Efficiency of an optimized decontamination procedure for five intravenous antineoplastic drugs in a compounding isolator of a hospital pharmacy : a real-life study

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Introduction

The chemical contamination of work surfaces by antineoplastic drugs (ADs) during their handling, and in particular their preparation in hospital pharmacies, is an occupational health issue. Numerous international recommendations therefore advocate chemical decontamination of surfaces in order to reduce potential exposure of professionals.

Objectives To optimize the current decontamination procedure of the surfaces inside an isolator and evaluate its efficiency in real life.

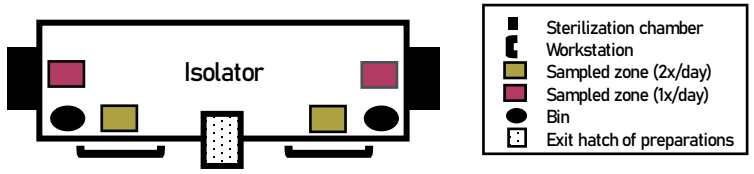
Materiel and Methods

Two commercial products were used consecutively:
Klercide Neutral Detergent™ and Surfanios IP sterile PAE®.

Optimization was based on supplier recommendations and efficacy factors found in the scientific literature:

	Before	After
Frequency of application	Every two to four hours	Every two hours
Order of use of products	Undefined	Klercide® then Surfanios®
Volume of Klercide® applied	Undefined	15mL
Volume of Surfanios® applied	Undefined	20mL
Use of different compresses to apply and to remove products	No	Yes
Vigorous application	No	Yes
Ending procedure when surface were fully dried	No	Yes

Ten pharmacy technicians were trained in the optimized procedure.
Six surface sampling campaigns were carried out, 3 before optimization and training and 3 after. The samples (n=54 before and 54 after optimization) were obtained by wiping the surfaces inside the isolator:



The samples were analysed using a UHPLC-MS/MS technique. The quantification limits of the method ranged from 0.025 to 1.000 ng/cm², depending on the five molecules analysed: 5-fluorouracil, cyclophosphamide, etopside, paclitaxel and methotrexate.

Results and discussion

For all the molecules studied, a reduction in contamination was found on the surfaces after optimization of the decontamination procedure in terms of total quantities (ng/cm²) (fig 1), the number of molecules (fig 2) and the 90th percentiles of quantities (table 1).

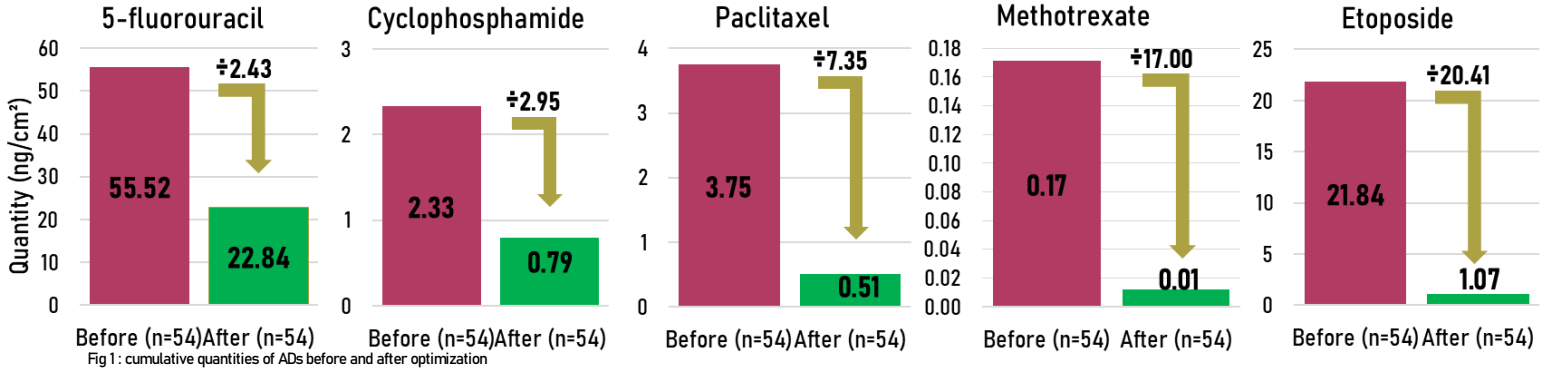


Fig 1 : cumulative quantities of ADs before and after optimization

	5-fluorouracil	Cyclophosphamide	Etoposide	Methotrexate	Paclitaxel	Total(All ADs combined)
Before (n =54)	2.994	0.092	0.235	0.007	0.120	3.672
After (n =54)	0.597	0.041	0.085	0.003	0.024	0.590

Table 1: 90th percentiles of the quantities of ADs before and after optimization in ng/cm².

No quantity of ADs per sample exceeded the 10ng/cm² threshold after optimization. The percentage of samples with a quantity of each AD below the 0.1ng/cm² threshold rose from 77% to 93%. (thresholds proposed by the Netherlands)

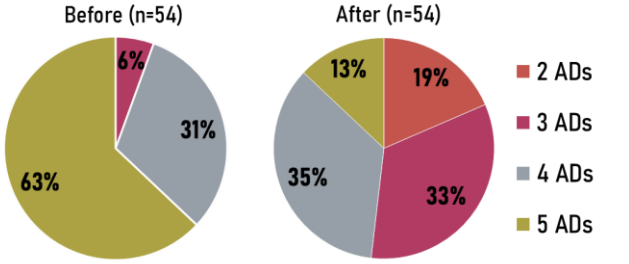


Fig 2 : Percentages of samples according to the number of ADs found before and after optimization

Conclusion

Despite persistent contamination, the optimized procedure in place proved efficient in lowering surfaces contamination inside the isolator for the ADs studied. However, the procedure needs to be tested on a wider range of molecules. In addition, actions must be taken to lower sources of contamination. Finally, regular staff training on this procedure will help maintain this level of efficiency.