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INSTITUTO POLITÉCNICO DE LISBOA

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Hospital Surfaces Contamination With Antineoplasic Drugs: Influence of Cleaning Procedures

ANA CEBOLA DE OLIVEIRA
MÁRIO PÁDUA
SUSANA VIEGAS

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Introduction

- Antineoplasic Drugs
  - Cancer cell growth inhibition
  - DNA damage
  - DNA synthesis inhibition
- Workplace Surface Contamination

In addition to the therapeutic effect, most antineoplasic drugs also have mutagenic, teratogenic and/or carcinogenic properties

- Accute effects
- Cardiovascular toxicity
- Defects in reproduction
- DNA damage

→ IARC

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Introduction

- Inhalation
- Ingestion
- Accidental Injection
- **Skin Absorption**

Occupational exposure to antineoplasic drugs

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Introduction

ALARA

- Prevention
- Control

→ Cleaning Protocols

↓

Environmental Contamination Exposure

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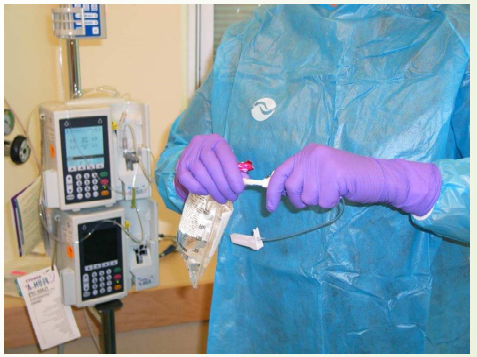
Aim

Assess surfaces contamination in a Portuguese chemotherapy unit before and during drug administration, in both preparation and administration facilities.



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Methods

- Cyclophosphamide
- 5-Fluorouracil
- Paclitaxel

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Results

- We've collected 34 samples before any activity and 37 samples after several hours of drugs preparation and administration.
- The total screening comprehended 71 samples obtained from both preparation and administration sites in the oncology service.
- The total screening showed that 45 (63%) of the samples analyzed presented some contamination level and 9 (13%) were contaminated by more that one drug.

	Contamination Level	More than 1 drug detected
Before	20 (59%)	5 (15%)
After	25 (68%)	4 (11%)

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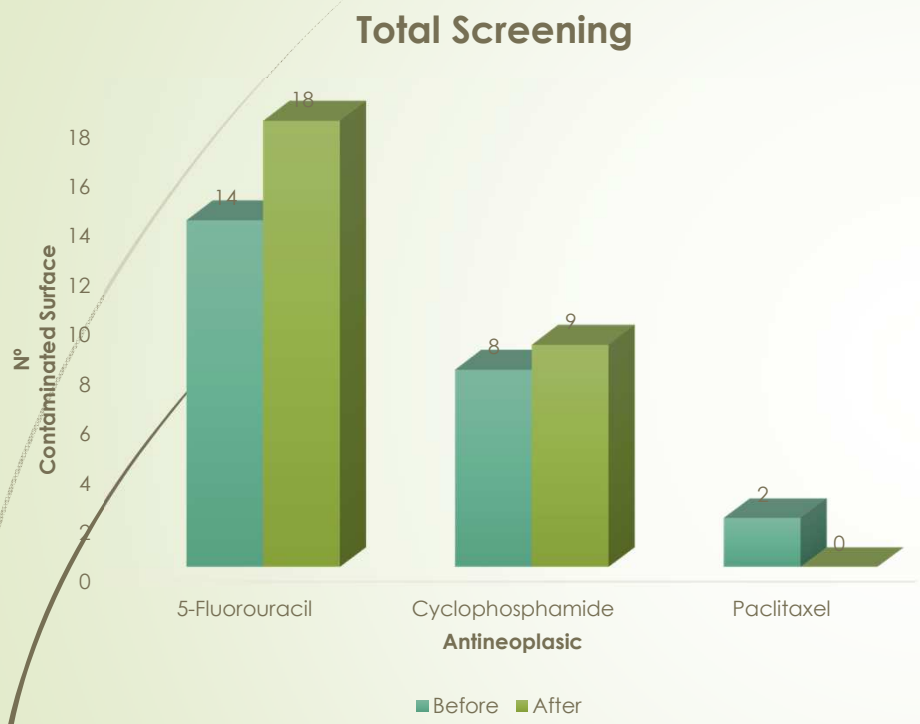
Results



5-Fluorouracil								
Total			**Before**			**After**		
n=71			n=34			n=37		
>LOQ	32	45%	>LOQ	14	41%	>LOQ	18	49%
LOD<Traces<LOQ	2	3%	LOD<Traces<LOQ	1	3%	LOD<Traces<LOQ	1	3%
ND	37	52%	ND	19	56%	ND	18	49%
Maximum	88.72		Maximum	84.7		Máximum	88.72	
Minimum	1.86		Minimum	4.28		Minimum	1.86	
Median	21.00		Median	24.48		Median	17.90	
*LOD=0.55ng/LOQ=1.67ng								
Cyclophosphamide								
Total			**Before**			**After**		
n=71			n=34			n=37		
>LOQ	17	24%	>LOQ	8	24%	>LOQ	9	24%
LOD<Traces<LOQ	0	0%	LOD<Traces<LOQ	0	0%	LOD<Traces<LOQ	0	0%
ND	54	76%	ND	26	76%	ND	28	76%
Maximum	139.55		Maximum	139.55		Máximum	93.92	
Minimum	11.98		Minimum	19.83		Minimum	11.98	
Median	32.01		Median	40.75		Median	13.15	
*LOD=LOD=0.41µg/LOQ=1.24µg								
Paclitaxel								
Total			**Before**			**After**		
n=71			n=34			n=37		
>LOQ	2	3%	>LOQ	2	6%	>LOQ	0	0%
LOD<Traces<LOQ	6	8%	LOD<Traces<LOQ	3	8%	LOD<Traces<LOQ	3	8%
ND	63	89%	ND	29	85%	ND	34	92%
Maximum	3.67		Maximum	3.67				
Minimum	1.98		Minimum	1.98				
*LOD=0.61ng/LOQ=1.85ng								

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Discussion

- This study allowed to characterize surfaces antineoplasic drugs contamination in this oncology service.
- The contamination observed can lead to occupational exposure by dermal absorption, since we detected an elevated amount of contaminated samples that are correspondent to surfaces manipulated most frequently and without the use of personal protection equipment, such as gloves (ex: telephones).
- Antineoplasic drug production and administration procedures may not be efficient, which may lead to surface contamination.
- Contamination before the beginning of any activity suggests that cleaning procedures are not appropriated (way, frequency, cleaning points, materials and decontamination products).

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Discussion

- Common cleaning techniques and reagents may dilute and spread antineoplasic drugs.
- Dispersion of organic compound (spilling ethanol for disinfection) can induce cross contamination.
- It's important to adequate the cleaning procedures to the chemicals used in these services.

False sense of Safety

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Conclusions

- The contamination level found in the surfaces, both before and after the beginning of any activity in the oncology center, suggests that there is a probable exposure to these drugs
- This is well in accordance to other studies that showed how the type of cleaning procedures and products used can be determinant for surfaces decontamination.
- Need to examine the effectiveness of the various cleaning protocols used in the oncology centers in these Portuguese Hospitals.

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