

Pharmacy and oncology clinic hazardous antineoplastic drugs surface contamination testing

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BACKGROUND

- Handling of antineoplastic drugs by health care workers can have adverse health effects.
- Periodic surface sampling contributes to worker safety.

OBJECTIVES

- To describe hazardous drug contaminations within hospitals and pharmacy.

METHODS

- QUESS 360 Pharmacy Solutions kits were used to collect the samples.
- The samples were sent to an independent laboratory for testing.
- A total of 19 hazardous antineoplastic drugs were tested.
- One sample test can detect from 1 to 19 drugs as requested by the site.



Hazardous drugs	Level of detection (LOD) expressed in ng/cm ²
fluorouracil (5FU)	0.0089
methotrexate	0.0044
cytarabine	0.011
dacarbazine	0.0022
DOXOrubicin	0.0444
epirubicin	0.0444
gemcitabine	0.0022
melphalan	0.0444
cyclophosphamide	0.0022
DOCEtaxel	0.1333
etoposide	0.0089
ifosfamide	0.0022
irinotecan	0.0089
methotrexate	0.0044
PACLitaxel	0.0444
PEMEtrexed	0.0089
topotecan	0.0044
vinBLAstine	0.0444
platins	0.0022

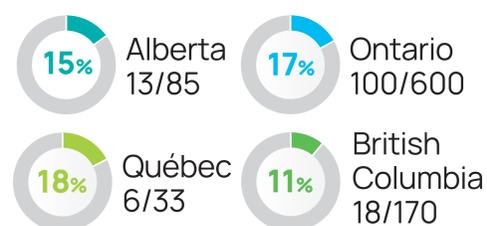
- Each site selected the areas they wanted to sample.
- Pharmacy areas mostly sampled: Bio Safety Cabinet (BSC), BSC frontgrill, Floor under BSC, Checking counter, Pharmacy Storage shelves, Cleanroom location unspecified, Transport bins and Storage bins.
- Clinic areas mostly sampled: Floor in the chemo clinic, Chairs armrest, Counters, Computers, and Chemo bins.

RESULTS

- Surface sampling was carried out between **March 2018** and **May 2024**.
- 1004 samples** were collected and **10938 drugs** tested analyzed.
- Surface contamination was detected in **199/1004 (20%)** of the samples.
- Detection of surface contamination by geography:

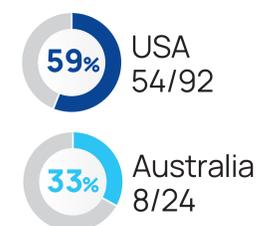
Within Canada:

888 samples (15%)



Within USA & Australia:

116 samples (53%)



Most frequently detected drugs	#	Median ng/225cm ²	Standard deviation
Cyclophosphamide	101	2	± 38.5
5-FU	78	12	± 581
Platins	71	3	± 17
Gemcitabine	36	9	± 114
Irinotecan	23	20	± 139
Methotrexate	15	2.5	± 407

Pharmacy areas:

- 174 contaminations detected on **853 samples (20%)**
- The most frequently contaminated areas were:



Oncology Clinic :

- 24 contaminations detected on **151 samples (15%)**
- The most frequently contaminated area samples was:



DISCUSSION/CONCLUSION

- A significant proportion of areas where pharmacy and clinic staff work are contaminated with hazardous antineoplastic agents.
- The QUESS 360 surface sampling kit has proven to be an effective tool for detecting hazardous drug residues.