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## BACKGROUND

High drug prices for antineoplastic medicines are an obstacle for access to appropriate cancer care in many countries. The worldwide cost of oncology drugs, including those for palliative care, reached \$ 107 billion, an increase of 11.5 percent over 2014. New targeted therapies and those of biotechnology origin are pointed out as one of the main causes for the increase of these costs in the world<sup>2,3,4</sup>. Specifically in relation to Brazil, the report of the Federal Audit Court (TCU)<sup>5</sup> pointed out that, in 2010, 74.1% of cancer treatment costs in Unified Health System (SUS) were related to chemotherapy. The National Cancer Institute José Alencar Gomes da Silva (INCA), a reference body of the Ministry of Health (MOH) in cancer care and the main stakeholder in the structuring and implementation of the National Cancer Prevention and Control Policy in the country, stands out as an important buyer of technologies in the Brazilian market. This study analysed the antineoplastic drugs with the greatest financial impact for the institution, in terms of their expenditures, incorporation processes and prices practiced by INCA between the years 2007 and 2014.

## METHODS

Medicines purchases data from January/2007 to December/2014 were extracted from the federal government procurement system (SIASG). We analyzed the number of purchases, quantities purchased, prices practiced and related expenses. Drugs purchased were categorized according to the Anatomical Therapeutic Chemical Classification available on the WHO Collaborating Center for Drug Statistics Methodology website. The antineoplastic drugs with the greatest financial impact were identified from a cut off point of 50% of the expenses contracted annually. Prices were restated by the Brazilian Pricing Index (IPCA / IBGE) for December 2014 and the values were converted to US dollars by the purchasing power parity (PPP) reported by the World Bank for 2014 (1 US\$ = R\$ 1.69). For drugs with more than one purchase per year, weighted average unit prices (WAUP) were estimated. Analysis of trends of historical behavior of the prices practiced were performed by the method of least squares. All analyzes were conducted using Microsoft Excel software.

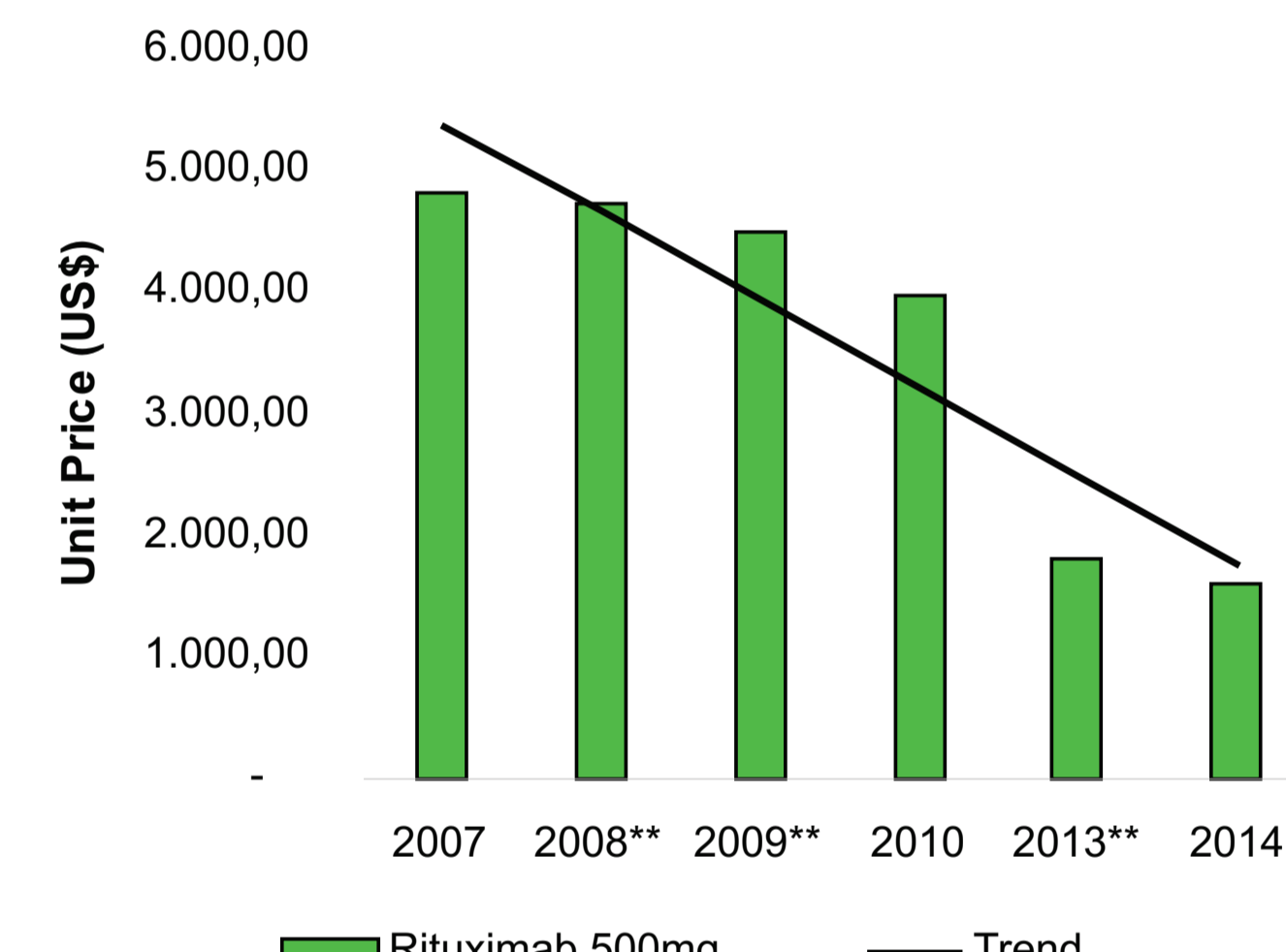
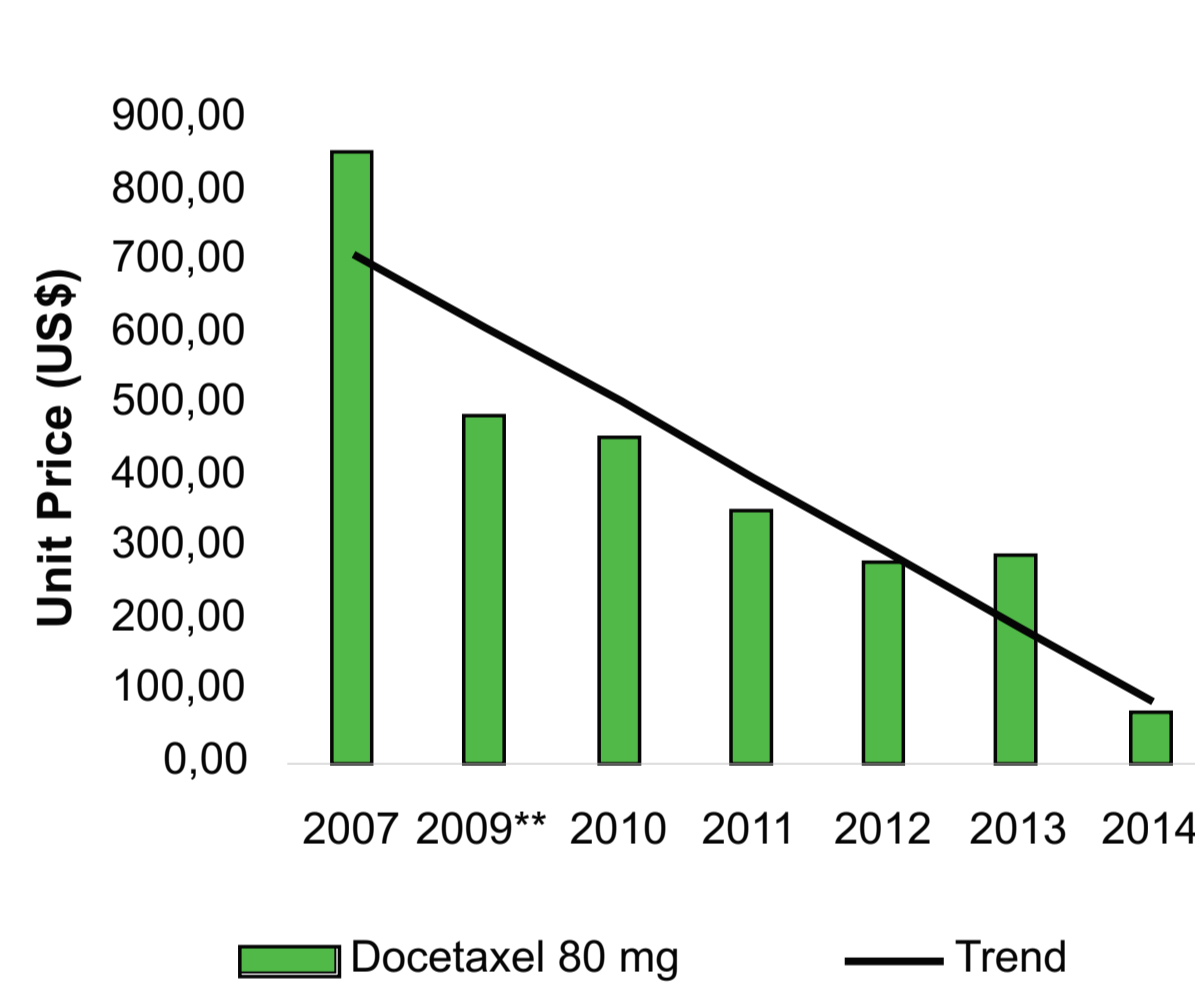
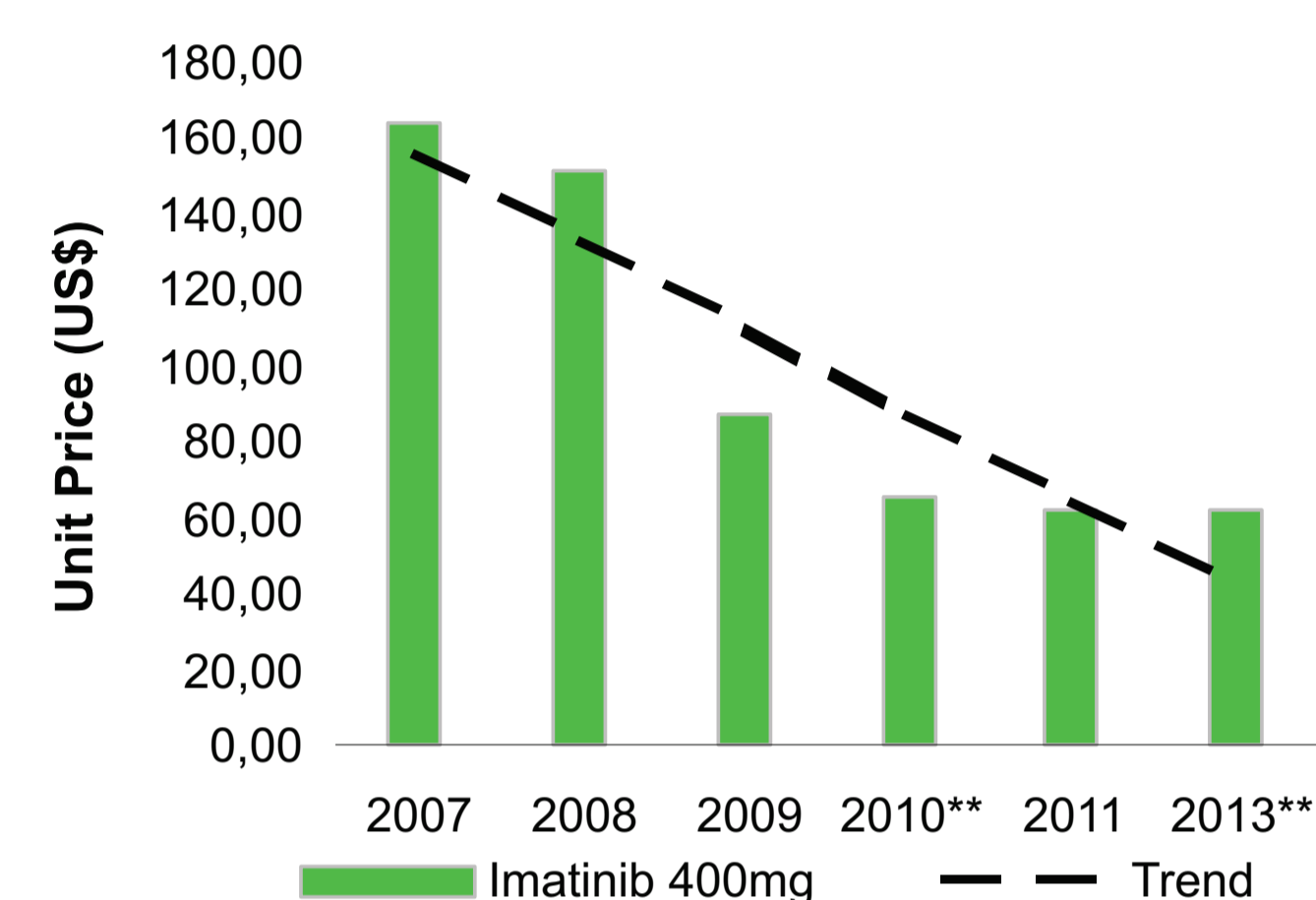
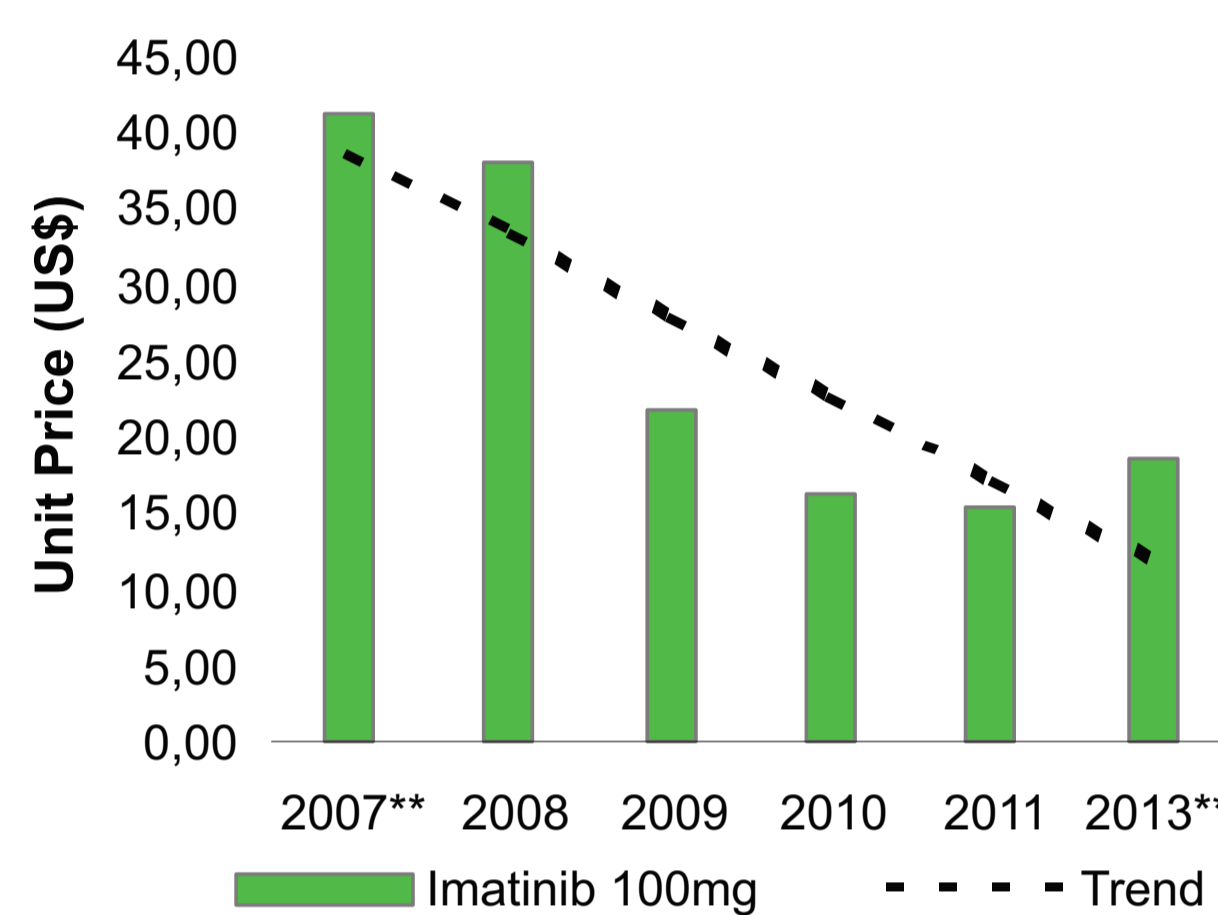
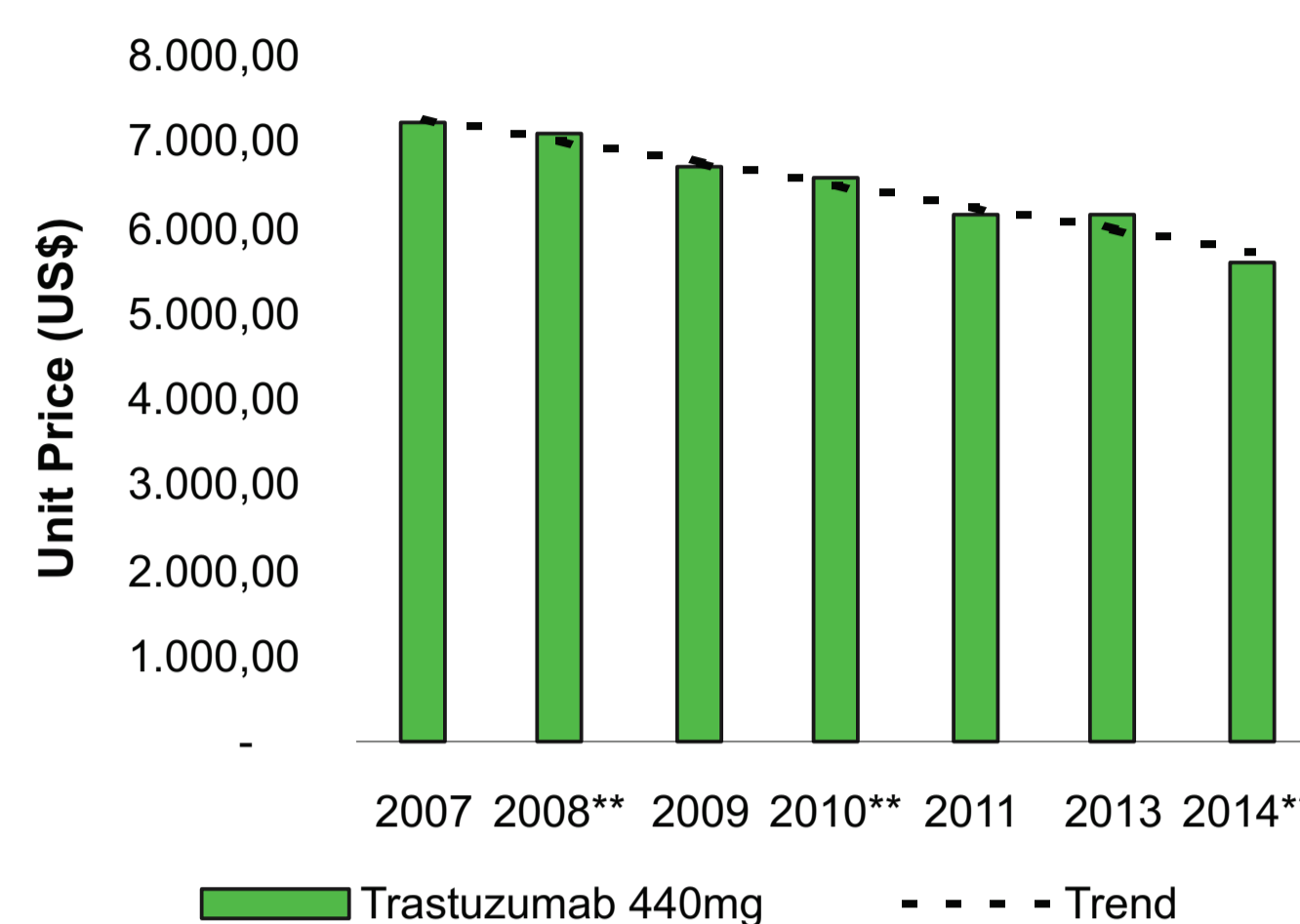
## RESULTS

INCA spent US\$ 545,665,500.30 between 2007 and 2014 on medication purchases, highlighting sixteen antineoplastic drugs with greater financial impact (Table 1). Trastuzumab 440mg vial (L01XC03) was the first expense item, surpassing US\$ 73 million contracted (13.4% of the total in the period). Imatinib mesylate 100mg and 400mg (L01XE01) with 8.8% of the total, was the first item of purchase in the first two years. The docetaxel 80mg vial (L01CD02) appeared as the third item with 3.4%, followed by the rituximab 500mg vial (L01XC02) with 3.2% of the total. These five drugs totaled US\$ 157 million in tender purchases, and suppliers were patent holders for much of the study period. Despite the trend of reduction in their purchase prices (Figure 1), discounts were observed only in the proximity of the expiration of patents or after price negotiation with the MOH for inclusion in SUS's clinical protocols. In the case of trastuzumab, for example, INCA did not benefit from the negotiated price reduction for the incorporation of this antineoplastic in SUS in 2012. On the other hand, INCA obtained a price reduction for imatinib before its first centralized purchase by the MOH in 2011, as well as for rituximab, when it was included in SUS' clinical protocol for the treatment of certain types of lymphomas in 2012 and 2013. Regarding docetaxel, significant price reduction was only observed with the purchase of generic manufactured in Argentina occurred in 2014.

**Table 1.** Antineoplastic agents of greater impact on medicine expenditures, by ATC, volume and proportion of expenses contracted (in US\$\*), INCA, 2007-2014

Antineoplastic agent	ATC	Volume (US\$)	Proportion of expenses contracted (%)
trastuzumab, 440 mg, vial	L01XC03	73,217,788.68	13.4
imatinib mesylate, 400 mg, tablet	L01XE01	30,980,503.56	5.7
docetaxel, 40 mg/mL, vial 2 mL	L01CD02	18,697,329.20	3.4
rituximab 10 mg/mL, vial 50 mL	L01XC02	17,540,620.50	3.2
imatinib mesylate, 100 mg, tablet	L01XE01	16,894,978.56	3.1
capecitabine, 500 mg, tablet	L01BC06	13,997,291.04	2.6
sunitinibe maleate, 50 mg, cap.	L01XE04	7,342,284.00	1.3
bortezomib, 3,5 mg, vial	L01XX32	5,706,120.99	1.0
bevacizumab, 25 mg/mL vial 16 mL	L01XC07	4,074,548.83	0.7
dasatinib, 50 mg, tablet	L01XE06	2,153,253.36	0.4
cetuximab, 5 mg/mL, vial 20mL	L01XC06	1,145,909.78	0.2
decitabine, 50 mg, vial	L01BC08	1,057,528.40	0.2
vinorelbine tartrate, 30 mg, cap.	L01CA04	818,797.41	0.2
carboplatin, 450 mg, vial	L01XA02	564,579.33	0.1
vinorelbine tartrate, 20 mg, cap.	L01CA04	427,802.93	0.1
anastrozol, 1 mg, tablet	L02BG03	388,148.29	0.1
<b>Total contracted between 2007-2014 (US\$)</b>		<b>545,663,500.30</b>	<b>100.0</b>

Legend: ATC — Anatomical Therapeutic Chemical Classification; cap. — capsule; mg — milligram; mL — millilitre.  
Note: \* — Values were converted to US dollars by the purchasing power parity (PPP) reported by the World Bank for 2014.



Notes: \* — Values were converted to US dollars by the purchasing power parity (PPP) reported by the World Bank for 2014. \*\* — Weighted average unit prices (WAUP) were estimated for more than one purchase per year.

**Figure 1.** Evolution of trastuzumab 440mg, imatinib mesylate 100mg and 400mg, docetaxel 80mg and rituximab 500mg prices (in US\$\*) and its trends, INCA, 2007-2014

## CONCLUSIONS

These findings allow a better understanding of the dynamics of the public market for pharmaceuticals in Brazil. Antineoplastic agents responsible for major financial impact on medicines expenditures should be the focus for price negotiations and price reduction strategies. Results have important consequences for public cancer medicines expenditures in Brazil, given the nationwide scope of the reference institution.

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