

## Active search about latex in injectable drugs for patient's safety in medical therapy

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### Abstract

**Objectives:** To classify injectable drugs used in a general hospital inventory according to latex presence or absence in vials with rubber stoppers, antibiotics, and electrolytes bags. **Methods:** The information about latex content has been collected from medicine industries, after identification of authorized manufacturers in Brazil, through the National Health Surveillance Agency (ANVISA) medicine search database. Medicines have been grouped per pharmaceutical manufacturers, and data were collected through telephone or e-mail. Only written information from pharmaceutical companies were considered. **Results:** Among 161 medicines used in the hospital packaged in vials with rubber stoppers, antibiotics, and electrolytes bags, 123 (76.4%) medicine-related responses were received, covering 540 (82.2%) different presentations. For this, from 87 contacts, 70 (80.5%) companies responded and 65 (74.7%) provided information related to the presence or absence of the allergen. Among the medicine list, 8 (6.5%) were identified as containing latex (in 12 different presentations – 2.2%) and 101 medications (82.1%) in 507 presentations (93.9%) do not contain latex. The manufacturers responded that the medicine was latex-free, but could not confirm for raw materials (6 medicines – 4.9% - in 6 different presentations – 1.1%) and that they were unable to ensure there was no contact with latex during manipulation (4 medicines – 3.3% - in 8 different presentations – 1.5%). For 4 medicines (3.3%) in 7 different presentations (1.3%), the companies were inconclusive, as they could not confirm whether they were latex-free or not. **Conclusion:** Although latex is a known allergen, information about the presence of latex components in pharmaceutical packaging and package inserts needs improvement, since the active search identified 161 medicines packaged in vials with rubber stoppers, antibiotics, and electrolytes bags that failed to depict this information. The results of this survey endorse the importance of displaying this information on medicines label or packaging in order to ensure healthcare professionals easy access and prompt consultation.

**Keywords:** injectable medicines; latex rubber; patient safety; latex hypersensitivity; latex allergy; drug packaging.

## Busca ativa sobre a presen a de l tex em medicamentos injet veis para a seguran a do paciente na terapia medicamentosa

### Resumo

**Objetivos:** Classificar os medicamentos injet veis padronizados em um hospital geral do Rio de Janeiro, de acordo com a presen a ou aus ncia de l tex acondicionados em frascos de medicamentos, bolsas de antibi ticos e eletr litos. **M todos:** As informa  es sobre a presen a ou aus ncia de l tex nas embalagens dos medicamentos foram coletadas junto  s ind strias farmac uticas, ap s verifica  o dos fabricantes com registro ativo no Brasil, atrav s da plataforma de consulta a medicamentos da ANVISA. Os medicamentos foram agrupados por fabricantes e foi realizado contato pelos canais disponibilizados pelo fabricante para obter as informa  es necess rias. Foram consideradas v lidas apenas informa  es recebidas por escrito. **Resultados:** Dentre os 161 medicamentos padronizados acondicionados em frascos, bolsas de antibi ticos e eletr litos, foram recebidas respostas relacionadas a 123 medicamentos (76,4%), em 540 diferentes apresenta  es (82,2%). Das 87 empresas contatadas, 70 (80,5%) responderam aos pesquisadores e 65 (74,7%) disponibilizaram as informa  es relacionadas a presen a ou aus ncia do al rgeno. Dentre a lista de medicamentos, 8 (6,5%) cont m l tex (em 12 diferentes apresenta  es – 2,2%) e 101 (82,1%) n o cont m l tex (em 507 diferentes apresenta  es- 93,9%). Foram obtidas respostas onde o fabricante afirmou que o medicamento n o continha l tex, por m n o poderia confirmar que suas mat rias-primas estavam livres do al rgeno (6 medicamentos – 4,9% - em 6 diferentes apresenta  es – 1,1%) e que n o garantiam que durante a manipula  o do medicamento n o poderia haver o contato com l tex (4 medicamentos – 3,3% - em 8 diferentes apresenta  es – 1,5%). Em 4 medicamentos (3,3%), em 7 apresenta  es diferentes (1,3%), a resposta das empresas foi inconclusiva, onde n o poderiam confirmar nem a aus ncia nem a presen a de l tex. **Conclus o:** Embora o l tex seja um al rgeno conhecido, as informa  es sobre a exist ncia ou n o do l tex nas informa  es dos fabricantes de produtos farmac uticos carece de melhora na qualidade da informa  o, uma vez que nossa busca ativa identificou 161 medicamentos acondicionados em frascos, bolsas de antibi ticos e eletr litos que n o apresentavam estas informa  es de maneira sistematizada. Os resultados desse levantamento refor am a import ncia dessa informa  o estar contida na bula ou embalagem dos medicamentos, de maneira a garantir acesso facilitado e para r pida consulta por parte das equipes de sa de.

**Palavras-chave:** medicamentos injet veis; borracha de l tex; seguran a do paciente; sensibilidade ao l tex; alergia ao l tex; embalagem de medicamentos.



## Introduction

Latex is an important raw material utilized worldwide as a component of many medical devices as gloves, condoms, packages, vials, and stoppers. Extracted from the tree *Hevea brasiliensis*, latex is a milky fluid consisting of nucleotides, proteins, lipids, and polypeptides. Among the polypeptides identified so far, 56 are allergenic and may cause sensitivity and/or allergy in patients. The sensitivity process may develop after repeated exposure periods from six months to 15 years.<sup>1-4</sup> Latex reactions can occur as dermatitis and urticaria, possibly leading to life-threatening allergic reactions.<sup>5,6</sup>

Data about allergy and allergen sensitivity are scarce, few studies address reactions in health professionals and patients with special cases<sup>7,8</sup>. Furthermore, patients submitted to several surgical procedures and workers of the latex industry are examples of the sensitive risk group<sup>6,9</sup>. Latex sensitiveness affects from 1% to 6% of the population and from 8% to 12% of health professionals who expose themselves usually to allergen-containing materials.<sup>1,3</sup> Among anesthesiologists, the incidence of allergy is 12.5% to 15.8%.<sup>10</sup> In Brazil, Montalv o et al (2008) conducted a study in a general hospital, where the prevalence of professionals with latex allergy was 3.7%.<sup>11</sup> Gomes et al (2012) showed that 22.4% of dental, medical and nursing students from a Federal University were sensitive to latex.<sup>3</sup> At a teaching hospital, the latex allergy rate was 1.02% among health professionals.<sup>12</sup>

The most susceptible patients who submit to surgical procedures and catheterization, if exposed to latex allergen, can develop allergic reactions. The prevalence of latex allergy in these patients is 7.2% and sensitiveness is 30.4%.<sup>1,3</sup> Yeh et al (2012), demonstrated a higher number of readmissions of Brazilians patients who suffer from myelomeningocele and latex allergy compared to others with the same pathology, but not allergic.<sup>13</sup> S  et al (2013), detected the prevalence of 25% of sensitization and 20% of allergy to latex in children and adolescents with myelomeningocele.<sup>14</sup> Garro et al (2017) observed sensitization in 33.2% and allergy in 12.2% of patients with neural tube defect.<sup>15</sup>

Since its creation in 2013, the National Patient Safety Program (PNSP) helps health professionals to prioritize the care to the patient with positive actions to improve its quality.<sup>16</sup> From the six PNSP goals, the third which addresses the safety improvement on the medical prescription and medication administration, also encompasses the management of allergies related to adverse drug reactions. Medications, inputs, and other substances which may induce allergies should be included in the medical chart and prescription to help the health team.<sup>17</sup>

The contamination of medicines and vaccines with latex traces is a reality that can cause risk to allergic patients.<sup>1,3</sup> The US Centers for Disease Control and Prevention within a world effort, endeavors to list the presence of allergens in vaccines. Surveys conducted in hospital pharmacies attempted to help and manage the active search for allergic patients.<sup>10,18</sup> Interdisciplinary action is required to prevent accidents with the allergen through routines adjustments, standardization, and easily accessible information for patient safety and improved care. Since 2013 in Brazil, product manufacturers are required by law to warn consumers about the presence of natural latex in their packaging.<sup>19</sup> ANVISA – Brazilian National Health Surveillance Agency, in College Board Resolution (RDC) number 26/2015, regulates the mandatory food labeling requirements mainly involved in allergies, including those which may contain latex.<sup>20</sup> However, there is no regulation for compliance with the Law on medicines.

It is challenging to keep an updated database of latex containing medications and inputs because different manufacturers have different primary packages for the same medication or traces of latex in their industrial facilities.<sup>7</sup> These are not easily accessible information as they are not included in the packages inserts or products packaging.<sup>21</sup> It is essential to elaborate a drug database for medication information, promoting the safety culture and preventing latex-related reactions in hospitals.

Thus, we aimed to identify and classify injectable drugs used in a general hospital according to the presence or absence of latex in rubber stoppers, antibiotics, and electrolytes.

## Methods

This is a retrospective, descriptive study of the identification process and classification of drugs packaged in vials with rubber stoppers, antibiotics, and electrolytes bags present in the hospital inventory regarding the presence or absence of latex carried out from August 2019 to September 2020. The study was developed by resident pharmacists and their Pharmacy preceptors at the Hospital Federal dos Servidores do Estado (HFSE), a general hospital from Rio de Janeiro, Brazil.

Standard drugs used in HFSE, packed in vials or plastic bags were the study base. We collected all the data provided by the pharmaceutical industry manufacturers. As there are various manufacturers because of the public bidding process, the active principles were searched at the ANVISA website where all the information about registered pharmaceutical manufacturers in Brazil is gathered.<sup>22</sup>

The drugs were grouped according to their respective pharmaceutical lab and the contact channel with these to obtain the required information, such as telephone and e-mail. Only written information were considered valid. We used Microsoft Excel<sup>®</sup> to tabulate all data collected according to the drug, presentation, manufacturer and presence or absence of latex in the package. Drugs were grouped alphabetically according to the Brazilian Common Denomination (DCB). The presence or absence of latex was classified as: 1) contains latex; 2) does not contain latex; 3) does not contain latex, but unable to ensure that during the manipulation no traces of the allergen are found; 4) does not contain latex, but unable to ensure whether raw materials contain the allergen; 5) does not contain latex, but unable to ensure whether allergen-free. During the analysis of our results, we excluded all drugs related to pharmaceutical manufacturers who did not reply to our requests and were unable to contact us.

The verification process for standard drugs at the HFSE, packaged in vials with rubber stoppers, antibiotics, and electrolytes bags, was carried out by five resident pharmacists and checked with the Pharmacy preceptors. The list of drugs was divided among the five residents, who searched ANVISA for their manufacturers. To ensure the reliability of the process, a pharmacist was responsible for sending all emails to pharmaceutical industries and distributors, in addition to compiling all the responses obtained. At the end of the compilation of the collected data, another pharmacist checked all the answers obtained through the emails received and crossed them with the results obtained, preventing errors or omissions from occurring at the end of the study.

The study was approved by the Institutional Review Board of HFSE (CAAE 41262620.7.0000.5252 on December 23<sup>th</sup> 2020).

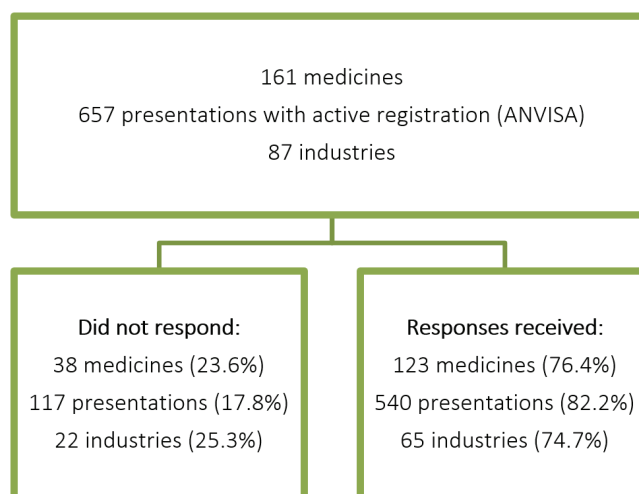


## Results

We identified 161 drugs packaged in vials with rubber stoppers, antibiotics, and electrolytes bags. After a survey at ANVISA website, 657 registered presentations of 87 different manufacturers were identified. Seventy (80.5%) manufacturers responded when contacted, 65 (74.7%) through e-mail containing latex-related responses. Information from 540 (82.2%) different presentations of 123 drugs (76.4%) used in the hospital have been received (Figures 1 and 2).

One hundred one drugs (82.1%) in 507 presentations (93.9%) do not contain latex. 8 drugs (6.5%) were detected in 12 presentations (2.2%) with latex. Four manufacturers providing 4 drugs (3.3%) in 8 different presentations (1.5%) reported their medications are latex-free. Nevertheless, they are unable to ensure that any latex traces can be found during the manipulation process. Three manufacturers distributing 6 drugs (4.9%) with 6 different presentations (1.1%) reported their medications are latex-free, they are not sure whether raw materials are allergen-free as well. Finally, three different manufacturers of 4 drugs (3.3%) in 7 different presentations (1.3%) affirmed their medications are latex-free, but also, are unable to ensure its absence (Figures 3 and 4).

**Figure 1.** The results obtained after an assessment of the information received from pharmaceutical manufacturers of standard drugs used in the hospital.



**Figure 2:** Information about the presence of latex in standard injectable drugs.

Drugs	Presentation	Manufacturer	Does it contain latex?
Acyclovir	Zynvir 250 mg F/A	Novafarma	No
	Acyclovir 250 mg F/A	Teuto	No
	Ezopen 250 mg F/A	Teuto	No
	Acyclovir 250 mg F/A	Uni�o Qu�mica	No
	Uni-vir 250 mg F/A	Uni�o Qu�mica	No
Alanylglutamine	Dipeptiven 20% F/A 100 mL	Fresenius Kabi	No
	Alaglu 20% F/A 100 mL	Inpharma	No
Alfaepoetin	Alfaepoetin 4.000 UI F/A 1 mL	Blau	No
Alprostadil	Alprostadil 20 mcg F/A	Flukka	No
Alteplase	Actilyse 10 mg F/A	Boehringer Ingelheim	Yes
	Actilyse 50 mg F/A	Boehringer Ingelheim	Yes
Amoxicillin + clavulanate	Amoxicillin + clavulanate 1 g + 200 mg F/A	Aurobindo	No
	Amoxicillin + clavulanate 1 g + 200 mg F/A	Blau	No
	Amoxicillin + clavulanate 1 g + 200 mg F/A	Eurofarma	No, but unable to ensure raw materials are latex-free
	Amoxicillin + clavulanate 1 g + 200 mg F/A	Teuto	No
Amphotericin B	Anphotericin B 50 mg F/A	Crist�lia	No
Amphotericin B lipid compound	Abelcet 5 mg/mL F/A 20 mL	Teva	No
Amphotericin B liposomal	Ambisome 5 mg/mL F/A 10 mL	United Medical	No
Ampicillin	Ampicillin 1 g F/A	Aurobindo	No
	Cilidon 1 g F/A	Blau	No
	Amplatil 1 g F/A	Novafarma	No
	Ampicillin 1 g F/A	Teuto	No
	Teuplafec 1 g F/A	Teuto	No
Ampicillin + sulbactam	Ampicillin + sulbactam 2 g + 1 g F/A	Aurobindo	No
	Ampicillin + sulbactam 2 g + 1 g F/A	Eurofarma	No
	Ampicillin + sulbactam 1 g + 500 mg F/A	Eurofarma	No
	Ampicillin + sulbactam 2 g + 1 g F/A	Novafarma	No
Anti-Rho (D) immunoglobulin	KamRho-D 300 mcg F/A 2 mL	Panamerican Medical Supply	Yes
Azacitidine	Winduza 100 mg F/A	Dr Reddy's	No
	Azacitidine 100 mg F/A	Dr Reddy's	No
Azithromycin	Azithromycin 500 mg F/A	Crist�lia	No
	Azicin 500 mg F/A	Crist�lia	No
	Astro IV 500 mg F/A	Eurofarma	No

**Figure 2:** Information about the presence of latex in standard injectable drugs.

Drugs	Presentation	Manufacturer	Does it contain latex?
Benzathine benzylpenicillin	Benzetacil 1.200.000 UI F/A	Eurofarma	No, but unable to ensure raw materials are latex-free
	Benzathine benzylpenicillin 1.200.000 UI F/A	Teuto	No
Benzylpenicillin procaine	Penkaron 400.000 UI F/A	Blau	No
	Wonilin 400.000 UI F/A	Novafarma	No
Bevacizumab	Avastin 25 mg/mL F/A 4 mL	Roche	No, but unable to ensure is latex-free
Bortezomib	Bortezomib 3.5 mg F/A	Accord	No
	Bortyz 3.5 mg F/A	Accord	No
	Mielocade 3,5 mg F/A	B�rgamo	No
	Bortezomib 3,5 mg F/A	B�rgamo	No
	Bortezomib 3,5 mg F/A	Dr Reddy's	No
	Bozored 3,5 mg F/A	Dr Reddy's	No
	Velcade 3,5 mg F/A	Janssen-Cilag	No
Botulinum toxin A	Botox 100 UI F/A	Allergan	No, but unable to ensure that during manipulation no latex traces are found
	Botulim 100 UI F/A	Blau	No
Bovine heparin	Heptar 5.000 UI/mL F/A 5 mL	Eurofarma	No
Bupivacaine	Neocaine 0.75% F/A 20 mL	Crist�lia	No
Bupivacaine	Neocaine 0.5% F/A 20 mL	Crist�lia	No
	Bupivacaine 0,5% F/A 20 mL	Hypofarma	No
	Bupstesic 0.5% F/A 20 mL	União Qu�mica	No
Bupivacaine with vasoconstrictor	Neocaine 0.5% F/A 20 mL	Crist�lia	No
Cabazitaxel	Cabazitaxel 60 mg F/A	Dr Reddy's	No
	Cabazred 60 mg F/A	Dr Reddy's	No
Cabazitaxel	Proazitax 60 mg F/A	Eurofarma	No
	Jevtana 60 mg F/A	Sanofi	No
Calcium folinate	Calcium folinate 10 mg F/A	Eurofarma	No
	Calcium folinate 50 mg F/A	Eurofarma	No
	Fauldleuco 50 mg F/A	Libbs	No
Carbacol	Ophtcol 0,1 mg/mL F/A 2 mL	Ophthalmos	No
Carboplatin	Carboplatin 150 mg F/A	Accord	No
	Carboplatin 450 mg	Accord	No
	B-platin 150 mg F/A	Blau	No
	B-platin 450 mg F/A	Blau	No
	Evocarb 150 mg F/A	Farmarin	No
	Evocarb 450 mg F/A	Farmarin	No
	Displata 150 mg F/A	Fresenius Kabi	No
	Displata 450 mg F/A	Fresenius Kabi	No
	Fauldcarbo 150 mg F/A	Libbs	No
	Fauldcarbo 450 mg F/A	Libbs	No
	Tevacarbo 150 mg F/A	Teva	No
	Tevacarbo 450 mg F/A	Teva	No
Caspofungin	Cancidas 50 mg F/A	MSD	No
Cefazolin	Cefazolin 1 g F/A	ABL	No
	Kefazol 1 g F/A	ABL	No
	Cefazolin 1 g F/A	Aurobindo	No
	Cezolin 1 g F/A	Instituto Biochimico	No
	Cefazolin 1 g F/A	Instituto Biochimico	No
	Fazolol 1 g F/A	Blau	No
	Fazolix 1 g F/A	Novafarma	No
	Cefazolin 1 g F/A	Novafarma	No
Cefazolin 1 g F/A	União Qu�mica	No	

**Figure 2:** Information about the presence of latex in standard injectable drugs.

Drugs	Presentation	Manufacturer	Does it contain latex?
Cefepime	Cefepime 1 g F/A	ABL	No
	Cefepime 2 g F/A	ABL	No
	Cefepime 1 g F/A	Aurobindo	No
	Cefepime 2 g F/A	Aurobindo	No
	Cemax 1 g F/A	Instituto Biochimico	No
	Cemax 2 g F/A	Instituto Biochimico	No
	Cefepime 1 g F/A	Instituto Biochimico	No
	Cefepime 2 g F/A	Instituto Biochimico	No
	Cefepime 1 g F/A	Novafarma	No
	Cefepime 2 g F/A	Novafarma	No
	Cefepime 2 g F/A	Teuto	No
	Clocef 1 g F/A	Teuto	No
	Clocef 2 g F/A	Teuto	No
	Unifepim 1 g F/A	Uni�o Qu�mica	No
	Unifepim 2 g F/A	Uni�o Qu�mica	No
Ceftazidime	Kefadim 1 g F/A	ABL	No
	Ceftazidime 1 g F/A	Instituto Biochimico	No
	Cefazima 1 g F/A	Instituto Biochimico	No
	Ceftazidon 1 g F/A	Blau	No
	Ceftafor 1 g F/A	Novafarma	No
Ceftriaxone	Ceftriaxone 1 g F/A	ABL	No
	Keftron 1 g F/A	ABL	No
	Ceftriaxone 1 g F/A	Blau	No
	Triaxton 1 g F/A	Blau	No
	Ceftriona 1 g F/A	Novafarma	No
	Ceftriaxone 1 g F/A	Novafarma	No
	Rocefin 1 g F/A	Roche	No, but unable to ensure is latex-free
	Teucef 1 g F/A	Teuto	No
Cefuroxime	Keroxime 750 mg F/A	ABL	No
	Cefuroxime 750 mg F/A	Aurobindo	No
	Cefuroxime 750 mg F/A	Instituto Biochimico	No
	Monocef 750 mg F/A	Instituto Biochimico	No
Cetuximab	Erbix 5 mg/mL F/A 20 mL	Merck	No
Ciprofloxacin	Ciprofloxacin 2% bag 100 mL	Fresenius Kabi	No
	Ciprofloxacin 2% bag 200 mL	Fresenius Kabi	No
	Fresoflox 2% bag 100 mL	Fresenius Kabi	No
	Fresoflox 2% bag 200 mL	Fresenius Kabi	No
	Ciprofloxacin 2 mg/mL bag 100 mL	Isofarma/ Halex Istar	No
	Ciprofloxacin 2 mg/mL bag 200 mL	Isofarma/ Halex Istar	No
	Hifloxan 2 mg/mL bag 100 mL	Isofarma/ Halex Istar	No
	Hifloxan 2 mg/mL bag 200 mL	Isofarma/ Halex Istar	No
	Hypoflox 2% bag 100 mL	Hypofarma	No
Cisplatin	Citoplax 50 mg F/A	B�rgamo	No
	Citoplax 10 mg F/A	B�rgamo	No
	C-platin 10 mg F/A	Blau	No
	C-platin 50 mg F/A	Blau	No
	Fauldcispla 50 mg F/A	Libbs	No
	Fauldcispla 10 mg F/A	Libbs	No

**Figure 2:** Information about the presence of latex in standard injectable drugs.

Drugs	Presentation	Manufacturer	Does it contain latex?
Citarabine	Citarabine 100 mg F/A	Accord	No
	Citarabine 500 mg F/A	Accord	No
	Cytos 100 mg F/A	Accord	No
	Cytos 500 mg F/A	Accord	No
	Citarax 100 mg F/A	Blau	No
	Citarax 500 mg F/A	Blau	No
	Fauldcita 500 mg F/A	Libbs	No
	Leustatin 8 mg F/A	Janssen-Cilag	No
	Leustatin 10 mg F/A	Janssen-Cilag	No
Clarithromycin	Klaricid 500 mg F/A	Abbott	No
	Clarithromycin 500 mg F/A	Abbott	No
	Clarithromycin 500 mg F/A	ABL	No
	Clarithromycin 500 mg F/A	MR Pharma	No
Cloranfenicol	Arifenicol 1 g F/A	Blau	No
Cristalline penicillin	Aricilina 5.000.000 UI F/A	Blau	No
	Cristacilina 5.000.000 UI F/A	Novafarma	No
Dacarbazine	Dacarbazine 100 mg F/A	Bérgamo	No
	Dacarbazine 200 mg F/A	Bérgamo	No
	Dacarb 200 mg F/A	Eurofarma	No
	Evodazin 100 mg	Farmarin	No
	Evodazin 200 mg	Farmarin	No
	Asercit 200 mg F/A	Fresenius Kabi	No
	Asercit 100 mg F/A	Fresenius Kabi	No
	Fauldacar 200 mg F/A	Libbs	No
Daptomycin	Cubicin 500 mg F/A	MSD	No
Daunorrubicin	Evoclass 20 mg F/A	Farmarin	No
Dexmedetomidine	Dexmedetomidine 100 mcg/mL F/A 2 mL	Aurobindo	No
	Dexmedetomidine 100 mcg/mL F/A 2 mL	Eurofarma	No
	Dexmedetomidine 100 mcg/mL F/A 2 mL	União Química	No
	Extodin 100 mcg/mL F/A 2 mL	União Química	No
Dextroketa mine	Ketamin 50 mg/mL F/A 10 mL	Cristália	No
Docetaxel	Docetaxel 20 mg F/A	Sanofi	No
	Docetaxel 80 mg F/A	Sanofi	No
	Taxotere 20 mg F/A	Sanofi	No
	Taxotere 80 mg F/A	Sanofi	No
	Docetaxel 80 mg F/A	Glenmark	No
	Docetaxel 20 mg F/A	Glenmark	No
	Doceglennu 80 mg F/A	Glenmark	No
	Doceglennu 20 mg F/A	Glenmark	No
Ertapenem	Invanz 1 g F/A	MSD	No
Esmolol	Brevibloc 10 mg/mL F/A	Cristália	No
Etoposide	Eposide 20 mg/mL F/A 5 mL	Blau	No
Fibrinogen	Fibrinogen 1 g F/A	CSL Behring	No
Filgrastim	Filgrastim 300 mcg/mL F/A	Blau	No
	Filgrastim 300 mcg/mL F/A 1 mL	Blau	No
Fluconazole	Fresolcan 2 mg/mL bag 100 mL	Fresenius Kabi	No
	Fluconazole 2 mg/mL bag 250 mL	Fresenius Kabi	No
	Fluconazole 2 mg/mL bag 100 mL	Isofarma/ Halex Istar	No
	Hypoflucnazol 2 mg/mL F/A 100 mL	Hypofarma	No
Fludarabine	Evoflubine 50 mg F/A	Farmarin	No
	Fludalibbs 50 mg F/A	Libbs	No
Fluorescein	Fluorescein 20% F/A 5 mL	Citopharma	No

**Figure 2:** Information about the presence of latex in standard injectable drugs.

Drugs	Presentation	Manufacturer	Does it contain latex?
Fluoruracil	Flusan 50 mg/mL F/A 10 mL	Eurofarma	No
	Fauldfluor 50 mg/mL F/A 10 mL	Libbs	No
	Fauldfluor 50 mg/mL F/A 50 mL	Libbs	No
Ganciclovir	Cymevir 1 mg/mL bag 250 mL	Halex Istar	No
	Cymevir 1 mg/mL bag 500 mL	Halex Istar	No
Gencitabine	Gencitabine 1 g F/A	Blau	No
	Gencitabine 200 mg F/A	Blau	No
	Gemcired 1 g F/A	Dr Reddy's	No
	Gemcired 200 mg F/A	Dr Reddy's	No
	Cytogem 200 mg F/A	Dr Reddy's	No
	Gemzar 200 mg F/A	Eli Lilly	No
	Gemzar 1 g F/A	Eli Lilly	No
	Gencitabine 1 g F/A	Eurofarma	No
	Gencitabine 200 mg F/A	Eurofarma	No
	Evozar 1 g F/A	Farmarin	No
	Evozar 200 mg F/A	Farmarin	No
	Genlibbs 1 g F/A	Libbs	No
	Genlibbs 200 mg F/A	Libbs	No
	Gemcit 1 g F/A	Sandoz	Yes
Gemcit 200 mg F/A	Sandoz	Yes	
Glucose	Baxter glucose 100 mg/mL bag 250 mL	Baxter	No
	Baxter glucose 100 mg/mL bag 500 mL	Baxter	No
	Baxter glucose 50 mg/mL bag 250 mL	Baxter	No
	Baxter glucose 50 mg/mL bag 500 mL	Baxter	No
	Baxter glucose 50 mg/mL bag 100 mL	Baxter	No
	Glucose Beker 50 mg/mL bag 100 mL	Beker	No
	Glucose Beker 50 mg/mL bag 250 mL	Beker	No
	Glucose Beker 50 mg/mL bag 500 mL	Beker	No
	Glucose Beker 100 mg/mL bag 500 mL	Beker	No
	Glucose Beker 100 mg/mL bag 250 mL	Beker	No
	Glucose 50 mg/mL bag 100 mL	EquiPLEX	No
	Glucose 50 mg/mL bag 250 mL	EquiPLEX	No
	Glucose 50 mg/mL bag 500 mL	EquiPLEX	No
	Glucose 5% bag 100 mL	Farmace	No
	Glucose 5% bag 250 mL	Farmace	No
	Glucose 5% bag 500 mL	Farmace	No
	Glucose 5% bag 100 mL	Farmarin	No
	Glucose 5% bag 500 mL	Farmarin	No
	Glucose 100 mg/mL bag 500 mL	Fresenius Kabi	No
	Glucose 100 mg/mL bag 250 mL	Fresenius Kabi	No
	Glucose 50 mg/mL bag 100 mL	Fresenius Kabi	No
	Glucose 50 mg/mL bag 250 mL	Fresenius Kabi	No
	Glucose 50 mg/mL bag 500 mL	Fresenius Kabi	No
	Glucose 5% bag 100 mL	Halex Istar	No
	Glucose 10 % bag 100 mL	Halex Istar	No
	JP glucose 50 mg/mL bag 100 mL	JP Farma	No
	JP glucose 50 mg/mL bag 250 mL	JP Farma	No
	JP glucose 50 mg/mL bag 500 mL	JP Farma	No
	JP glucose 100 mg/mL bag 250 mL	JP Farma	No
	JP glucose 100 mg/mL bag 500 mL	JP Farma	No
Hepatitis B vaccine	Euvax 200 mcg HBcHG F/A 10 mL	Sanofi	No
	Hepatitis B vaccine	Serum Institute of India	No
Hidrocortisone	Hidrocortisone 100 mg F/A	Blau	No
	Hidrocortisone 500 mg F/A	Blau	No

**Figure 2:** Information about the presence of latex in standard injectable drugs.

Drugs	Presentation	Manufacturer	Does it contain latex?
Hidrocortisone	Ariscorten 100 mg F/A	Blau	No
	Ariscorten 500 mg F/A	Blau	No
	Hidrocortisone 100 mg F/A	Blau	No
	Hidrocortisone 500 mg F/A	Blau	No
	Gliocort 100 mg F/A	Novafarma	No
	Gliocort 500 mg F/A	Novafarma	No
	Androcortil 100 mg	Teuto	No
	Androcortil 500 mg	Teuto	No
Human albumin	Albiomin 20% F/A 50 mL	Biotest	No
	Albumax 20% F/A 50 mL	Blau	No
	Balbimax 20% F/A 50 mL	Blau	No
	Alburex 20% F/A 50 mL	CSL Behring	No
	Beribumin 20% F/A 50 mL	CSL Behring	No
	Human albumin 20% F/A 50 mL	Grifols	No
	Octalbin 20 % F/A 50 mL	Octapharma	No
Human immunoglobulin	Intratec 5 g F/A 100 mL	Biotest	No
	Intratec 2,5 g F/A 50 mL	Biotest	No
	Pentaglobin 5 g F/A 100 mL	Biotest	No
	Pentaglobin 2,5 g F/A 50 mL	Biotest	No
	Human immunoglobulin 5 g F/A	Blau	No
	Immunoglobulin 5 g F/A 100 mL	Blau	No
	Immunoglobulin 2,5 g F/A 50 mL	Blau	No
	Flebogamma 5 g F/A 100 mL	Grifols	No
	Flebogamma 2,5 g F/A 50 mL	Grifols	No
	Igvena 5 g F/A 100 mL	Kedrion	No
	Igvena 2,5 g F/A 50 mL	Kedrion	No
	Octagam 5 g F/A 100 mL	Octapharma	No
	Octagam 2,5 g F/A 50 mL	Octapharma	No
Human NPH insulin	Insunorm N 100 UI/mL F/A 10 mL	Aspen Pharma	No
	Humulin N 100 UI/mL F/A 10 mL	Eli Lilly	Yes
	Novolin N 100 UI/mL F/A 10 mL	Novo Nordisk	No
Hydroxyethylamide	Voluven 6% bag 500 mL	Fresenius Kabi	No
	Plasmin 6% bag 500 mL	Halex Istar	No
Idarubicin	Evomid 10 mg F/A	Farmarin	No
Ifosfamide	Ifosfamide 1 g F/A	Eurofarma	No
	Ifosfamide 2 g F/A	Eurofarma	No
	Ifosmide 1 g F/A	Eurofarma	No
	Evolox 1 g F/A	Farmarin	No
Imipenem + cilastatin	Imipenem + cilastatin 500 mg + 500 mg F/A	ABL	No
	Tiep�m 500 mg + 500 mg F/A	Instituto Biochimico	No
	Imipenem + cilastatin 500 mg + 500 mg F/A	Instituto Biochimico	No
Imipenem + cilastatin	Imipenem + cilastatin 500 mg + 500 mg F/A	Midfarma	No
	Tienan 500 mg + 500 mg F/A	MSD	Yes
Infliximab	Imicil 500 mg + 500 mg F/A	Uni�o Qu�mica	No
	Infliximab 10 mg/mL F/A	Bio-Manguinhos	No
	Remicade 10 mg/mL F/A 10 mL	Janssen-Cilag	No
Insulin glargine	Glargilin 100 UI/mL F/A 10 mL	Biommm	No
	Glargilin 100 UI/mL F/A 3 mL	Biommm	No
	Basaglar 100 UI/mL F/A 3 mL	Eli Lilly	Yes
	Basaglar 100 UI/mL F/A 10 mL	Eli Lilly	Yes
	Lantus 100 UI/mL F/A 10 mL	Sanofi	No, but unable to ensure that during manipulation no latex traces are found
	Lantus 100 UI/mL F/A 3 mL	Sanofi	No, but unable to ensure that during manipulation no latex traces are found



**Figure 2:** Information about the presence of latex in standard injectable drugs.

Drugs	Presentation	Manufacturer	Does it contain latex?
Insulin lispro	Humalog 100 UI/mL F/A 10 mL	Eli Lilly	Yes
	Humalog 100 UI/mL F/A 3 mL	Eli Lilly	Yes
Irinotecan	Proto-itecan 20 mg/mL F/A 2 mL	ABL	No
	Irinotecano 20 mg/mL F/A 5 mL	ABL	No
	Irinotecano 20 mg/mL F/A 5 mL	Accord	No
Irinotecan	Tecnotecan 20 mg/mL F/A 2 mL	Zodiac	No
	Tecnotecan 20 mg/mL F/A 5 mL	Zodiac	No
	Evoterin 20 mg/mL F/A 5 mL	Farmarin	No
	Irinotecano 20 mg/mL F/A 5 mL	Glenmark	No
Ketoprofen	Ketoprofen 100 mg F/A	Crist�lia	No
	Ketoprofen 100 mg F/A	Eurofarma	No
	Profenid 100 mg F/A	Sanofi	No
	Artrnid 100 mg F/A	Uni�o Qu�mica	No
Levosimendan	Simdax 2,5 mg F/A 5 mL	Biolab	No
Lidocaine	Lidocaine 2% F/A 20 mL	Hipolabor	No
	Lidocaine 2% F/A 20 mL	Hypofarma	No
Lidocaine with vasoconstrictor	Xylestesin 2% F/A 20 mL	Crist�lia	No
Lidocaine without vasoconstrictor	Xylestesin 2% F/A 20 mL	Crist�lia	No
Linezolid	Linezolid 2 mg/mL bag 300 mL	Beker	No
Medroxiprogesterone	Demedrox 150 mg/mL F/A 1 mL	Uni�o Qu�mica	No
Meropenem	Meropenem 500 mg F/A	ABL	No
	Meropenem 1 g F/A	ABL	No
	Meropenem 500 mg F/A	Aurobindo	No
	Meropenem 1 g F/A	Aurobindo	No
	Mepinox 500 mg F/A	Instituto Biochimico	No
	Mepinox 1 g F/A	Instituto Biochimico	No
	Meropenem 500 mg F/A	Instituto Biochimico	No
	Meropenem 1 g F/A	Instituto Biochimico	No
	Meropenem 2 g F/A	Instituto Biochimico	No
	Meromax 2 g F/A	Eurofarma	No
	Meropenem 1 g F/A	Eurofarma	No
	Meropenem 500 mg F/A	Eurofarma	No
	Meropenem 1 g F/A	Novafarma	No
	Meropenem 500 mg F/A	Novafarma	No
	Meropenem 500 mg F/A	Novafarma	No
	Meropenem 1 g F/A	Novafarma	No
	Meropenem 500 mg F/A	Teuto	No
	Meropenem 1 g F/A	Teuto	No
	Methotrexate	Hytas 25 mg/mL F/A 2 mL	Accord
Hytas 100 mg/mL F/A 5 mL		Accord	No
Hytas 100 mg/mL F/A 10 mL		Accord	No
Methotrexate 25 mg/mL F/A 20 mL		Blau	No
Methotrexate 100 mg/mL F/A 10 mL		Blau	No
Fauldmetro 25 mg/mL F/A 20 mL		Libbs	No
Fauldmetro 25 mg/mL F/A 2 mL		Libbs	No
Fauldmetro 25 mg/mL F/A 10 mL		Libbs	No
Fauldmetro 25 mg/mL F/A 50 mL		Libbs	No
Tevametho 25 mg/mL F/A 2 mL		Teva	No
Tevametho 25 mg/mL F/A 20 mL		Teva	No
Tevametho 25 mg/mL F/A 10 mL		Teva	No
Tevametho 25 mg/mL F/A 50 mL		Teva	No

**Figure 2:** Information about the presence of latex in standard injectable drugs.

Drugs	Presentation	Manufacturer	Does it contain latex?
Methylprednisolone	Solupren 125 mg F/A 2 mL	B�rgamo	No
	Solupren 50 mg F/A 8 mL	B�rgamo	No
	Methylprednisolone 125 mg F/A 2 mL	Blau	No
	Methylprednisolone 500 mg F/A 8 mL	Blau	No
	Methylprednisolone 125 mg F/A 2 mL	Novafarma	No
	Methylprednisolone 500 mg F/A 8 mL	Novafarma	No
	Unimedrol 125 mg F/A 2 mL	Uni�o Qu�mica	No
	Unimedrol 500 mg F/A 8 mL	Uni�o Qu�mica	No
Metronidazole	Metronidazole 5 mg/mL bag 100 mL	ABL	No
	Metronidazole 5 mg/mL bag 100 mL	Beker	No
	Nidazofarma 5 mg/mL bag 100 mL	Farmace	No
	Metronidazole 5 mg/mL bag 100 mL	Fresenius Kabi	No
	Endonidazol 5 mg/mL bag 100 mL	Fresenius Kabi	No
	Flagyl 5 mg/mL bag 100 mL	Sanofi	No
	Metronidazole 5 mg/mL bag 100 mL	Isofarma/ Halex Istar	No
	Hidazol 5 mg/mL bag 100 mL	Isofarma/ Halex Istar	No
	Metronidazole 5 mg/mL bag 100 mL	Hypofarma	No
	Metronidazole 5 mg/mL bag 100 mL	JP Farma	No
	Metronidazole 5 mg/mL bag 100 mL	EquiPLEX	No
Mycafungin	Mycamine 100 mg F/A	Astellas	No, but unable to ensure that during manipulation no latex traces are found
	Mycamine 50 mg F/A	Astellas	No, but unable to ensure that during manipulation no latex traces are found
Mitoxantrone	Evomixan 2 mg/mL F/A 10 mL	Farmarin	No
Moxifloxacin	Moxifloxacin 1,6 mg/mL bag 250 mL	Eurofarma	No
	Praiva 1,6 mg/mL bag 250 mL	Eurofarma	No
	Moxibacten 1,6 mg/mL bag 250 mL	Halex Istar	No
Nonionic low osmolality iodinated contrast	Henetix 300 mg/mL F/A	Guerbet	No
Omeprazole	Omeprazole 40 mg F/A	Blau	No
Omeprazole	Oprazon 40 mg F/A	Blau	No
	Omeprazole 40 mg F/A	Crist�lia	No
	Omeprazole 40 mg F/A	Eurofarma	No
	Stomedini 40 mg F/A	Uni�o Qu�mica	No
	Uniprazol 40 mg F/A	Uni�o Qu�mica	No
Oxaciline	Oxaciline 500 mg F/A	Aurobindo	No
	Oxanon 500 mg F/A	Blau	No
	Oxaciline 500 mg F/A	Blau	No
	Oxacilil 500 mg F/A	Novafarma	No
	Oxaciline 500 mg F/A	Novafarma	No
	Oxaciline 500 mg F/A	Teuto	No
Oxaliplatin	Oxaliplatin 50 mg F/A	B�rgamo	No
	Oxaliplatin 100 mg F/A	B�rgamo	No
	Oxa-platin 50 mg F/A	Blau	No
	Oxa-platin 100 mg F/A	Blau	No
	Oxaliplatin 50 mg F/A	Blau	No
	Oxaliplatin 100 mg F/A	Blau	No
	Oxaliplatin 50 mg F/A	Eurofarma	No
	Oxaliplatin 100 mg F/A	Eurofarma	No
	Evoxali 100 mg F/A	Farmarin	No
	Evoxali 50 mg F/A	Farmarin	No
	Eloxatin 5 mg/mL F/A 10 mL	Sanofi	No
	Eloxatin 5 mg/mL F/A 20 mL	Sanofi	No
	Eloxatin 5 mg/mL F/A 40 mL	Sanofi	No

**Figure 2:** Information about the presence of latex in standard injectable drugs.

Drugs	Presentation	Manufacturer	Does it contain latex?
Oxaliplatin	Oxaliplatin 5 mg/mL F/A 10 mL	Sanofi	No
	Oxaliplatin 5 mg/mL F/A 20 mL	Sanofi	No
	Oxaliplatin 5 mg/mL F/A 40 mL	Sanofi	No
	Oxaliplatin 50 mg F/A	Glenmark	No
	Oxaliplatin 100 mg F/A	Glenmark	No
	Oxalibbs 50 mg F/A	Libbs	No
	Oxalibbs 100 mg F/A	Libbs	No
	Oxalibbs 5 mg/mL F/A 10 mL	Libbs	No
	Oxalibbs 5 mg/mL F/A 20 mL	Libbs	No
	Tevaoxali 5 mg/mL F/A 10mL	Teva	No
	Tevaoxali 5 mg/mL F/A 20mL	Teva	No
	Tevaoxali 5 mg/mL F/A 28mL	Teva	No
Tevaoxali 5 mg/mL F/A 40mL	Teva	No	
Paclitaxel	Paclitaxel 6 mg/mL F/A 5 mL	Accord	No
	Paclitaxel 6 mg/mL F/A 16,7 mL	Accord	No
	Paclitaxel 6 mg/mL F/A 50 mL	Accord	No
	Pantium 6 mg/mL F/A 5 mL	Accord	No
	Pantium 6 mg/mL F/A 16,7 mL	Accord	No
	Pantium 6 mg/mL F/A 50 mL	Accord	No
	Akssus 6 mg/mL F/A 16,7 mL	B�rgamo	No
	Taxilan 6 mg/mL F/A 16,7 mL	B�rgamo	No
	Paclitaxel 6 mg/mL F/A 5 mL	Blau	No
	Paclitaxel 6 mg/mL F/A 16,7 mL	Blau	No
	Paclitaxel 6 mg/mL F/A 50 mL	Blau	No
	Taxol 6mg/mL F/A 5 mL	Bristol-Myers Squibb	No, but unable to ensure that during manipulation no latex traces are found
	Taxol 6mg/mL F/A 16,7 mL	Bristol-Myers Squibb	No, but unable to ensure that during manipulation no latex traces are found
	Taxol 6mg/mL F/A 50 mL	Bristol-Myers Squibb	No, but unable to ensure that during manipulation no latex traces are found
	Abraxane 100 mg F/A	Celgene	No
	Paclired 6 mg/mL F/A 16,7 mL	Dr Reddy's	No
	Paclired 6 mg/mL F/A 41,7 mL	Dr Reddy's	No
	Paclired 6 mg/mL F/A 5 mL	Dr Reddy's	No
	Parexel 6 mg/mL F/A 5 mL	Zodiac	No
	Parexel 6 mg/mL F/A 16,7 mL	Zodiac	No
	Parexel 6 mg/mL F/A 25 mL	Zodiac	No
	Parexel 6 mg/mL F/A 50 mL	Zodiac	No
	Evotaxel 6 mg/mL F/A 5 mL	Farmarin	No
	Evotaxel 6 mg/mL F/A 16,7 mL	Farmarin	No
	Evotaxel 6 mg/mL F/A 25 mL	Farmarin	No
	Evotaxel 6 mg/mL F/A 50 mL	Farmarin	No
	Paclitaxel 6 mg/mL F/A 5 mL	Fresenius Kabi	No
	Paclitaxel 6 mg/mL F/A 16,7 mL	Fresenius Kabi	No
	Paclitaxel 6 mg/mL F/A 50 mL	Fresenius Kabi	No
	Paclitaxel 6 mg/mL 5 mL	Glenmark	No
	Paclitaxel 6 mg/mL 16,7 mL	Glenmark	No
	Paclitaxel 6 mg/mL 25 mL	Glenmark	No
	Paclitaxel 6 mg/mL 50 mL	Glenmark	No
	Ontax 6 mg/mL F/A 5 mL	Libbs	No
	Ontax 6 mg/mL F/A 16,7 mL	Libbs	No
	Ontax 6 mg/mL F/A 25 mL	Libbs	No
Tarvexol 6 mg/mL F/A 5 mL	Sandoz	No, but unable to ensure is latex-free	
Tarvexol 6 mg/mL F/A 16,7 mL	Sandoz	No, but unable to ensure is latex-free	
Paclitaxel 6 mg/mL F/A 5 mL	Sandoz	No, but unable to ensure is latex-free	
Paclitaxel 6 mg/mL F/A 16,7 mL	Sandoz	No, but unable to ensure is latex-free	

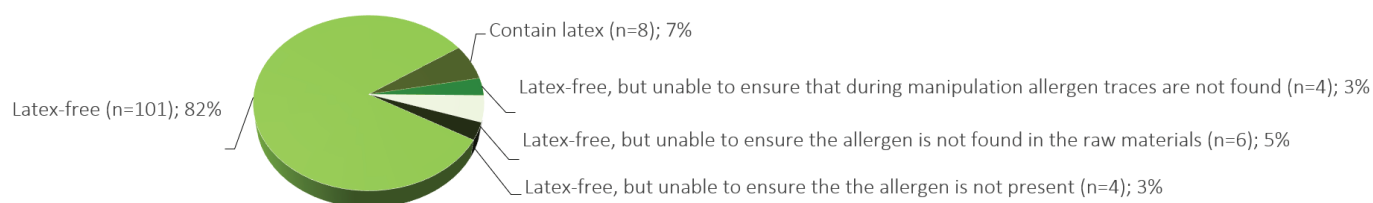
**Figure 2:** Information about the presence of latex in standard injectable drugs.

Drugs	Presentation	Manufacturer	Does it contain latex?
Pemetrexede	Alimta 100 mg F/A	Eli Lilly	No
	Alimta 500 mg F/A	Eli Lilly	No
Perfluoractane	Perfluoractane F/A 5 mL	Ophthalmos	No
Piperacillin + tazobactam	Piperacillin + tazobactam 2 g + 250 mg F/A	ABL	No
	Piperacillin + tazobactam 4 g + 500 mg F/A	ABL	No
	Aurotaz-p 2 g + 250 mg F/A	Aurobindo	No
	Aurotaz-p 4 g + 500 mg F/A	Aurobindo	No
	Piperacillin + tazobactam 2 g + 250 mg F/A	Aurobindo	No
	Piperacillin + tazobactam 4 g + 500 mg F/A	Aurobindo	No
	Piperacillin + tazobactam 2,25 g + 250 mg F/A	Eurofarma	No
	Piperacillin + tazobactam 4,5 g + 500 mg F/A	Eurofarma	No
	Novataz 4 g + 500 mg F/A	Novafarma	No
	Tazomaz 2 g + 250 mg F/A	Uniao Qu�mica	No
Tazomaz 4 g + 500 mg F/A	Uniao Qu�mica	No	
Polymycin B	Polymycin B 500.000 U F/A	Eurofarma	No, but unable to ensure raw materials are latex-free
Polyvitamin cerne 12	Cerne 0.747 mg F/A	Baxter	No
Poractant alpha	Curosurf 80 mg/mL F/A	Chiesi	No
Prilocaine + felypressin	Citocine 3% tubete 1.8 mL	Crist�lia	No
Propofol	Diprivan 20 mg/mL F/A 50 mL	Aspen Pharma	No
	Diprivan 10 mg/mL F/A 50 mL	Aspen Pharma	No
	Diprivan 10 mg/mL F/A 100 mL	Aspen Pharma	No
Propofol	Propovan 10 mg/mL F/A 10 mL	Crist�lia	No
	Propovan 10 mg/mL F/A 20 mL	Crist�lia	No
	Propofol 10 mg/mL 10 mL	Crist�lia	No
	Propofol 10 mg/mL 20 mL	Crist�lia	No
	Fresofol 20 mg/mL F/A 50 mL	Fresenius Kabi	No
	Propofol 10 mg/mL F/A 20 mL	Fresenius Kabi	No
	Propofol 10 mg/mL F/A 50 mL	Fresenius Kabi	No
	Propofol 10 mg/mL F/A 100 mL	Fresenius Kabi	No
Prothrombin complex	Beriplex 500 UI F/A	CSL Behring	No
	Octaplex 500 UI F/A	Octapharma	No
Ranibizumab	Lucentis 10 mg/mL F/A	Novartis	No
Rasburicase	Fasturtec 1.5 mg F/A	Sanofi	No, but unable to ensure raw materials are latex-free
Recombinant human erythropoetin	Alfapoetin 4.000 UI F/A 2 mL	Blau	No
Regular human insulin	Insunorm R 100 UI/mL F/A 10 mL	Aspen Pharma	No
	Humulin R 100 UI/mL F/A 10 mL	Eli Lilly	Yes
	Novolin R 100 UI/mL F/A 10 mL	Novo Nordisk	No
Remifentanil	Ultiva 2 mg F/A	Aspen Pharma	No, but unable to ensure raw materials are latex-free
Rocuronium	Rocuronium 50 mg F/A	Eurofarma	No, but unable to ensure raw materials are latex-free
Ropivacaine	Ropi 1% F/A 20 mL	Crist�lia	No
Sodium bicarbonate	Sodium bicarbonate 8.4% bag 250 mL	Fresenius Kabi	No
Sodium chloride	Sodium chloride 0,9% bag 100 mL	Baxter	No
	Sodium chloride 0,9% bag 250 mL	Baxter	No
	Sodium chloride 0,9% bag 500 mL	Baxter	No
	Sodium chloride 0,9% bag 1000 mL	Baxter	No
	Sodium chloride 0,9% bag 100 mL	Beker	No
	Sodium chloride 0,9% bag 250 mL	Beker	No
	Sodium chloride 0,9% bag 500 mL	Beker	No
	Sodium chloride 0,9% bag 1000 mL	Beker	No
Sodium chloride 0,9% bag 100 mL	Fresenius Kabi	No	

**Figure 2:** Information about the presence of latex in standard injectable drugs.

Drugs	Presentation	Manufacturer	Does it contain latex?
Sodium chloride	Sodium chloride 0,9% bag 250 mL	Fresenius Kabi	No
	Sodium chloride 0,9% bag 500 mL	Fresenius Kabi	No
	Sodium chloride 0,9% bag 1000 mL	Fresenius Kabi	No
	Sodium chloride 0,9% bag 100 mL	Halex Istar	No
Sugammadex	Bridion 100 mg/mL F/A	MSD	No
Suxamethonium	Succitrat 100 mg F/A	Blau	No
Swine heparin	Hepamax-S 5.000 UI/mL F/A 5 MI	Blau	No
	Hemofol 5.000 UI/mL F/A 5 mL	Crist�lia	No
	Swine heparin 5.000 UI F/A 5 mL	Uni�o Qu�mica	No
Teicoplanin	Bactomax 200 mg F/A	Crist�lia	No
	Bactomax 400 mg F/A	Crist�lia	No
	Teicoplanin 200 mg F/A	Eurofarma	No
	Teicoplanin 400 mg F/A	Eurofarma	No
Teicoplanin	Koplan 400 mg F/A	Novafarma	No
	Targocid 400 mg F/A	Sanofi	No
	Teicoplanin 400 mg F/A	Teuto	No
	Teicoplanin 400 mg F/A	Uni�o Qu�mica	No
	Teicoplanin 200 mg F/A	Uni�o Qu�mica	No
Terlipressin	Glypressin 1 mg F/A	Laborat�rios Ferring	No
Thiopental	Thiopentax 1 g F/A	Crist�lia	No
Trastuzumab	Herceptin 150 mg F/A	Roche	No, but unable to ensure is latex-free
Triancinolone	Triancinolone 40 mg/mL F/A 1 mL	Ophthalmos	No
Trypan blue	Trypan blue 0.1 % F/A 1 mL	Oftalmopharma	No
	Trypan blue 0.1 % F/A 1 mL	Ophthalmos	No
Vancomycin	Vancomycin 500 mg F/A	ABL	No
	Vancomycin 500 mg F/A	Blau	No
	Vancoson 500 mg F/A	Blau	No
	Vancomycin 500 mg F/A	Eurofarma	No
	Novamicin 500 mg F/A	Novafarma	No
	Vancomycin 500 mg F/A	Teuto	No
	Vancotrat 500 mg F/A	Uni�o Qu�mica	No
Vecuronium	Vecuron 4 mg F/A	Crist�lia	No
Vimblastine	Rabinefil 10 mg F/A	Fresenius Kabi	No
	Faulblastina 10 mg F/A	Libbs	No
Vincristine	Dabaz 1 mg/mL F/A 2 mL	Accord	No
	Vincristine 1 mg/mL F/A 2 mL	Accord	No
	Faulvincrri 1 mg/mL F/A	Libbs	No
Voriconazole	Micend 200 mg F/A	B�rgamo	No
	Veac 200 mg F/A	Eurofarma	No
Water for injection	Water for injection bag 250 mL	Fresenius Kabi	No
	Water for injection bag 500 mL	Fresenius Kabi	No
	Water for injection bag 1000 mL	Fresenius Kabi	No
Zoledronic acid	Zoledronic acid 4 mg F/A 5 mL	Sandoz	No
	Zometa 4 mg/mL F/A 5 mL	Novartis	No

**Figure 3.** Classification of injectable drugs according to the presence or absence of latex (n=123).



**Figure 4.** Injectable drugs with latex or at any risk of contamination.

Drugs	Presentation	Manufacturer
<b>Contain latex</b>		
Alteplase	Actilyse 10 mg F/A	Boehringer Ingelheim
	Actilyse 50 mg F/A	
Gencitabine	Gemcit 1 g F/A	Sandoz
	Gemcit 200 mg F/A	
Imipenem + cilastatin	Tienan 500 mg + 500 mg F/A	MSD
Anti-RhO (D) immunoglobulin	KamRhO-D 300 mcg F/A 2 mL	Panamerican Medical Supply
Insulin glargin	Basaglar 100 UI/mL F/A 3 mL	Eli Lilly
	Basaglar 100 UI/mL F/A 10 mL	
Regular human insulin	Humulin R 100 UI/mL F/A 10 mL	Eli Lilly
Human NPH insulin	Humulin N 100 UI/mL F/A 10 mL	Eli Lilly
Insulin lispro	Humalog 100 UI/mL F/A 10 mL	Eli Lilly
	Humalog 100 UI/mL F/A 3 mL	
<b>Latex-free, but unable to ensure that during the manipulation no traces of the allergen are found</b>		
Insulin glargin	Lantus 100 UI/mL F/A 3 mL	Sanofi
	Lantus 100 UI/mL F/A 10 mL	
Micafungin	Mycamine 100 mg F/A	Astellas
	Mycamine 50 mg F/A	
Paclitaxel	Taxol 6 mg/mL F/A 5 mL	Bristol-Myers Squibb
	Taxol 6 mg/mL F/A 16,7 mL	
	Taxol 6 mg/mL F/A 50 mL	
Botulinum toxin A	Botox 100 UI F/A	Allergan
<b>Latex-free, but unable to ensure that raw materials contain the allergen</b>		
Amoxicillin + clavulanate	Amoxicillin + clavulanate 1 g + 200 mg F/A	Eurofarma
Benzathine benzylpenicillin	Benzetacil 1.200.000 UI F/A	Eurofarma
Polymycin B	Polymycin B 500.000 U F/A	Eurofarma
Rasburicase	Fasturtec 1,5 mg F/A	Sanofi
Remifentanil	Ultiva 2 mg F/A	Aspen Pharma
Rocuronium	Rocuronium 50 mg F/A	Eurofarma
Latex-free, but unable to ensure whether allergen-free		
Bevacizumab	Avastin 25 mg/mL F/A 4 mL	Roche
Ceftriaxone	Rocefin 1 g F/A	Roche
Paclitaxel	Tarvexol 6 mg/mL F/A 5 mL	Sandoz
	Tarvexol 6 mg/mL F/A 16,7 mL	
	Paclitaxel 6 mg/mL F/A 5 mL	
	Paclitaxel 6 mg/mL F/A 16,7 ML	
Trastuzumab	Herceptin 150 mg F/A	Roche

## Discussion

In 1999, the American Society of Anesthesiology suggested some measures of care and prevention as the correct identification of the allergic patient, elective surgeries carried out as early as possible to minimize latex antigens levels as aerosol in the operation room, surveys and listing of all the institution's products containing latex.<sup>10</sup>

There was an expressive reduction of the use of products and medical devices with latex in the last years, due to the increase of allergic reactions in health professionals and patients, considered the second cause of anaphylactic reactions in the surgery-anesthetic area.<sup>6,23,24</sup> The intensity of these reactions that can range from dermatological findings to shock and anaphylaxis have been promoting efforts in hospital services worldwide in favor of

the substitution of their materials and products by other latex-free.<sup>17</sup> According to Heitz & Bader (2010), the American database latexdrugs.com conducted a survey which showed that 78% of the drugs were latex-free, 14% had traces of the allergen and 8% failed to be classified as latex-free drugs, because their packages or part of the production batches contained latex or would be latex-free in the future.<sup>25</sup> These data corroborate our findings, since few products contain latex in their composition.

Some manufacturers had difficulties in accessing the information requested immediately as the composition of the rubber stopper utilized in the primary product package. Some responses were received only after one month or follow up, e-mails or telephone contact. The delay to respond these information is concerning as the demand for this is urgent when related to the immediate use in the hospital.

The manufacturers justified the delay because the product is



manufactured abroad which demands contact with foreign employees to confirm the information, lack of quick access information in the customer "contact us" option and necessity to check with third parties like the manufacturers of raw materials used in the medications. Most of the data received was sent by the manufacturers informed in e-mail body. Internal documents from the companies were made available to the study team, including analyzes of the presence or absence of the allergen. However, these documents are not public, and are unavailable on the companies' websites, ANVISA leaflets, or in medicines package inserts. The study results were not registered in any database.

The literature corroborates the difficulty of access to manufacturer data about the composition of the rubber stopper. A study whose objective was to identify medications with latex in 2008 reported industry's response time over one month. We received the same justification in our study, the need to contact international officers to get responses. Barbare *et al.* found manufacturers who did not have the information about the composition of injectable medication vial stoppers. The sanitary authorities should evaluate the presence and identification of packages with latex.<sup>21</sup>

Whereas the severity of latex-induced allergic reactions, a significant worsening of the patient outcome could occur if the presence of the allergen in drugs is not clearly stated. In cases where only one industry sells the drug, if the patient is allergic to latex, its use would be unfeasible.<sup>14</sup>

The United States Food and Drug Administration (FDA) issued guidelines for the identification of medical products to inform the users that the product contains latex.<sup>26</sup> In 1998, Holzman & Katz warned about the importance of labeling products with latex as protective additional measure.<sup>27</sup> All these measures are justified due to contamination with the allergen that may occur when the liquid medication comes into contact with the stopper before or after the needle is pushed through the latex seal.<sup>28</sup> The pharmaceutical industries should include information about the presence of latex in package inserts and labels to help health professionals and patients at the end of the medicine distribution chain.

Although the list of drugs do not reflect the reality of all Brazilian hospitals, it was possible to highlight the lack of identification of medications that contain the allergen in their composition or primary packaging. It is necessary that health institutions develop a contingency plan for the identification of these drugs within hospital units, in order to avoid adverse events. Our difficulty during data collection about the presence of latex also shows that pharmaceutical industries need a strategic planning to answer questions from health professionals and patients, in addition to including latex information in patient package insert and on packaging.

## Conclusion

Access to information is difficult and scarce data in the scientific literature, package inserts and packaging about the presence of latex in drugs are a concrete issue which affects health professionals and patients. It is essential that the interdisciplinary team is aware of this information rapidly, to enhance the patient's safety during different procedures and phases of care for better choice of therapeutic options and possible replacements safely. Sanitary authorities and other responsible bodies need to carefully watch the composition of drugs to evaluate whether information

such as the presence of latex in package inserts and packaging should be mandatory. Data about the composition of drugs should not be restricted to the active principle and its excipients alone, they must encompass the entire medications production and commercialization chain.

Although the information gathered does not reflect the reality of all Brazilian hospitals, they may help other health services to promote their patients' safety because their content can be accessed immediately.

Due to the relevance of the data collected, they were included in the Pharmacotherapy Guideline of Hospital Federal dos Servidores do Estado to facilitate the access to information for interdisciplinary team. Identification labels informing the presence of latex in hospital products allows the prompt visualization and aims to help preventing possible errors that can lead to unfavorable clinical outcomes.

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## Collaborators

Conception and design: RGP, APA. Analysis and interpretation of data: RGP, MCS, BBO, LPG, IGH, APA. Writing of the article: RGP, MCS, BBO, LPG, IGH, APA. Relevant critical review of the intellectual content: APA, RTA. English Translator: JCC.

## Conflict of interest statement

The authors declare that there are no conflicts of interest regarding this article.

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