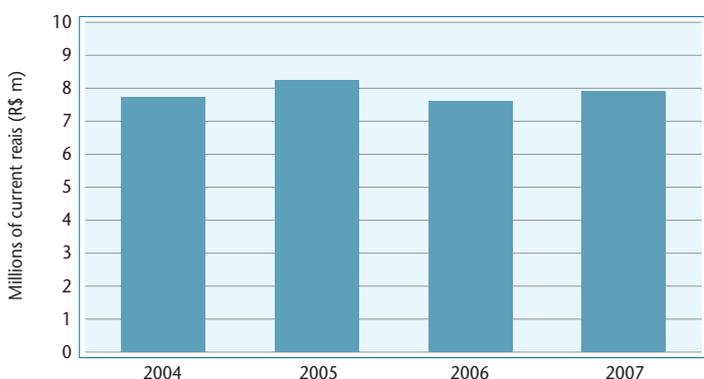


- The industrial health complex in Brazil, which includes the manufacturing of pharmaceutical drugs and medical and hospital equipment, displays low innovative intensity. According to PINTEC 2005, IBGE’s survey of technological innovation in industry, the main innovation activities of pharmaceutical companies and producers of medical instrumentation and hospital equipment were the acquisition of equipment for process improvement and the creation of new products and processes for companies but not for the domestic market.
- Even in this context, pharmaceutical companies located in São Paulo State invested 4.7 times more in innovation activities in 2005 than the rest of the Brazilian pharmaceutical industry combined.
- São Paulo State also accounts for a significant proportion of innovation expenditure by producers of medical and hospital equipment. Companies in this sector invested 1.4 times more in innovation activities in São Paulo State than in the rest of Brazil in 2005.
- The science base of the companies in the industrial health complex is very large, as can be seen from their links with universities and research institutions. According to PINTEC 2005, 57.4% of pharmaceutical companies (187 out of 326) and 73.7% of medical and hospital equipment producers (462 out of 627) that said they had innovated in the period 2003-05 considered universities and research institutions a major source of information.
- Investment in health research and development (R&D) is estimated to have totalled some R\$994 million in Brazil in 2007. The public sector invested R\$700 million, of which R\$147.2 million came from the Ministry of Health’s budget. Universities and research institutions were the main users of public-sector funding for health R&D in Brazil, receiving 55.5% of the total.
- Data on budget execution in São Paulo State show that the state programme of technological innovation and scientific development in health spent some R\$7.862 million in 2007.

São Paulo State: Budget execution – Health Function, Technological Innovation & Scientific Development Program, 2004-07



Source: São Paulo State Government (Budget Execution Report).

- São Paulo State accounts for 32% of CNPq grants for biological sciences on average, with the modality “Doctoral Retention” in the lead. The proportion in health sciences is 44%, with “Research Productivity” accounting for more than half.
- In the case of FAPESP, health sciences receive more investment than any other knowledge area, accounting for over 22%

of disbursements in the period 1999-2009, with a peak of 27.9% in 2009.

FAPESP: Disbursements – health sciences and total, 1999-2009

Year	Total	Health sciences	
	R\$ m (current)	R\$ m (current)	%
1999	517.6	106.7	20.6
2000	522.4	92.4	17.7
2001	577.8	113.9	19.7
2002	455.5	89.7	19.7
2003	354.8	69.0	19.5
2004	393.9	83.6	21.2
2005	481.7	108.1	22.4
2006	521.8	110.0	21.1
2007	549.6	134.8	24.5
2008	637.9	161.7	25.4
2009	679.5	189.6	27.9

Source: FAPESP, annual reports 1999-2009.

- Between 1999 and 2009, Fapesp invested almost R\$1.3 billion in research projects and grants in the area of health.
- With regard to scientific output measured in terms of ISI-indexed publications in the area of health sciences, São Paulo State exceeds all other regions of Brazil by a factor of 1.5-2.
- Besides the larger volume, scientific articles by authors in São Paulo State have a greater impact (measured by the number of citations per article) than articles by authors resident in other regions of Brazil.

São Paulo State & regions of Brazil: Scientific articles indexed by ISI in health area, numbers & and impact, 1995-2006

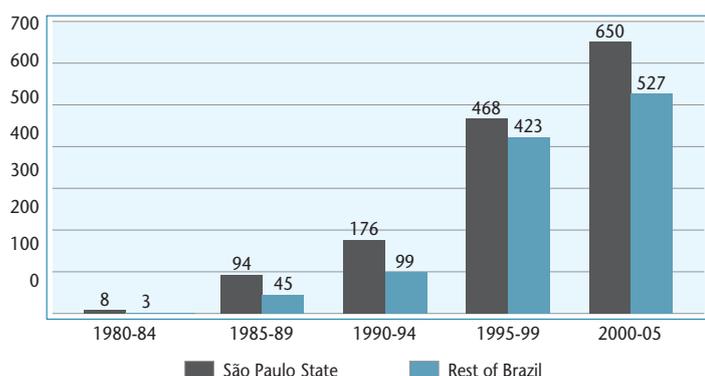
Geographic area	Articles in health sciences		% total articles	Citations per article
	No.	%		
São Paulo State	33,420	48.6	43.4	8.1
Southeast (except SP)	16,571	24.1	36.1	7.7
Centre-West	2,530	3.7	33.5	6.3
North	1,212	1.8	32.2	6.7
Northeast	4,930	7.2	31.1	6.2
South	10,077	14.7	39.1	7.9

Note: ISI. Impact = number of citations per article (citations divided by articles).

Source: ISI

- The number of cancer-related articles with Brazilian participation totalled 1,090 in the period: 313 (28.7%) had at least one author from USP. The same applies to articles on AIDS (26.9%) and atherosclerosis (42.5%).
- Unifesp ranked second in scientific output in the health area, particularly with articles on diseases such as Alzheimer’s (16.1%) and asthma (15.6%).
- Unicamp ranked third, with a particularly large share of articles on oncology (9.5%). Other leading institutions on this measure were Unesp, Instituto Adolfo Lutz, Instituto de Infectologia Emilio Ribas, Hospital A. C. Camargo and Instituto Pasteur.
- São Paulo State’s share of INPI patent applications in health is also significant. In the period 2000-05 alone, residents of the state accounted for 55% of such filings (among those for which information on the applicant’s state was available).

São Paulo State & rest of Brazil: INPI patent grants in health, 1980-2005



Source: INPI

- With regard to the education and training of researchers in the health area, it is worth noting that 14.4% of all master's degrees and 18.5% of all doctoral degrees awarded by post-graduate programmes recognised by CAPES were in this knowledge area.
- In CAPES's assessments of the main post-graduate programmes in Brazil in the area of health (Medicine I, Medicine II, Medicine III, and Collective Health), six out seven programmes rated 7 (the highest score) are located in São Paulo State, as are 11 of the 19 programmes rated 6.
- According to statistics from the Annual Employee Register (RAIS) produced by the Ministry of Labour & Employment (MTE), the numbers of master's and doctoral degree holders employed in the industrial health complex increased significantly in the period 2006-08, although they remained modest by international standards.
- This growth occurred mainly in São Paulo State, where the largest proportion of the jobs in question are located. In pharmaceuticals, for example, 87% of masters and 80% of doctors employed by companies in the health complex worked in São Paulo State.

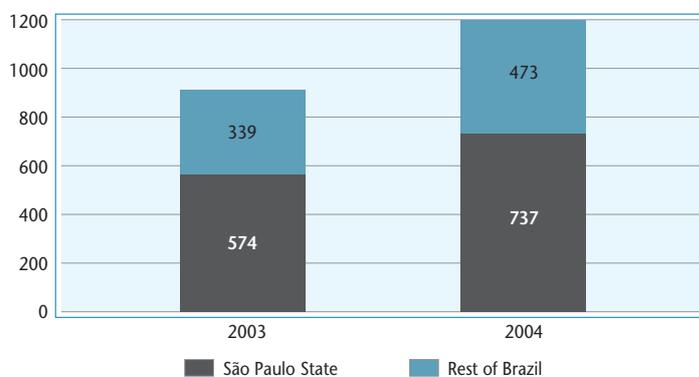
São Paulo State & rest of Brazil: masters & doctors employed in the industrial health complex, 2006-08

Year	Doctors		Masters	
	SP	Rest of Brazil	SP	Rest of Brazil
Pharmaceuticals				
2006	102	20	98	31
2007	123	29	111	23
2008	183	45	192	27
Medical & hospital equipment				
2006	6	1	32	8
2007	9	1	39	14
2008	16	0	74	7

Source: MTE, RAIS.

- Another salient feature of the human resource situation is that a significant proportion of the R&D workforce in the industrial health complex is located in São Paulo State. In 2005, the state accounted for 61% of R&D jobs in the sector.

São Paulo State & rest of Brazil: R&D jobs in the industrial health complex, 2003-05



Source: IBGE, PINTEC 2005.