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Redispensing of unused HIV post-exposure prophylaxis for medical students

Dear editor,

Medical students often acquire work experience abroad and frequently choose a resource-limited country. The prevalence of HIV is relatively high in many of these countries and the access to post-exposure prophylaxis (PEP) is low. Therefore, many medical schools provide PEP kits to these students [1–3]. PEP is then readily available in case of potential HIV exposure. Fortunately, most PEP kits are not used and subsequently destroyed upon return to the pharmacy. Since PEP is expensive, the disposal results in substantial financial waste. Therefore, the Utrecht University and the outpatient pharmacy of the University Medical Center Utrecht have implemented a waste-minimising measure in which the unused PEP can be redispensed. This study aims to assess the proportion of PEP that is redispensed after being returned unused by medical students who had internships in countries with a high prevalence of HIV, and to estimate the potential cost savings thereof.

This retrospective follow-up study was conducted in the outpatient pharmacy. Medical students who received a PEP kit between March 2014 and December 2017 were included. PEP consisted of a four-week course of lopinavir/ritonavir (Kaletra®, 200/50mg) and lamivudine/zidovudine (Combivir®, 300/150mg) and included either new medication packages or packages which had previously been dispensed to another student. PEP was wrapped in a sealed bag with a temperature logger that registered the surrounding temperature on an hourly basis (PEP kit). Returned Kaletra® and Combivir® could be redispensed if 1) sealed bag was returned unopened, 2) primary and secondary packaging materials were undamaged, 3) expiry date was at least six months after the date of being returned, and 4) medication had been continuously stored below 35° Celsius. If the storage temperature exceeded 35° Celsius, the expiry date was shortened by one month per excursion above this temperature.

Cost savings were assessed by calculating the total economic value of the redispensed medication packages [4] minus the pharmacy's additional processing costs required to enable redispensing, based on a micro-costing study on costs associated with redispensing (Bekker, submitted). Potential cost savings were determined for a worst-, average-, and best-case scenario, based on:

Number of times PEP could be redispensed, derived from duration students went abroad and medications' duration until expiry.
Variation in the proportion of PEP that met the criteria for redispensing (between 0 and 100%).

A total of 379 PEP kits were dispensed. Of these, 80.3% Kaletra® and 76.6% Combivir® packages were redispensed.

Of the dispensed PEP kits, 370 (97.6%) were returned to the pharmacy. The most common reason for disposal was “remaining time to expiry date too short”, followed by “temperature logger defect”.

Of all returned PEP kits, 288 (77.8%) were continuously stored below 35° Celsius. The median storage time above 35° Celsius for the PEP kits that exceeded this temperature was 4 hours (IQR 2–9).
Providing a PEP kit to the medical students using the redispensing process costed on average €841 per kit; €805 for the medication and €36 for additional processing costs. Total value of the redispensed medication packages was estimated at €240,714. When adjusting for the total additional processing costs, €15,037 over the study period, cost savings achieved from redispensing were valued at €225,677. Medication costs made when the redispensing process was not implemented were €305,095. Redispensing thus resulted in savings of 74% of the total medication costs.

On average, students went abroad for 5.2 months (10th percentile 3.3, 90th percentile 7.4). The new medication packages had an average time of 16 months to expiry (10th percentile 8.2, 90th percentile 19.9). The most optimal scenario would allow PEP to be redispensed five times, in worst-case, PEP could not be redispensed (Fig. 1).

Medical students have a higher risk of occupational needle stick injuries, requiring additional safety precautions when working in countries where the prevalence of HIV is high [4,5]. Some students may not carry PEP kits with them since PEP is expensive and institutions may not be able to provide this expensive medication free of charge. Our results show that a small investment is needed to enable the provision of free PEP kits to students following a redispensing protocol, while the cost savings are substantial. This could enable institutions to consider providing free PEP kits to students and other travelling (healthcare) workers [6].

Limitations include that humidity and light exposure was not measured that may have affected the product quality. However, the medication was dispensed in the original manufacturer's packaging materials that were assumed to sufficiently protect the medication. Finally, cost savings strongly depend on the duration of the students' time abroad and the type of PEP that is dispensed, specifically regarding costs, expiry date, and storage recommendations, which may differ among settings.

In conclusion, the majority of Kaletra® and Combivir® returned unused by medical students could be redispensed. Additional cost investments for the redispensing process were relatively low and the redispensing of PEP resulted in cost savings of 74% in comparison with no redispensing.

Disclosure of interest

All authors declare that they have no conflicts of interest.

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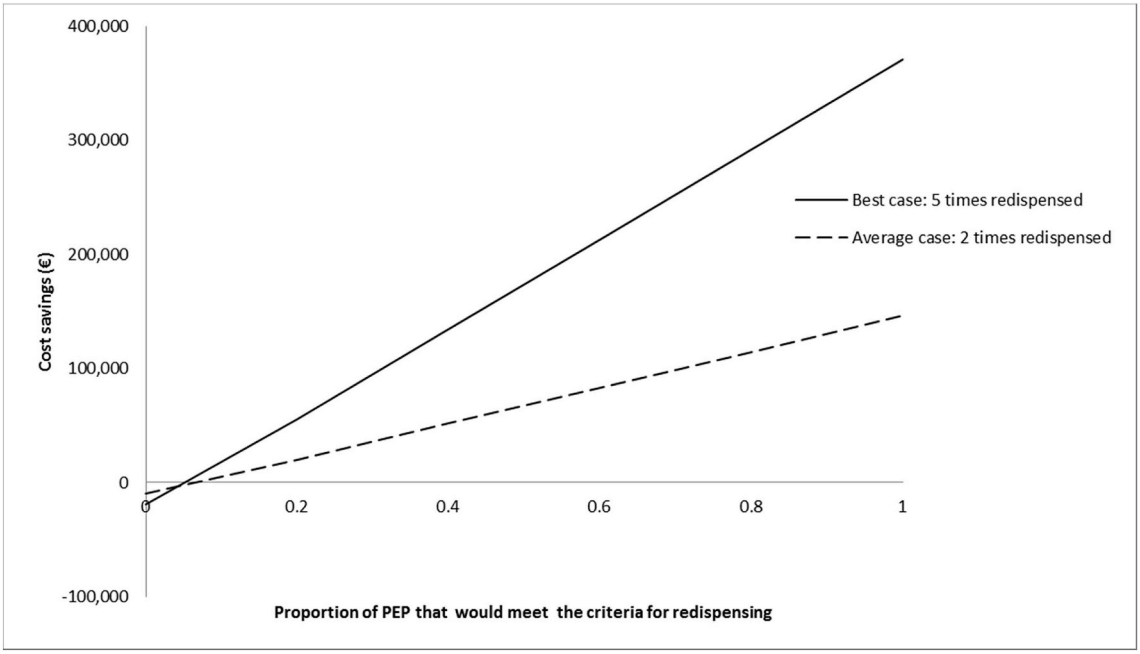

Fig. 1. Cost savings of redispensing PEP for an average- and best-case scenario. In the worst case, PEP could not be redispensed and a financial loss would occur (not shown). Scenarios are based on 100 dispensed PEP kits, of which 97.6% would be returned, with redispensing processing costs of €3906 for 100 kits.

agencies in the public, commercial, or not-for-profit sectors.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.tmaid.2019.02.005.

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