.D. Wikimedia Commons

high research costs. However, the active agent sorafenib was not even developed by Bayer themselves but by a small company as contract research. After the development, a simple approval as an orphan drug against the renal cell carcinoma occurred in 2005. The contracting company Onyx received 26.1 million US$ from Bayer. Further public funds flowed from the NIH (US National Institute of Health); 53 trials were carried out, 35 of those were financed with public funds, only 15 were paid by the industry, three were paid for with a mixed financing.[21] These trials resulted in an expansion of the drug's indication to that of liver cancer. In 2008, Bayer already achieved a turnover of 1.2 billion US$ with sorafenib, so the extremely low research costs have long been paid off.[22] With an annual turnover of more than 700 million €, the drug takes fourth place of Bayer's blockbusters.[23] If Bayer's opposition against the rejection of the patent application fails, prices are expected to fall dramatically.

Many medicinal products, which entered the Brazilian market after 1996 and which do not have a generic alternative there are probably protected by patents. Exceptions are biopharmaceuticals such as alteplase and some Baxter products. Identical copies of these highly complex substances are not possible, similar biopharmaceuticals (biosimilars) can only be produced at great expense. Accordingly, even after expiry of the patent, the monopoly and thus the high price will be maintained.

Summary assessment

Medicinal products which had been researched with public funding should be available at affordable prices everywhere. The example sorafenib shows, however, how companies – in this case Bayer – profit from publicly financed research and then pocket profits for themselves and their shareholders. Bayer's opposition against the rejection of the sorafenib patent

results in the fact that there is no generic and reasonably priced version of the drug – to the detriment of the cancer patients.

Boehringer Ingelheim also insist on enforcing their patent rights; however, in the case of Aids they opened up to the demands of a fairer access to medicines with a non assert declaration.[24] The Access to Medicine Index therefore places Boehringer's patent policy on place two of 20 pharmaceutical companies examined whereas Bayer only takes place 16. Baxter was not examined.[25] Because of Boehringer´s Non Assert Declaration nevirapine and tipranavir are largely available in very poor regions. In the whole of Africa and India, these important Aids-drugs are allowed to be generically produced and sold without the company enforcing their patent rights[26] – a significant step in the right direction. Although Brazil, as a middle-income country, is not included in this agreement, the drugs are not patented there. The price for the essential tipranavir with 460 Euro per month is still very high since no generic exists. Nevriapine is generically produced at a good price as a tablet. [27]

Baxter produces numerous rational drugs for rare applications which are often without a treatment alternative. For many products, the company can therefore determine the price without competition. A conclusion to the patent status of these drugs is difficult to make.

None of the companies contemplates alternatives to the existing patent system or is willing to renounce what are called the TRIPS-plus regulations. They include e.g. the renouncement of compulsory licenses or the granting of data exclusivity which can assure a prolonged period of monopoly.

Endnotes

1 *arznei-telegramm (2001) BOLUS-FIBRINOLYTIKUM TENECTEPLASE (METALYSE). a-t 2001; 32, p. 51-52*
2 *In addition to generics, the Brazilian pharmaceutical law also provides for "similar drugs"; in an approved generic, the bio-equivalence must be shown, in a "similar drug" not; both contain the identical ingredient as the original preparation. See www.anvisa.gov.br/eng/generic/faq.htm#02 [accessed May 22, 2012)*
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4 *arznei-telegramm (1999) Telmisartan (Micardis) im Vergleich. (Comparison of Telmisartan). Nr. 2, p. 22*
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11 *Patentantragsnummer: PI0007487-0 (Title: DIFENIL-URÉIAS SUBSTITUÍDAS COM W-CARBÓXI-ARILAS COMO INIBIDORES DE RAF CINASE)*
12 *Many trials are multicenter and are carried out with patients in several countries.*
13 *World Health Organisation (2011) International Clinical Trials Registry Platform (ICTRP). http://.apps.who.int/trialsearch/Default.aspx [accessed: May 24, 2012] und World Health Organisation (2012). http://www.who.int/ictrp/en/ [accessed Oct 24, 2011]*
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www.boehringer-ingelheim.com/microsites0/focus_on_clinicalresearch2011.html www.clinicaltrials.gov/ [accessed June 4, 2012]
14 *Clinical trials on humans are divided into four phases. Phase I: Test of the tolerability of the new active agent in healthy humans; phase II: Determination of dosage in patients; phase III: studies relating to the efficacy against the disorder; phase IV: studies after approval (questions of safety, new fields of application or merely for marketing)*
15 *Reis R et al. (2007) Intellectual Property Rights and Access to ARV Medicines: Civil Society Resistance in the Global South. Brazilian Interdisciplinary AIDS Association – ABIA, p 9-54*
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18 *Medicines Patent Pool (2012) Patent Status Database for Selected HIV Medicines. http://www.medicinespatentpool.org/patent-data/patent-status-of-arvs/ [accessed Feb. 14, 2012]*
PI0007487-0 (Title: DIFENIL-URÉIAS SUBSTITUÍDAS COM W-CARBÓXI-ARILAS COMO INIBIDORES DE RAF CINASE) http://pesquisa.inpi.gov.br/MarcaPatente/servlet/PatenteServletController?Action=detail&CodPedido=582715&PesquisaPorTitulo=&PesquisaPorResumo=&PesquisaPorDepositante=&PesquisaPorInventor=&PesquisaPorProcurador= [accessed Apr. 24, 2012]
19 *Status April 2011; BUKO Pharma-Kampagne has access to the list. Other patented drugs entered the market after April 2011.*
20 *PI0007487-0 (Title: DIFENIL-URÉIAS SUBSTITUÍDAS COM W-CARBÓXI-ARILAS COMO INIBIDORES DE RAF CINASE)http://pesquisa.inpi.gov.br/MarcaPatente/servlet/PatenteServletController?Action=detail&CodPedido=582715&PesquisaPorTitulo=&PesquisaPorResumo=&PesquisaPorDepositante=&PesquisaPorInventor=&PesquisaPorProcurador= [accessed Apr. 24, 2012]*
21 *Love J (2012) Affedavit Nacto Pharma versus Bayer Corporation. http://keionline.org/sites/default/files/aff-jameslove_13Feb2012_as_Filed_natco_cl.pdf [accessed: Feb. 17, 2012]*
22 *Love J (2012) Affedavit Nacto Pharma versus Bayer Corporation. http://keionline.org/sites/default/files/aff-jameslove_13Feb2012_as_Filed_natco_cl.pdf [accessed Feb. 17, 2012]*
23 *Bayer (2012) Annual Report 201, p 70*
24 *This is a written renouncement of assertion of the patent rights on the anti-aids drugs in all Africa and India.*
25 *Access to medicine Index (2010). www.acesstomedicineindex.org, p.142 und p. 64 [accessed May 24, 2012]*
26 *Boehringer Ingelheim (2007) Boehringer Ingelheim further intensifies fight against AIDS. press release 15/May/2007. www.boehringer-ingelheim.com/news/news_releases/press_releases/2007/15_may_2007.html [accessed Feb. 11, 2012]*
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Stomach ache after too much pizza? In a television ad, Boehringer Ingelheim recommends Buscopan® Composto for those complaints.

24 hours of cardiovascular protection with Micardis®, that is what the hand puppets claim. Advertising material for Boehringer's benefit program "Programa Saudé Fácil", in which patients receive discounts on certain pharmaceutical products.

6. Product promotion

The Brazilian health authority Anvisa supervises pharmaceutical marketing in Brazil on the basis of resolution RDC nº 102/2000.[1] As is the case in Germany, prescription drugs may only be advertised in specialized circles. Lay advertising for over the counter drugs is allowed but it has to meet certain requirements. Bayer and Boehringer Ingelheim, among others, were penalized several times because of unfair advertising.[2] In 2001 Anvisa criticized Bayer's ad promoting Lipobay®; in 2003 it was an advertising campaign about sexual performance. In 2009, Anvisa stopped Bayer's campaign "Um mundo com menos dor", (a world with less pain) for the painkiller Aspirin®. In the same year, the authority also prohibited the campaign "Leve a Vida sem Dor", (Live your life without pain) relating to Boehringers painkiller Anador®.
What has to be particularly criticized is the massive product advertising for Buscopan® Composto, which is prohibited in Germany, by the company Boehringer Ingelheim. The risky painkiller also helped in case of a pinching stomach after too much pizza – that was insinuated by a Brazilian television spot. Such irresponsible advertising practices further the careless use of metamizole-containing preparations as well as their abuse.

Boehringer Ingelheim advertises the prescription antihypertensive Micardis® (telmisartan) to Brazilian patients with questionable methods. In an information leaflet of the company, consumers are offered a considerable price reduction on the drug if they give their personal data to the company (name, address, telephone number, name of prescribing physicians and their registration numbers). Patients can then buy telmisartan at a price reduction of 30-50

Photo: Pharmaton for women

percent in pharmacies. This advertising strategy is also used by other brand manufacturers in Brazil – among them the Bayer company. Bayer's benefit program bears the wonderful name "Bayer Para Você" (Bayer for you).[3] Apart from the fact that it is highly questionable to create

Stronger bones with lysine and Kiddi Pharmaton®? A study made in 1962 is supposed to prove this.

Pharmaton with Ginseng: A better quality of life with Pharmaton®? That is suggested by the Brazilian Pharmaton website.

financial incentives for the purchase of branded prescription drugs, such practices also raise problems regarding data protection. Furthermore, Boehringer's information on Micardis® has to be criticized. The promotional text in the information flyer says that the medicine offered cardiovascular protection. According to the German pharmaceutical journal arznei-telegramm, it is not sufficiently proven that sartanes prevent cardiovascular incidents.[4] The half-life of the active ingredient of more than 20 hours was, moreover, longer than is necessary for a 24-hour action. In the case of an intolerance, an extended half-life was even unfavourable.

Dubitable clinical trials are cited on the Brazilian Pharmaton website to promote Boehringer's tonic for all circumstances. In children, Kiddi Pharmaton® is supposed to increase bone density. As proof, a study involving 84 children between six and twelve years is cited, who received lysine for almost half a year. That publication was made in 1962![5]

In the ads for this medicinal product, it is also claimed that it increases the physical and mental performance: a Brazilian television spot of 2009 shows a woman who skillfully swerves a football rolling onto the road in front of her car or a man who – thanks to Pharmaton – catches the subway at the last moment.[6]

The Ginseng extract which is contained in the vitamin mixture for adults is to minimize stress as well as physical and mental tension. It is also to strengthen the immune system and reduce ageing symptoms.[7] The Stiftung Warentest (a German consumer organization) however warns that people with high blood pressure or diabetes should take Ginseng-containing medicines only after consultation with their physicians. These preparations could furthermore weaken the action of anticoagulants.[8] In order to obtain such information, the users of the Pharmaton website have to work through to the small print under the heading "Frequently asked questions" (FAQ).

Bayer also vehemently advertise their vitamin mixtures. A Brazilian television spot presents an energetic mother who delights her son as a light saber fighter. The power woman's energy source are the Supradyn® tablets which are taken together with the hamburger lunch.

Ad for Bayer`s vitamin mixture Supradyn. Mother and son have hamburgers for lunch and vitamin tablets.

Bayer massively advertises their impotency medicine Levitra® in Brazil – mostly in specialist circles, but occasionally also for lay people. Only a few years ago Levitra® advertisements were found at elevators and car park barriers. Such

Advertisement for the impotency drug Levitra, original source:

advertisements for prescription drugs are illegal in Brazil.

Physicians are likewise courted: according to Bayer's information, the company employ more than 600 pharmaceutical representatives in Brazil with the task of familiarizing physicians with Bayer's prescription drugs such as contraceptive pills or hormone preparations for men. Medical practices are visited once per month.[9]
On their website, Bayer tempts young women with a free app for a menstruation calendar or a calendar for taking the pill on schedule. The Brazilian Bayer website Gineco gives tips on women's health and beauty. What is interesting is the fact that experts are cited here again and again who make a connection between the

On their website, Bayer offers a free app with a menstruation calendar.

selection of the right contraceptive with good looks. For example, the dermatologist Dr. Maria Fernanda Gavazzoni pointed out the benefits of drospirenone containing contraceptives such as Yaz® and Yasmin® for more beautiful skin as late as February 2012. Such advertising practices are more than questionable. Bayer focuses on the lifestyle area with their statements on the beauty effect, the feel-good factor or the figure bonus of their pills. Besides, other contraceptive pills with fewer risks would better serve the women taking them.

Bayer gives tips relating to women's health and beauty on the Brazilian website Gineco. The benefits of contraceptive pills are here regularly referred to.

7. Partnerships and donation programs

Boehringer Ingelheim

In Brazil, Boehringer Ingelheim is the partner of the German GIZ (Society for International Cooperation) and of the environmental organization WWF and various social projects and health initiatives. The company supports, among others, an institution which looks after Aids patients in São Paolo. In addition, patient organizations receive financial funding, for example the Instituto Oncoguia and the Instituto Espaço de Vida. Those two organizations want to support cancer patients with information on the disease and therapies. However, it is an open question if patients can find independent information there. The Instituto Oncoguia not only provides Boehringer's logo on their website but also those of Bayer HealthCare, Novartis, Sanofi, Astra Zeneca, Merck, Bristol-Myers Squibb, Roche and others.
Since 2011, there is also a partnership between Boehringer Ingelheim and the Brazilian government aimed at improving access to the Parkinson medication Sifrol® in the long run. Within five years, the knowledge and technology relating to the production of the drug is to be passed on to a public production company. Until then, Boehringer Ingelheim remains the sole supplier of the drug in the public health system. The Brazilian Patent Office had priorly denied an exten-

Banner with Bayer logo at an activity of the World Contraception Day

Bayer – best selection in the matter of contraception?

sion of the patent term of Sifrol®. 220,000 Brazilians suffer from Parkinson's disease and could profit from this expensive treatment.[10]

Bayer

In 2011, the company Bayer renewed their agreement with the World Health Organization WHO to provide the important drug Nifurtimox for the treatment of the Chagas disease, which is widely spread in South America, until 2017. One million free tablets will be provided by the manufacturer per year and the WHO will also be supported financially as regards the logistics and distribution. The company informed BUKO Pharma-Kampagne that they were currently researching a special dosage for children.[11]

In the course of Bayer's partnership with the environmental program of the United Nations (UNEP), e.g. a drawing contest for children or a competition for young environmentalists was organized in Brazil in 2011. However, on the website to the UNEP-Bayer partnership, news relating to Bayer's diabetes products could also be found.[12]

In addition, the company supported educational projects as well as sports and culture projects. Bayer Brazil was also partner of the World Contraception Day 2012[13] for preventing teenage pregnancies. The event's motto was "Your future. Your choice. Your contraception." This year's activities included measures to sensitize people at much frequented places in São Paulo: educational material was distributed and balloons were released. Different than in India, Bayer does not seem to place product names on the website referring to the World Contraception Day, although the free Bayer apps are advertised there.

Baxter

According to Baxter's information, the company takes over social responsibilities by the Baxter International Foundation. The basic aim of the foundation was the "positive and sustainable effect on the health system and the health of communities". About 270,000 US dollars were spent as subsidies and grants and about four million US dollar have reached Latin America as product donations.[14]

On their website, the company particularly praise their employees commitment: the volume of voluntary work in the Baxter Global Service Project amounted to 159.000 hours in 2009. Baxter's employees in Latin America contributed 4,400 working hours, which were invested in various communal, social and ecological initiatives.[15] In the São Paulo region, Baxter also supports the project Arrastão which supports dental health of children.[16]

As in previous years, the company financed activities of the World Federation of Hemophilia at the world hemophilia day on April 17th. In

2012, the company sponsored discussion meetings which offered a platform for representatives of patient organizations, physicians and governmental representatives in Brazil. They were aimed at examining the medical care of hemophilia patients and to discuss how access to therapy could be improved in Brazil.[17]

At the beginning of November 2012, Baxter International announced a 20-year partnership with the public Brazilian company Hemobrás (Empresa Brasileira de Hemoderivados e Biotechnologia). This agreement should allow long-term technological transfer to enable local production of the recombinant factor VIII (rFVIII) therapy for treating hemophilia. Hemobrás pays Baxter for this service and will later be a licensee paying fees. For the next 10 years, however, Baxter remains the sole provider of the costly brand preparation. The majority of about 10,000 hemophilia patients in Brazil depend on this therapy.[18]

8. Communication behaviour

At the beginning of this examination, all companies received written communications. Intermediate results were also presented for validation and individual questions. The communication behaviour of the three companies differs considerably. In the case of Bayer, it has significantly improved since our study relating to India.
Boehringer Ingelheim practised a particularly open communication behaviour, answered our queries promptly and at high content level. The company also signaled high willingness to communicate. Still, Boehringer Ingelheim – as well as Bayer – were initially not prepared to disclose the patent status of all their medicinal products in Brazil. It was only shortly before this brochure was printed that we received corresponding information from the two companies.
Bayer also answered most questions after a short period of time and significantly faster than in the case of our India study. The company also provided us with a contact person. Willingness to communicate was signaled.
Baxter refused almost any kind of communication, answered neither letters nor e-mails and declared, at the beginning of 2012, that they were not prepared to discuss this study.

Endnoten

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5 *The reference on the website is: Reprint from: American Journal of Clinical Nutrition 11 (10) Mack PB, Vose GP, CL Kinard, HB Campbell. Effects of lysine-supplemented diets on growth and skeletal density of preadolescent children. 1962; 255-262 http://translate.google.de/translate?hl=de&sl=pt&u=http://www.pharmaton.com.br/&prev=/search%3Fq%3Dwww.pharmaton.com.br%26hl%3Dde%26client%3Dfirefox-a%26hs%3Dvht%26rls%3Dorg.mozilla:de:official%26biw%3D1264%26bih%3D759%26prmd%3Dimvns&sa=X&ei=7gZoUNKEGYvotQbo4IDYBQ&ved=0CCUQ7gEwAA [accessed Oct. 8, 2012]*
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9 *The company's reply dated October 2012*
10 *Company's information under http://www.boehringer-ingelheim.com/global_activities/americas/brazil/medicine_market.html*
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14 *http://translate.googleusercontent.com/translate_c?depth=1&hl=de&prev=/search%3Fq%3Dbaxter%2Bbrasilien%26hl%3Dde%26prmd%3Dimvns&rurl=translate.google.com&sl=pt&u=http://www.latinoamerica.baxter.com/brasil/sobre-a-baxter/sustentabilidade/missoes-e-prioridades.html&usg=ALkJrhgrK7j51ZgzlgZJ4AQgx9RdYODuhQ [accessed Oct. 8, 2012]*
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IV In a nutshell – conclusion and prospects

Bayer and Boehringer Ingelheim offer a number of drugs which are not on the German market (any more) for good reasons. Both companies sell useless vitamin mixtures as well as a number of more recent and more expensive pharmaceutical drugs which badly serve patients.

Access to many important essential drugs are ensured by public Brazilian generic companies in a much better way than German brand companies. In the public health system SUS, hardly any drug of the examined companies is available. Even essential drugs such as the cardiac Actilyse® of Boehringer Ingelheim were mostly not available in most public clinics at the time of our examination. The reason for this is probably the high price of the drug. Brazil's free health care, which also comprises medicinal products, fails because of the price policy of the companies. The treatment of so-called diseases of civilization is mostly achieved with exclusively expensive brand preparations. These diseases will become an increasing challenge for the SUS in the years to come and necessitate enormous investments.

The product portfolios of Bayer, Boehringer Ingelheim and Baxter are focused on Brazil's well-to-do middle and upper classes. The portfolios mainly serve private hospitals and pharmacies. The examined companies carry out a large number of research projects in Brazil. They concentrate on lucrative medical fields and new fields of application of their blockbusters. The companies do not finance studies on neglected diseases. The focus of research are cardiovascular diseases, cancer and diabetes – diseases which are indeed widely spread in Brazil.

As regards marketing, Boehringer Ingelheims advertising practices for risky metamizole-containing painkillers have to be criticized. The manufacturer should finally take Buscopan® Composto from the Brazilian market. In the same way alarming is the clever marketing of Bayer's blockbusters Yaz® and Yasmin®. The two third-generation contraceptives are riskier than the older second-generation drugs which are equally effective. However, the manufacturer pointedly advertises a beauty effect. Bayer cleverly present themselves as specialists in contraception. Young women are made familiar with the brand Bayer by beauty tips in the internet and free handy apps.

With their policy of free access to Aids medication, the Brazilian health system had been on the road to success. Now it is in danger of failing because of the exploding costs of cardiovascular, anti-cancer and diabetics medication.
Photo: Loggan11, Wikimedia Commons

V. Annex: List of examined drugs

Drugs Boehringer Ingelheim 2011

Generic name	Brand name Boehringer Ingelheim	Dosage form	Strength	Units per package	Price in R$ *(Manufacturer price)*	Classification
algestone acetophenide + estradiol enanthate	*Perlutan*	*ampoule injectable solution*	*(150 + 10) mg/mL; 1 mL*	*1*	*13.07*	*i*
alteplase	*Actilyse*	*vial with liofilized powder for injection + diluent*	*50 mg; 50 mL*	*1*	*1846.9*	*r+e*
ambroxol hydrochloride	*Mucoangin*	*lozenge*	*20 mg*	*12*	*12.23*	*i*
ambroxol hydrochloride	*Mucosolvan*	*syrup*	*3 mg/mL; 120 mL*	*1*	*16.53*	*i*
ambroxol hydrochloride	*Mucosolvan*	*syrup*	*6 mg/mL; 120 mL*	*1*	*23.8*	*i*
ambroxol hydrochloride	*Mucosolvan*	*oral solution*	*7.5 mg/mL; 50 mL*	*1*	*12.36*	*i*
ambroxol hydrochloride	*Mucosolvan 24 HRS*	*controlled release capsule*	*75 mg*	*10*	*21.67*	*i*
bisacodyl	*Dulcolax*	*coated tablet*	*5 mg*	*20*	*5.13*	*r*
bromhexine hydrochloride	*Bisolvon*	*oral solution*	*2 mg/mL; 50 mL*	*1*	*9.62*	*i*
bromhexine hydrochloride	*Bisolvon*	*syrup*	*1.6 mg/mL; 120 mL*	*1*	*15.27*	*i*
bromhexine hydrochloride	*Bisolvon*	*syrup*	*0.8 mg/mL; 120 mL*	*1*	*12.79*	*i*
calcium lactate + thiamine hydrochloride + riboflavin sodium phosphate + pyridoxine hydrochloride + colecalciferol + tocopherol acetate + nicotinamide + dexpanthenol + lysine hydrochloride	*Pharmaton Kiddi*	*syrup*	*200 mL*	*1*	*29.19*	*i*
clonidine hydrochloride	*Atensina*	*tablet*	*0.1 mg*	*30*	*4.9*	*r*
clonidine hydrochloride	*Atensina*	*tablet*	*0.15 mg*	*30*	*6.09*	*r*
clonidine hydrochloride	*Atensina*	*tablet*	*0.2 mg*	*30*	*7.58*	*r*
dabigatran etexilate	*Pradaxa*	*capsule*	*75 mg*	*10*	*137.1*	*i*
dabigatran etexilate	*Pradaxa*	*capsule*	*75 mg*	*30*	*411.34*	*i*
dabigatran etexilate	*Pradaxa*	*capsule*	*110 mg*	*10*	*137.1*	*i*
dabigatran etexilate	*Pradaxa*	*capsule*	*110 mg*	*30*	*411.34*	*i*
diltiazem hydrochloride	*Cardizem*	*tablet*	*30 mg*	*20*	*6.84*	*r*
diltiazem hydrochloride	*Cardizem*	*tablet*	*30 mg*	*50*	*17.86*	*r*
diltiazem hydrochloride	*Cardizem*	*tablet*	*60 mg*	*20*	*13.87*	*r*
diltiazem hydrochloride	*Cardizem*	*tablet*	*60 mg*	*50*	*33.97*	*r*
diltiazem hydrochloride	*Cardizem CD*	*extended release capsule*	*180 mg*	*16*	*40.54*	*r*
diltiazem hydrochloride	*Cardizem CD*	*extended release capsule*	*240 mg*	*16*	*48.14*	*r*
diltiazem hydrochloride	*Cardizem SR*	*extended release capsule*	*90 mg*	*20*	*26.47*	*r*
diltiazem hydrochloride	*Cardizem SR*	*extended release capsule*	*120 mg*	*20*	*34.42*	*r*
dipyridamole	*Persantin*	*ampoule injectable solution*	*5 mg/mL; 2 mL*	*5*	*4.74*	*i*
dipyridamole	*Persantin*	*coated tablet*	*75 mg*	*40*	*7.4*	*i*
dipyridamole	*Persantin*	*coated tablet*	*75 mg*	*200*	*35.01*	*i*
dipyridamole	*Persantin*	*coated tablet*	*100 mg*	*50*	*19.28*	*i*
etilefrine hydrochloride	*Efortil*	*ampoule injectable solution*	*10 mg/mL; 1 mL*	*5*	*5.98*	*r*
etilefrine hydrochloride	*Efortil*	*tablet*	*5 mg*	*20*	*3.21*	*r*
etilefrine hydrochloride	*Efortil*	*oral solution; drops*	*7.5 mg/mL; 20 mL*	*1*	*4.67*	*r*
fenoterol hydrobromide	*Berotec*	*inhalant aerosol*	*2 mg/mL; 10 mL*	*1*	*18.98*	*i*
fenoterol hydrobromide	*Berotec*	*oral/nebulization solution*	*5 mg/mL; 20 mL*	*1*	*5.37*	*i*
fenoterol hydrobromide	*Berotec*	*syrup*	*0.25 mg/mL; 120 mL*	*1*	*4.23*	*i*
fenoterol hydrobromide	*Berotec*	*syrup*	*0.5 mg/mL; 120 mL*	*1*	*4.65*	*i*
ibuprofen	*Buscofem*	*capsule*	*400 mg*	*2*	*2.85*	*r*
ibuprofen	*Buscofem*	*capsule*	*400 mg*	*10*	*13.59*	*r*

Generic name	Brand name Boehringer Ingelheim	Dosage form	Strength	Units per package	Price in R$ (Manufacturer price)	Classification
ibuprofen	Buscofem	capsule	400 mg	50	71.2	r
ipratropium bromide	Atrovent	inhalant solution	0.25 mg/mL; 20 mL	1	15.62	r+e
ipratropium bromide	Atrovent N	inhalant aerosol	20 mcg/dose; 10 mL	1	20.93	r+e
ipratropium bromide + fenoterol hydrobromide	Duovent	inhalant aerosol	(40 + 100) mcg/dose; 15 mL	1	35.78	i
ipratropium bromide + salbutamol sulfate	Combivent	inhalant aerosol	(20 + 120) mcg/50 mcL; 10 mL	1	34.46	r
meloxicam	Movatec	tablet	7.5 mg	10	23.5	r
meloxicam	Movatec	tablet	15 mg	10	43.65	r
meloxicam	Movatec	ampoule injectable solution	10 mg/mL; 1.5 mL	5	40.42	i
metamizole sodium	Anador	tablet	500 mg	4	2.29	i
metamizole sodium	Anador	tablet	500 mg	8	4.58	i
metamizole sodium	Anador	tablet	500 mg	24	13.08	i
metamizole sodium	Anador	tablet	500 mg	120	68.7	i
metamizole sodium	Anador	tablet	500 mg	512	293.24	i
metamizole sodium	Anador	oral solution; drops	500 mg/mL; 10 mL	1	6.68	i
metamizole sodium	Anador	oral solution; drops	500 mg/mL; 20 mL	1	12.14	i
nevirapine	Viramune	tablet	200 mg	60	150.66	r+e
nevirapine	Viramune	oral suspension	10 mg/mL; 240 mL	1	62.19	r+e
phenylbutazone calcium	Butazona Cálcica	coated tablet	200 mg	100	39.9	i
pramipexole dihydrochloride	Sifrol	tablet	0.125 mg	30	37.42	r
pramipexole dihydrochloride	Sifrol	tablet	0.25 mg	30	85.44	r
pramipexole dihydrochloride	Sifrol	tablet	1 mg	30	257.43	r
pramipexole dihydrochloride	Sifrol ER	extended release tablet	0.375 mg	30	96.54	r
pramipexole dihydrochloride	Sifrol ER	extended release tablet	0.75 mg	10	64.36	r
pramipexole dihydrochloride	Sifrol ER	extended release tablet	0.75 mg	30	193.07	r
pramipexole dihydrochloride	Sifrol ER	extended release tablet	1.5 mg	10	128.71	r
pramipexole dihydrochloride	Sifrol ER	extended release tablet	1.5 mg	30	386.14	r
pramipexole dihydrochloride	Sifrol ER	extended release tablet	3 mg	30	772.28	r
retinol palmitate + colecalciferol + thiamine nitrate + riboflavin + pyridoxine hydrochloride + cyanocobalamin + biotin + nicotinamide + ascorbic acid + copper + manganese + magnesium + iron + zinc + dibasic calcium phosphate + selenium + soy lecithin + tocopherol acetate + folic acid + Panax ginseng extract Gl15	Pharmaton	capsule		30	57.1	i
retinol palmitate + colecalciferol + thiamine nitrate + riboflavin + pyridoxine hydrochloride + cyanocobalamin + biotin + nicotinamide + ascorbic acid + copper + manganese + magnesium + iron + zinc + dibasic calcium phosphate + selenium + soy lecithin + tocopherol acetate + folic acid + Panax ginseng extract Gl15	Pharmaton	capsule		60	103.49	i
retinol palmitate + colecalciferol + thiamine nitrate + riboflavin + pyridoxine hydrochloride + cyanocobalamin + biotin + nicotinamide + ascorbic acid + copper + manganese + magnesium + iron + zinc + dibasic calcium phosphate + selenium + soy lecithin + tocopherol acetate + folic acid + Panax ginseng extract Gl15	Pharmaton	capsule		100	161.17	i
scopolamine butylbromide	Buscopan	coated tablet	10 mg	20	10.4	i
scopolamine butylbromide	Buscopan	oral solution	10 mg/mL; 20 mL	1	11.23	i

Generic name	Brand name Boehringer Ingelheim	Dosage form	Strength	Units per package	Price in R$ *(Manufacturer price)*	Classification
scopolamine butylbromide	*Buscopan*	*ampoule injectable solution*	*20 mg/mL; 1 mL*	*5*	*8.2*	*r*
scopolamine butylbromide + metamizole sodium	Buscopan Composto	ampoule injectable solution	(4 + 500) mg/mL; 5 mL	3	11.89	i
scopolamine butylbromide + metamizole sodium	*Buscopan Composto*	*oral solution; drops*	*(6.67 + 333.4) mg/mL; 20 mL*	*1*	*10.65*	*i*
scopolamine butylbromide + metamizole sodium	*Buscopan Composto*	*coated tablet*	*(10 + 250) mg*	*20*	*11.17*	*i*
scopolamine butylbromide + paracetamol	*Buscoduo*	*coated tablet*	*(10 + 500) mg*	*4*	*3.41*	*i*
scopolamine butylbromide + paracetamol	*Buscoduo*	*coated tablet*	*(10 + 500) mg*	*20*	*17.06*	*i*
scopolamine butylbromide + paracetamol	*Buscoduo*	*coated tablet*	*(10 + 500) mg*	*120*	*102.34*	*i*
sodium picosulfate	*Guttalax*	*capsule*	*2.5 mg*	*50*	*21.96*	*r*
sodium picosulfate	*Guttalax*	*oral solution*	*7.5 mg/mL; 20 mL*	*1*	*9.02*	*r*
sulfamethoxazole + trimethoprim	*Infectrin*	*tablet*	*(400 + 80) mg*	*20*	*13.05*	*r+e*
sulfamethoxazole + trimethoprim	*Infectrin*	*oral suspension*	*(40 + 8) mg/mL; 50 mL*	*1*	*5.94*	*r+e*
sulfamethoxazole + trimethoprim	*Infectrin*	*oral suspension*	*(40 + 8) mg/mL; 120 mL*	*1*	*12.69*	*r+e*
sulfamethoxazole + trimethoprim	*Infectrin F*	*tablet*	*(800 + 160) mg*	*10*	*14.41*	*r*
tamsulosin hydrochloride	*Secotex*	*controlled resease tablet*	*0.4 mg*	*20*	*128.89*	*r*
tamsulosin hydrochloride	*Secotex*	*controlled resease tablet*	*0.4 mg*	*30*	*189.86*	*r*
telmisartan	*Micardis*	*tablet*	*40 mg*	*14*	*50.98*	*i*
telmisartan	*Micardis*	*tablet*	*40 mg*	*28*	*92.57*	*i*
telmisartan	*Micardis*	*tablet*	*80 mg*	*14*	*56.88*	*i*
telmisartan	*Micardis*	*tablet*	*80 mg*	*28*	*103.29*	*i*
telmisartan + hydrochlorothiazide	*Micardis HCT*	*tablet*	*(40 + 12.5) mg*	*14*	*56.93*	*i*
telmisartan + hydrochlorothiazide	*Micardis HCT*	*tablet*	*(40 + 12.5) mg*	*28*	*104*	*i*
telmisartan + hydrochlorothiazide	*Micardis HCT*	*tablet*	*(80 + 12.5) mg*	*14*	*65.63*	*i*
telmisartan + hydrochlorothiazide	*Micardis HCT*	*tablet*	*(80 + 12.5) mg*	*28*	*116.09*	*i*
telmisartan + hydrochlorothiazide	*Micardis HCT*	*tablet*	*(80 + 25) mg*	*14*	*65.63*	*i*
telmisartan + hydrochlorothiazide	*Micardis HCT*	*tablet*	*(80 + 25) mg*	*28*	*116.09*	*i*
tenecteplase	*Metalyse*	*vial with liofilized powder for injection + diluent*	*40 mg; 8 mL*	*1*	*4418.04*	*r*
tenecteplase	*Metalyse*	*vial with liofilized powder for injection + diluent*	*50 mg; 10 mL*	*1*	*5460.15*	*r*
tiotropium bromide	*Spiriva Respimat*	*solution for inhalation*	*2.5 mcg/dose; 4 mL (60 doses)*	*1*	*255.56*	*r*
tipranavir	*Elodius*	*capsule*	*250 mg*	*120*	*1588.66*	*r+e*
tipranavir	*Elodius*	*oral solution*	*100 mg/mL; 95 mL*	*1*	*738.61*	*r+e*
Vitis vinifera L	*Antistax*	*coated tablet*	*360 mg*	*18*	*34.51*	*i*
Vitis vinifera L	*Antistax*	*coated tablet*	*360 mg*	*30*	*55.6*	*i*
Vitis vinifera L	*Antistax*	*coated tablet*	*360 mg*	*18*	*34.51*	*i*
Vitis vinifera L	*Antistax*	*coated tablet*	*360 mg*	*30*	*55.60*	*i*

Drugs Baxter 2011

Generic name	Brand name Baxter	Dosage form	Strength	Units per package	Price in R$ *(Manufacturer price)*	Classification
albumin	*Albumina Sérica Humana Normal*	*plastic bag injectable solution*	*20%; 50 mL*	*1*	*229.69*	*r+e*
albumin	*Albumina Sérica Humana Normal*	*plastic bag injectable solution*	*20%; 100 mL*	*1*	*459.37*	*r+e*
anti-D (rh) immunoglobulin	*Partogama SDF*	*prefilled syringe with injectable solution*	*250 mcg/mL; 1.0 mL*	*1*	*176.87*	*r+e*
anti-D (rh) immunoglobulin	*Partogama SDF*	*prefilled syringe with injectable solution*	*250 mcg/mL; 1.32 mL (330 mcg)*	*1*	*233.52*	*r*
antithrombin III	*AT III Baxter*	*vial with liofilized powder for injection + diluent*	*500 IU*	*1*	*888.02*	*r*
antithrombin III	*AT III Baxter*	*vial with liofilized powder for injection + diluent*	*1000 IU*	*1*	*1701.69*	*r*
coagulation factor IX	*Immunine*	*vial with liofilized powder for injection + diluent*	*200 IU*	*1*	*644.63*	*r*
coagulation factor IX	*Immunine*	*vial with liofilized powder for injection + diluent*	*600 IU*	*1*	*1749.72*	*r*
coagulation factor IX	*Immunine*	*vial with liofilized powder for injection + diluent*	*1200 IU*	*1*	*3324.55*	*r*
coagulation factor IX. II. VII and X in combination	*Prothromplex-T*	*vial with liofilized powder for injection + diluent*	*600 IU*	*1*	*1279.02*	*r+e*
cyclophosphamide	*Genuxal*	*coated tablet extended release*	*50 mg*	*50*	*-*	*r+e*
cyclophosphamide	*Genuxal*	*vial with powder for injectable solution*	*200 mg*	*10*	*106.7*	*r*
cyclophosphamide	*Genuxal*	*vial with powder for injectable solution*	*1000 mg*	*10*	*395.91*	*r+e*
fibrinogen + aprotinin + thrombin	*Tissucol*	*vial with liofilized powder + diluent. for topical use*		*3*	*473.96*	*r*
gelatin + thrombin	*Floseal*	*vial with liofilized powder for injection + diluent (5 mL)*	*5 ml*	*1*	*682.81*	*r*
glucose	*Baxter Glicose*	*plastic bag with injectable solution*	*50 mg/mL; 100 mL*	*1*	*4.26*	*r+e*
glucose	*Baxter Glicose*	*PVC bag with injectable solution*	*100 mg/mL; 500 mL*	*1*	*5.99*	*r+e*
glucose	*Baxter Glicose*	*PVC bag with injectable solution*	*500 mg/mL; 1000 mL*	*1*	*18.7*	*r+e*
glucose + sodium chloride	*Solução Glicofisiológica*	*plastic bag with injectable solution*	*(50 + 9) mg/mL; 500 mL*	*1*	*4.86*	*r+e*
glucose + sodium chloride	*Solução Glicofisiológica*	*plastic bag with injectable solution*	*(50 + 9) mg/mL; 1000 mL*	*1*	*7.4*	*r+e*
human coagulation factor VIII (rDNA); octocog alfa	*Advate*	*vial with liofilized powder for injection + diluent*	*250 IU*	*1*	*721.45*	*r+e*
human coagulation factor VIII (rDNA); octocog alfa	*Advate*	*vial with liofilized powder for injection + diluent*	*500 IU*	*1*	*1370.73*	*r+e*
human coagulation factor VIII (rDNA); octocog alfa	*Advate*	*vial with liofilized powder for injection + diluent*	*1000 IU*	*1*	*2604.47*	*r+e*
human coagulation factor VIII (rDNA); octocog alfa	*Advate*	*vial with liofilized powder for injection + diluent*	*1500 IU*	*1*	*4114.25*	*r+e*
human coagulation factor VIII (rDNA)	*Feiba*	*vial with liofilized powder for injection + diluent*	*500 IU*	*1*	*1429.83*	*r+e*

Generic name	Brand name Baxter	Dosage form	Strength	Units per package	Price in R$ (Manufacturer price)	Classification
human coagulation factor VIII (rDNA)	Feiba	vial with liofilized powder for injection + diluent	1000 IU	1	2716.7	r+e
ifosfamide	Holoxane	vial with powder for injection + diluent	500 mg	10	589.53	r+e
ifosfamide	Holoxane	vial with powder for injection + diluent	1000 mg	10	1124.29	r+e
ifosfamide	Holoxane	vial with powder for injection + diluent	2000 mg	10	2017.86	r+e
immunoglobulin G	Endobulin S/D	vial with liofilized powder for injection + diluent	500 mg	1	148.3	r+e
immunoglobulin G	Endobulin S/D	vial with liofilized powder for injection + diluent	1000 mg	1	296.6	r+e
immunoglobulin G	Endobulin S/D	vial with liofilized powder for injection + diluent	2500 mg	1	704.45	r+e
immunoglobulin G	Endobulin S/D	vial with liofilized powder for injection + diluent	5000 mg	1	1338.46	r+e
immunoglobulin G	Endobulin S/D	vial with liofilized powder for injection + diluent	10000 mg	1	2365.96	r+e
immunoglobulin G	Endobulin KIOVIG	vial with injectable solution	100 mg/mL; 10 mL	1	296.6	r+e
influenza A H1N1 vaccine (inactivated. whole virus)	Vacina influenza A (inativada)	vial with injectable suspension	15 mcg/mL; 5 mL	20	5744.17	r
isoflurane	Isothane	bottle with inhalant liquid	100%; 100 mL	6	2735.95	r+e
mannitol	Manitol Baxter	plastic bag with injectable solution	200 mg/mL; 250 mL	1	8.42	r+e
meningococcus C. purified polysaccharides antigen conjugated + tetanus toxoid	Vacina Meningocócica C (conjugada)	prefilled syringe with injectable suspension	0.5 mL	1	156.32	r+e
mesna	Mitexan (Mesna)	ampoule with injectable solution	100 mg/mL; 4 mL	10	122.99	r+e
mesna	Mitexan (Mesna)	coated tablet	400 mg	20	133.74	r+e
mesna	Mitexan (Mesna)	coated tablet	600 mg	20	188.17	r+e
metronidazole	Metroniflex	plastic bag with injectable solution	5 mg/mL; 100 mL	1	7.04	r+e
sodium chloride	Cloreto de sódio Baxter	PVC bag with injectable solution	9 mg/mL; 100 mL	1	4.1	r+e
sodium chloride	Cloreto de sódio Baxter	PVC bag with injectable solution	9 mg/mL; 110 mL	1	4.1	r+e
sodium chloride	Cloreto de sódio Baxter	PVC bag with injectable solution	9 mg/mL; 500 mL	1	4.24	r+e
sodium chloride	Cloreto de sódio Baxter	PVC bag with injectable solution	9 mg/mL; 1000 mL	1	5.77	r+e
sodium chloride + sodium gluconate + sodium acetate + potassium chloride + magnesium chloride	Plasma Lyte	plastic bag injectable solution	500 mL	24	98.27	r
sodium chloride + potassium chloride + calcium chloride	Solução de Ringer Baxter	PVC bag with injectable solution	500 mL	1	4.64	r
sodium chloride + potassium chloride + calcium chloride + sodium lactate	Solução de Ringer com lactato Baxter	PVC bag with injectable solution	(6 + 0.3 + 0.2 + 3.1) mg/mL; 500 mL	1	4.91	r+e
sodium chloride + potassium chloride + calcium chloride + sodium lactate	Solução de Ringer com lactato Baxter	PVC bag with injectable solution	(6 + 0.3 + 0.2 + 3.1) mg/mL; 1000 mL	1	7.38	r+e
sodium phosphate monobasic + sodium phosphate dibasic	Travad	plastic bag with solution for enema	(16 + 6) g/100 mL; 133 mL	1	12.88	r
sorbitol	Baxter Sorbitol	plastic bag with urologic irrigation solution	3 mg/mL; 3000 mL	1	19.99	r
Sorbitol	Baxter Sorbitol	plastic bag with urologic irrigation solution	3 mg/mL; 3.000 mL	1	19.99	r

Drugs Bayer 2011

Generic name	Brand name Bayer	Dosage form	Strength	Units per package	Price in R$ *(Manufacturer price)*	Classification
acarbose	*Glucobay*	*tablet*	*50 mg*	*30*	*38.12*	*i*
acarbose	*Glucobay*	*tablet*	*100 mg*	*30*	*56.86*	*i*
acetylsalicylic acid	*Aspirina*	*tablet*	*500 mg*	*4*	*1.95*	*r+e*
acetylsalicylic acid	*Aspirina*	*tablet*	*500 mg*	*10*	*4.87*	*r+e*
acetylsalicylic acid	*Aspirina*	*tablet*	*500 mg*	*20*	*9.87*	*r+e*
acetylsalicylic acid	*Aspirina*	*tablet*	*500 mg*	*96*	*46.77*	*r+e*
acetylsalicylic acid	*Aspirina*	*tablet*	*500 mg*	*100*	*48.72*	*r+e*
acetylsalicylic acid	*Aspirina*	*tablet*	*500 mg*	*240*	*116.93*	*r+e*
acetylsalicylic acid	*Aspirina Prevent*	*coated tablet*	*300 mg*	*30*	*34.45*	*r+e*
acetylsalicylic acid	*Aspirina Prevent*	*coated tablet*	*100 mg*	*10*	*3.41*	*r+e*
acetylsalicylic acid	*Aspirina Prevent*	*coated tablet*	*100 mg*	*20*	*7.22*	*r+e*
acetylsalicylic acid	*Aspirina Prevent*	*coated tablet*	*100 mg*	*30*	*11.7*	*r+e*
acetylsalicylic acid	*Aspirina Prevent*	*coated tablet*	*100 mg*	*100*	*34.13*	*r+e*
acetylsalicylic acid + caffeine	*Cafiaspirina*	*tablet*	*650 mg + 65 mg*	*4*	*3.05*	*i*
acetylsalicylic acid + caffeine	*Cafiaspirina*	*tablet*	*650 mg + 65 mg*	*20*	*17.27*	*i*
acetylsalicylic acid + caffeine	*Cafiaspirina*	*tablet*	*650 mg + 65 mg*	*100*	*76.16*	*i*
acetylsalicylic acid + sodium bicarbonate + citric acid	*Alka-Seltzer*	*eferv tablet*	*324 mg + 965 mg + 1625 mg*	*2*	*1.08*	*i*
acetylsalicylic acid + sodium bicarbonate + citric acid	*Alka-Seltzer*	*eferv tablet*	*324 mg + 965 mg + 1625 mg*	*10*	*5.92*	*i*
acetylsalicylic acid + sodium bicarbonate + citric acid	*Alka-Seltzer*	*eferv tablet*	*324 mg + 965 mg + 1625 mg*	*100*	*54.13*	*i*
alemtuzumab	*Campath*	*vial injectable solution*	*30 mg/mL; 1 mL*	*3*	*6305.07*	*r*
ampicillin trihydrate	*Binotal*	*tablet*	*500 mg*	*12*	*25.22*	*i*
ampicillin trihydrate	*Binotal*	*tablet*	*500 mg*	*18*	*37.92*	*i*
ampicillin trihydrate	*Binotal*	*tablet*	*1000 mg*	*12*	*45.19*	*i*
ampicillin trihydrate	*Binotal*	*tablet*	*1000 mg*	*18*	*67.75*	*i*
ascorbic acid	*Redoxon*	*eferv tablet*	*1000 mg*	*10*	*10.66*	*i*
ascorbic acid	*Redoxon*	*eferv tablet*	*2000 mg*	*10*	*15.68*	*i*
ascorbic acid	*Redoxon*	*oral solution*	*200 mg/mL; 20 mL*	*1*	*7.95*	*r*
ascorbic acid + zinc	*Redoxon*	*eferv tablet*	*1000 mg + 10 mg*	*10*	*13.57*	*i*
ascorbic acid + zinc	*Redoxon*	*eferv tablet*	*1000 mg + 10 mg*	*30*	*32.56*	*i*
azelaic acid	*Azelan*	*gel*	*150 mg/g ; 15 g*	*1*	*24.34*	*r*
azelaic acid	*Azelan*	*cream*	*200 mg/g; 30 g*	*1*	*48.67*	*r*
bifonazole	*Mycospor*	*topical solution spray*	*10 mg/mL; 15 mL*	*1*	*27.62*	*i*
bifonazole	*Mycospor*	*cream*	*10 mg/g; 15 g*	*1*	*26.29*	*i*
ciprofloxacin	*Cipro*	*coated tablet*	*250 mg*	*6*	*57.71*	*r+e*
ciprofloxacin	*Cipro*	*coated tablet*	*250 mg*	*14*	*130.5*	*r+e*
ciprofloxacin	*Cipro*	*coated tablet*	*500 mg*	*6*	*100.9*	*r+e*
ciprofloxacin	*Cipro*	*coated tablet*	*500 mg*	*14*	*206.1*	*r+e*
ciprofloxacin	*Cipro*	*coated tablet*	*500 mg*	*50*	*560.35*	*r+e*
ciprofloxacin	*Cipro*	*PVC bag injectable solution*	*2 mg/mL; 100 mL*	*1*	*125.02*	*r+e*
ciprofloxacin	*Cipro*	*PVC bag injectable solution*	*2 mg/mL; 200 mL*	*1*	*215.11*	*r+e*
ciprofloxacin	*Cipro XR*	*coated tablet extended release*	*500 mg*	*3*	*57.61*	*r*
ciprofloxacin	*Cipro XR*	*coated tablet extended release*	*500 mg*	*7*	*134.42*	*r*
ciprofloxacin	*Cipro XR*	*coated tablet extended release*	*1000 mg*	*3*	*88.2*	*r*
ciprofloxacin	*Cipro XR*	*coated tablet extended release*	*1000 mg*	*7*	*205.78*	*r*
clotrimazole	*Canesten*	*cream*	*10 mg/g; 20 g*	*1*	*11.46*	*r*

Generic name	Brand name Bayer	Dosage form	Strength	Units per package	Price in R$ *(Manufacturer price)*	Classification
clotrimazole	*Canesten*	*topical solution spray*	*10 mg/mL; 30 mL*	*1*	*25.48*	*r*
clotrimazole	*Canesten*	*topical solution*	*10 mg/mL; 30 mL*	*1*	*16.93*	*r*
clotrimazole	Gino-Canesten	vaginal cream + 6 applicators	10 mg/g; 35 g	1	*42.73*	r+e
clotrimazole	*Gino-Canesten*	*vaginal cream + 3 applicators*	*20 mg/g; 20 g*	*1*	*41.14*	*r*
clotrimazole	*Gino-Canesten*	*vaginal tablet + applicator*	*500 mg*	*1*	*44.69*	*r+e*
clotrimazole + dexamethasone acetate	*Baycuten N*	*cream*	*1%; 40 g*	*1*	*23.96*	*i*
cyproterone	*Androcur*	*tablet*	*50 mg*	*20*	*115.22*	*i*
cyproterone	*Androcur*	*tablet*	*100 mg*	*20*	*216.96*	*i*
cyproterone + ethinylestradiol	*Diane 35*	*tablet*	*2 mg + 0.035 mg*	*21*	*20.09*	*i*
dexpanthenol	*Bepantol*	*ointment*	*50 mg/g; 30 g*	*1*	*12.14*	*i*
dexpanthenol	*Bepantol*	*topical solution*	*50 mg/mL; 50 mL*	*1*	*8.95*	*i*
diflucortolone valerate	*Nerisona*	*cream*	*1 mg/g; 15 g*	*1*	*17*	*r*
diflucortolone valerate	*Nerisona*	*ointment*	*1 mg/g; 15 g*	*1*	*17*	*r*
diflucortolone valerate + chlorquinaldol	*Bi-Nerisona*	*cream*	*(1 mg + 10 mg)/g; 15 g*	*1*	*18.9*	*i*
dimeglumine gadopentetate	*Magnevistan*	*vial injectable solution*	*469 mg/mL; 10 mL*	*10*	*1485.39*	*r*
dimeglumine gadopentetate	*Magnevistan*	*vial injectable solution*	*469 mg/mL; 15 mL*	*10*	*2218.46*	*r*
dimeglumine gadopentetate	*Magnevistan*	*vial injectable solution*	*469 mg/mL; 30 mL*	*10*	*4186.94*	*r*
dimeglumine gadopentetate	*Magnevistan*	*vial injectable solution*	*469 mg/mL; 100 mL*	*10*	*13615.6*	*r*
estradiol / estradiol + gestodene	*Avaden*	*coated tablet*	*1 mg / 1 mg + 0.025 mg*	*28*	*47.56*	*i*
estradiol hemihydrate + drospirenone	*Angeliq*	*coated tablet*	*1 mg + 2 mg*	*28*	*77.69*	*i*
estradiol hemihydrate + norethisterone acetate	*Cliane*	*coated tablet*	*2 mg + 1 mg*	*28*	*42.74*	*r*
estradiol valerate	*Primogyna*	*coated tablet*	*1 mg*	*28*	*28.37*	*r*
estradiol valerate + cyproterone acetate	*Climene*	*coated tablet*	*2 mg; 2 mg + 1 mg*	*21*	*23.09*	*i*
estradiol valerate + dienogest	*Qlaira*	*coated tablet*	*tablet A + tablet B + tablet C + tablet D*	*3 x (26 + 2 placebo)*	*40.85*	*i*
estradiol valerate + levonorgestrel	*Ciclоprimogyna*	*coated tablet*	*2 mg; 2 mg + 0.25 mg*	*21*	*8.22*	*i*
estradiol valerate + norethisterone enantate	*Mesigyna*	*ampoule injectable solution + syringe + needle*	*(5 + 50) mg/mL; 1 mL*	*1*	*23.78*	*r+e*
ethinylestradiol + drospirenone	*Yasmin*	*coated tablet*	*0.03 mg + 3 mg*	*21*	*58.35*	*i*
ethinylestradiol + drospirenone	*Yaz*	*coated tablet*	*0.02 mg + 3 mg*	*24*	*58.35*	*i*
ethinylestradiol + gestodene	*Gynera*	*coated tablet*	*0.03 mg + 0.075 mg*	*21*	*27.89*	*i*
ethinylestradiol + gestodene	*Mirelle*	*coated tablet*	*0.015 mg + 0.06 mg*	*24*	*35.79*	*i*
ethinylestradiol + levonorgestrel	*Microvlar*	*coated tablet*	*0.03 mg + 0.15 mg*	*21*	*5.9*	*r+e*
ethinylestradiol + levonorgestrel	*Miranova*	*coated tablet*	*0.02 mg + 0.1 mg*	*21*	*15.26*	*r*
ethinylestradiol + levonorgestrel	*Neovlar*	*coated tablet*	*0.05 mg + 0.25 mg*	*21*	*5.3*	*r*
ethinylestradiol + levonorgestrel	*Triquilar*	*coated tablet*	*0.03 mg + 0.05 mg (A) 0.04 mg + 0.075 mg (B) 0.03 mg + 0.125 mg (C)*	*21*	*7.25*	*r*
ethinylestradiol + norethisterone acetate	*Primosiston*	*tablet*	*0.01 mg + 2 mg*	*30*	*8.03*	*r*
fludarabine phosphate	*Fludara*	*coated tablet*	*10 mg*	*15*	*2675.63*	*i*
fludarabine phosphate	*Fludara*	*liofilized powder for injection*	*50 mg*	*5*	*4619.82*	*r*
fluocortolone pivalate + lidocaine hydrochloride	*Ultraproct LDO*	*rectal cream + applicator*	*1 mg /g + 20 mg/g; 30 g*	*1*	*25.93*	*i*
fluocortolone pivalate + lidocaine hydrochloride	Ultraproct LDO	rectal suppositore	1 mg + 40 mg	10	*16.14*	i
gadobutrol	*Gadovist*	*vial with injectable solution*	*604.72 mg/mL; 15 mL*	*1*	*400.48*	*r*
hydrocortisone acetate	*Berlison*	*cream*	*10 mg/g; 15 g*	*1*	*10.14*	*r+e*
hydrocortisone acetate	*Berlison*	*cream*	*10 mg/g; 30 g*	*1*	*18.22*	*r+e*

Generic name	Brand name Bayer	Dosage form	Strength	Units per package	Price in R$ (Manufacturer price)	Classification
hydrocortisone acetate	Berlison	ointment	10 mg/g; 15 g	1	10.14	r+e
hydrocortisone acetate	Berlison	ointment	10 mg/g; 30 g	1	18.22	r+e
imiquimod	Aldara	cream	50 mg/g ; 0.25 g	12	711.85	r
interferon beta-1b	Betaferon	vial with liofilized powder for injection + diluent + syringe	9.6 MU	15	6097.85	r
iopromide	Ultravist	vial with injectable solution	623.4 mg/mL; 20 mL	10	579.59	r
iopromide	Ultravist	vial with injectable solution	623.4 mg/mL; 50 mL	10	1448.98	r
iopromide	Ultravist	vial with injectable solution	623.4 mg/mL; 100 mL	10	2897.99	r
iopromide	Ultravist	vial with injectable solution	623.4 mg/mL; 200 mL	10	5795.97	r
iopromide	Ultravist	vial with injectable solution	623.4 mg/mL; 500 mL	1	1445.93	r
iopromide	Ultravist	vial with injectable solution	768.86 mg/mL; 50 mL	10	1787.1	r
iopromide	Ultravist	vial with injectable solution	768.86 mg/mL; 100 mL	10	3574.19	r
iopromide	Ultravist	vial with injectable solution	768.86 mg/mL; 200 mL	10	7147.87	r
isoconazole nitrate	Gyno-Icaden	vaginal cream + 7 applicators	10 mg/g; 40 g	1	43.31	i
isoconazole nitrate	Gyno-Icaden	vaginal suppositore	600 mg	1	49.13	i
isoconazole nitrate	Icaden	cream	10 mg/g; 20 g	1	21.84	i
isoconazole nitrate	Icaden	topical solution	10 mg/mL; 30 mL	1	30.7	i
isoconazole nitrate	Icaden	topical solution spray	10 mg/mL; 60 mL	1	57.14	i
levonorgestrel	Mirena	intrauterine system	52 mg	1	828.18	r
meglumine amidotrizoate + sodium amidotrizoate	Urografina	vial injectable solution	600 mg/mL; 50 mL	1	40.21	r
meglumine amidotrizoate + sodium amidotrizoate	Urografina	vial injectable solution	600 mg/mL; 100 mL	1	76.85	r
mesterolone	Proviron	coated tablet	25 mg	20	21.67	i
methylprednisolone aceponate	Advantan	cream	1 mg/g; 15 g	1	36.47	r
methylprednisolone aceponate	Advantan	lotion	1 mg/g; 20 g	1	46.73	r
methylprednisolone aceponate	Advantan	topical solution	1 mg/mL; 20 mL	1	49.97	r
moxifloxacin hydrochloride	Avalox	coated tablet	400 mg	5	120.17	r+e
moxifloxacin hydrochloride	Avalox	coated tablet	400 mg	7	152.05	r+e
moxifloxacin hydrochloride	Promira	coated tablet	400 mg	5	120.17	r+e
moxifloxacin hydrochloride	Promira	coated tablet	400 mg	7	152.05	r+e
moxifloxacin hydrochloride	Avalox	plastic bag	1.6 mg/mL; 250 mL	1	167.37	r
naproxen	Naprosyn	tablet	250 mg	15	10.18	r
naproxen	Naprosyn	tablet	500 mg	20	23.15	r
naproxen (sodium)	Flanax	coated tablet	275 mg	20	22.87	r
naproxen (sodium)	Flanax	coated tablet	550 mg	10	21.78	r
naproxen (sodium)	Flanax Junior	powder oral suspension	25 mg/mL; 100 mL	1	18.08	r
nifedipine	Adalat	soft capsule	10 mg	60	25.89	r+e
nifedipine	Adalat Oros	coated tablet	20 mg	15	51.18	r
nifedipine	Adalat Oros	coated tablet	20 mg	30	102.36	r
nifedipine	Adalat Oros	coated tablet	30 mg	15	62.53	r
nifedipine	Adalat Oros	coated tablet	30 mg	30	125.05	r
nifedipine	Adalat Oros	coated tablet	60 mg	15	92.1	r
nifedipine	Adalat Oros	coated tablet	60 mg	30	184.2	r
nifedipine	Adalat Retard	coated tablet	10 mg	30	17.98	r

Generic name	Brand name Bayer	Dosage form	Strength	Units per pak-kage	Price in R$ *(Manu-facturer price)*	Classi-fication
nifedipine	*Adalat Retard*	*coated tablet*	*20 mg*	*30*	*26.64*	*r*
nimodipine	*Nimotop*	*coated tablet*	*30 mg*	*30*	*98.06*	*i*
norethisterone acetate	*Primolut-Nor*	*tablet*	*10 mg*	*30*	*15.55*	*i*
oxiconazole nitrate	*Oceral*	*cream*	*10 mg/g; 20 g*	*1*	*18.65*	*i*
oxiconazole nitrate	*Oceral*	*topical solution*	*10 mg/mL; 20 mL*	*1*	*19.4*	*i*
paracetamol + propyphenazone + caffeine	*Saridon*	*tablet*	*250 mg + 150 mg + 50 mg*	*20*	*12.38*	*i*
paracetamol + propyphenazone + caffeine	*Saridon*	*tablet*	*250 mg + 150 mg + 50 mg*	*100*	*63.7*	*i*
paracetamol + propyphenazone + caffeine	*Saridon*	*tablet*	*250 mg + 150 mg + 50 mg*	*400*	*254.81*	*i*
retinol	*Arovit*	*tablet*	*50000 IU*	*30*	*6.04*	*r+e*
retinol	*Arovit*	*ampoule injectable solution*	*300.000 IU/mL; 1 mL*	*25*	*34.08*	*r*
retinol	*Arovit*	*oral solution drops*	*150.000 IU/mL; 20 mL*	*1*	*6.62*	*r+e*
retinol + colecalciferol + tocopherol acetate + ascorbic acid + thiamine + riboflavin + nicotinamide + pyridoxine hydrochloride + folic acid + cyanocoba-lamin + iron + zinc + calcium	*Natele*	*capsule*		*28*	*36.8*	*i*
retinol palmitate + thiamine hydrochlo-ride + riboflavin phosphate sodium + ni-cotinamide + dexpanthenol + pyridoxi-ne hydrochloride + biotin + ascorbic acid + ergocalciferol + tocopherol acetate	*Protovit Plus*	*oral solution*	*20 mL*	*1*	*5.9*	*i*
retinol palmitate + thiamine + riboflavin + nicotinamide + calcium pantothenate + pyridoxine hydrochloride + D-biotin + folic acid + cyanocobalamin + ascorbic acid + colecalciferol + alphatocopherol acetate + phytomenadione + calcium + chrome + copper + fluoride + iodine + iron + magnesium + manganese + molybdenum + phosphorus + selenium + zinc	*Supradyn*	*eferv tablet*		*10*	*27.5*	*i*
retinol palmitate + thiamine + riboflavin + nicotinamide + calcium pantothenate + pyridoxine hydrochloride + D-biotin + folic acid + cyanocobalamin + ascorbic acid + colecalciferol + alphatocopherol acetate + phytomenadione + calcium + chrome + copper + fluoride + iodine + iron + magnesium + manganese + molybdenum + phosphorus + selenium + zinc	*Supradyn*	*coated tablet*		*30*	*39.35*	*i*
retinol palmitate + thiamine + riboflavin + nicotinamide + calcium pantothenate + pyridoxine hydrochloride + D-biotin + folic acid + cyanocobalamin + ascorbic acid + colecalciferol + alphatocopherol acetate + phytomenadione + calcium + chrome + copper + fluoride + iodine + iron + magnesium + manganese + molybdenum + phosphorus + selenium + zinc	*Supradyn Pré Natal*	*coated tablet*		*30*	*52.14*	*i*
rivaroxaban	*Xarelto*	*coated tablet*	*10 mg*	*10*	*235.41*	*r*
rivaroxaban	*Xarelto*	*coated tablet*	*10 mg*	*30*	*706.25*	*r*
sodium clodronate	Bonefós	capsule	400 mg	30	*401.89*	r
sodium clodronate	*Bonefós*	*ampoule injectable solution*	*60 mg/mL; 5 mL*	*5*	*517.7*	*r*
sodium clodronate	*Bonefós*	*ampoule injectable solution*	*60 mg/mL; 25 mL*	*1*	*517.7*	*r*
sorafenib tosylate	*Nexavar*	*coated tablet*	*200 mg*	*60*	*6952.2*	*r*

Generic name	Brand name Bayer	Dosage form	Strength	Units per pak-kage	Price in R$ (Manu-facturer price)	Classi-fication
testosterone undecylate	Nebido	ampoule with injectab-le solution	250 mg/mL; 4 mL	1	460.44	r
thiamine	Benerva	coated tablet	300 mg	30	19.18	r+e
thiamine hydrochloride + riboflavin + nicotinamide + pantothenic acid + pyridoxine hydrochloride + biotin + folic acid + cyanocobalamine + ascorbic acid + calcium + magnesium + zinc	Beroccal Cálcio Magnésio e Zinco	eferv tablet		10	20.63	i
thiamine hydrochloride + riboflavin + nicotinamide + pantothenic acid + pyridoxine hydrochloride + biotin + folic acid + cyanocobalamine + ascorbic acid + calcium + magnesium + zinc	Beroccal Cálcio Magnésio e Zinco	coated tablet		30	34.57	i
thiamine mononitrate + riboflavin + nicotinamide + pyridoxine hydrochlori-de + calcium pantothenate	Beneroc	coated tablet		100	13.58	i
thiamine mononitrate + riboflavin + nicotinamide + pyridoxine hydrochlori-de + calcium pantothenate + cyanoco-balamin	Beneroc Complex	coated tablet		30	10.47	i
thiamine mononitrate + riboflavin + nicotinamide + pyridoxine hydrochlori-de + calcium pantothenate	Beneroc Junior	oral solution	20 mL	1	6.56	i
thiamine mononitrate + riboflavin + ni-cotinamide + pyridoxine hydrochloride + calcium pantothenate + cyanocobala-mine + ascorbic acid + retinol palmitate tocopherol acetate + calcium + ferrous fumarate + dibasic magnesium phos-phate + manganese + colecalciferol	Elevit	coated tablet		30	21.53	i
tocopherol	Ephynal	soft capsule	400 mg	30	28.83	i
vardenafil hydrochloride trihydrate	Levitra	coated tablet	5 mg	4	124.37	r
vardenafil hydrochloride trihydrate	Levitra	coated tablet	10 mg	1	40.48	r
vardenafil hydrochloride trihydrate	Levitra	coated tablet	10 mg	2	72.9	r
vardenafil hydrochloride trihydrate	Levitra	coated tablet	10 mg	4	138.38	r
vardenafil hydrochloride trihydrate	Levitra	coated tablet	20 mg	2	81.81	r
vardenafil hydrochloride trihydrate	Levitra	coated tablet	20 mg	4	163.59	r
vardenafil hydrochloride trihydrate	Levitra	coated tablet	20 mg	8	324.95	r
Vardenafil	Levitra	coated tablet	10 mg	4	138.38	r
Vardenafil	Levitra	coated tablet	20 mg	2	81.81	r
Vardenafil	Levitra	coated tablet	20 mg	4	163.59	r
Vardenafil	Levitra	coated tablet	20 mg	8	324.95	r

BUKO Pharma-Kampagne has carefully examined the business behaviour of Bayer HealtCare, Boehringer Ingelheim and Baxter in Brazil. Our conclusions: whereas Baxter's portfolio exclusively comprises rational drugs, the manufacturers Bayer and Boehringer Ingelheim sell quite a number of nonsensical preparations. Even the majority of the blockbusters declared inventive do not offer advantageous treatment for the patients. They are unaffordably expensive and waste scarce resources. The examined companies conduct a large number of research projects in Brazil. Those are focused on lucrative fields such as cardiovascular diseases, cancer and diabetes – diseases which are increasingly common in Brazil. For neglected diseases, which are also still common in Brazil, the companies don´t show much commitment.

With almost 53% of irrational drugs and roughly 10% of essential preparations, the family business Boehringer Ingelheim has a shockingly bad pharmaceutical portfolio. However, the company relinquish the strict enforcement of the patents granted on their Aids drugs. The important drug Nevirapine is thus available as a low-priced generic in Brazil. The company Bayer have 63% rational products in their portfolio and 20% essential drugs. The company's aggressive patent policy, however, blocks access to the inventive cancer drug Nexavar®. With exclusively rational products and among them 74% essential drugs, the company Baxter has the best quality pharmaceutical portfolio. Some of the drugs, however, do not have a generic alternative. Their price is high and the drugs cannot be obtained in the public sector – a heavy burden for patients.

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Pharma-Kampagne

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