ROUND TABLE

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CSTDs: a cost-effective element of the clinical care pathway in hazardous drug preparation and administration

Media partner: hospital pharmacy europe

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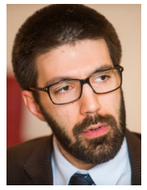

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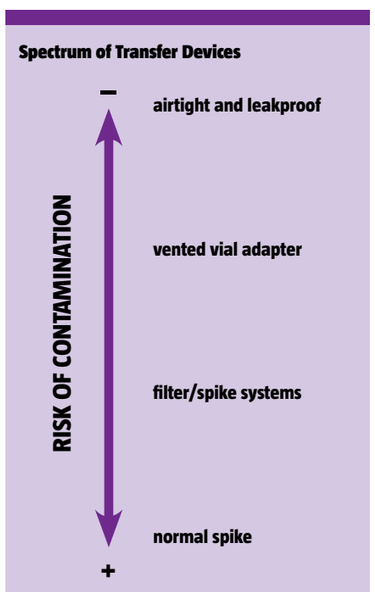
In a pan-European climate of health service cost-consciousness, a clinical pathway narrative that builds the product, product preparation/delivery system and patient group into the care continuum is as an entirely new paradigm for considering the role of closed system transfer devices (CSTDs). Several hospital pharmacists from the UK, The Netherlands, France, Germany and Spain met recently to challenge each others' thinking on how these devices might be deployed cost-effectively.

CSTDs: a cost-effective element of the clinical care pathway in hazardous drug preparation and administration

There is a spectrum of risk of contamination associated with the various transfer devices currently available, which range from normal spikes to the airtight and leakproof closed system transfer device (this page below), and the decision about which device to use will be driven by the product and its presentation – is it a powder, is it in solution, is it a dose, is it in a vial or bag?

Which transfer device?

As an example of the decision-making process, filter needles might be used for glass ampoules, but subsequent decisions would have to be based on the final presentation, which will usually be determined by the data sheet: what is the licensed way to administer, or what is your agreed protocol for administration?



The decision about what kind of device is used is typically made by agreement between pharmacists and nurses, who prepare the chemotherapy. So, for example, powder reconstitution can require vigorous shaking that releases aerosols, driving the need for a fully closed system.

In all instances it is ideal that the product preparation and administration be risk-assessed by technical services – the protocol has to be as safe as possible, but also as cost-effective as possible.
The financial challenge has led to the drive to outsource whenever feasible, and to buy in dose-banded product when appropriate; there is no doubt that this can sometimes create more capacity to deal with the less standard and more clinically appropriate issues for the hospital pharmacy.

Protocol

In The Netherlands, the method of how a drug gets from the prescription to the patient is always set out in the protocol, which has been agreed and signed off by the doctor, the nurse and the pharmacist. Every time the protocol is changed, the sign-off is repeated – for the drug, how it is administered, whether and what devices are used.
In the hospital here represented, the use of CSTDs is defended on the grounds that it is a very good waste reduction programme, minimising the disposal of unused drug (so-called drug vial optimisation) so much that more cost is recovered. Cost recovery is dependent on rationalising your processes through the whole chain.

Cost will necessarily factor into the consideration of which transfer device to use, and the cost to an entire unit could be contained by using devices that offer maximum safety for the most hazardous drugs while spikes and filter/spike systems might be appropriate for the less hazardous.

'If you look for contamination in the pharmacy or on the ward you will find it.'

Legislation and pharmacy standards have led to the preferred use of negative pressure isolators in clean rooms. Given that isolator filters remain aerosol-contaminated even after wiping down, and that laminar flow cabinets are much more convenient than isolators in terms of cleaning, upkeep and maintenance, it would be interesting to compare the cost of using negative pressure isolators with that for laminar flow cabinets plus CSTDs. The latter system may make sense in terms of both safety and cost.

Alternatively, decisions on what safety device to use could be taken not on cost but rather on safety alone, in which case you might choose to use the devices across the hospital, regardless of the fact that the products are not equally hazardous, on the grounds that harmonisation makes processes easier.

Guidance

Some European countries have guidelines and standards for the preparation and handling of hazardous drugs.
In France, the Good Compounding Practice recommends the use of closed system devices for oncolytics. In The Netherlands, Good Manufacturing Practice contains monographs on compounding for all drugs (started

by the Dutch Association of Hospital Pharmacists in 1969 and reviewed every three years). Germany has the Apothekenbetriebsordnung (2012), which deals with the preparation of all drugs in general terms, and is in recommendation form only, meaning that, once preparation is done in a clean room, the choice of what device to use is left to the professional's judgement.

Perception

In those instances where CSTDs are used, contamination can still be detected, although at a greatly reduced level than otherwise would have been the case. This represents the objective fact. But the presence of even some contamination perhaps reinforces a subjective reality, that these systems do not 'work'. So the argument does not end with the case proven. It is about how this sits with the perception of the healthcare professional.

Process ownership

There is non-negotiable consensus that all hazardous drugs are prepared in the pharmacy – cytotoxics, mutagenic drugs, high-risk procedures, nutritional products, epidurals. Beyond that, decisions on where the preparations are done will depend on the product, and will be led often by cost, but also by risk

Key points

1. **The definition of CSTD used in this report is that agreed by the National Institute for Occupational Safety and Health (NIOSH) and the International Society of Oncology Pharmacy Practitioners (ISOPP), who define a closed system transfer device to be 'a drug-transfer device that mechanically prohibits the transfer of environmental contaminants into the system and the escape of hazardous drug or vapour concentrations outside the system'.**

2. **Contamination detection systems are sufficiently sophisticated that, if and where contamination is looked for, it will be found – including on the filters of isolators.**

3. **A Pharmacy Director will spend most of his day managing his budgetary constraints. There is no CSTD safety argument, whatever the supportive evidence, data-driven or anecdotal, that will change that in the short term. So the bottom line is the bottom line – CSTDs cost money that the Pharmacy Director would have to find from elsewhere.**

4. **Use of maximum protection in the preparation and handling of hazardous drugs is in the form of guidance and recommendations. Mandatory regulation is slow to surface.**

5. **Therefore, to break the stalemate of the notion that the choice has to be made between cost and benefit, there is evidence – easily quantified – that CSTDs largely pay for themselves as an effective waste reduction system.**

6. **In parallel to an argument supporting their cost effectiveness, a shift in their marketing is envisaged whereby CSTDs are built into a clinical pathway, at critical preparation and administration points, presented to pharmacists as a logical and necessary element of continuity of care. Shift the focus from marketing the product to marketing a pathway, with the CSTDs as an integral part.**

7. **Selling a combined product/CSTD would speak favourably to procurement decisions, by 1. placing the cost in a central drug budget, and 2. focusing on the safety of the drug.**

8. **Several potential uses for CSTDs were identified, listed in the Box entitled 'New Thinking on Opportunities for CSTDs'.**

'One of the reasons we use them [CSTDs] is that we minimise our waste in such a dramatic way that we get most of our money back.'

in terms of stability and practicality, by capacity and by system benefit. Every product fits into a risk hierarchy.

On the topic of capacity, in the UK, nurse shortages drive the pharmacist to take some preparative procedures from the ward back into the pharmacy. But, in general, what gets prepared in the pharmacy as opposed to what gets prepared on the ward ranges from the high-risk, non-negotiable drugs to those that are subject to process and discussion.

In The Netherlands, the decision about where a preparation is made sits with the process owner of the high-risk medication. You cannot be responsible for something you do not own. Administration is the responsibility of the nurse, but only when the process owner has provided the right product with the right instructions: each pharmacist bears responsibility for getting the drug to the patient.

'There is no point using CSTDs in the pharmacy if you are not going to use them for administration; it has to be a complete system. It is the whole system risk that you have to take into consideration.'

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In Germany, pharmacists are responsible for preparation of oncolytics in the pharmacy, but beyond that it is the physician's responsibility to delegate diffusion to the nurses, who follow the hospital protocol. In the UK, the landscape is changing rapidly – pharmacy technicians potentially retraining to administer chemotherapy, nursing assistants, physician assistants. In France, pharmacy technicians are being put out on the ward, not to administer drugs on behalf of the nurses' but to manage stocks and aid with medicines reconciliation.

'Imagine that each vial you buy comes with a closed system to prepare it or to administer it.'

The matter of home care in the UK raises several issues. By home care, what is meant is simply care in the home – perhaps for patients who do not want to or who cannot come to hospital, or who have additional needs. Drugs (both inexpensive and high-end) are zero-rated for VAT when administered in the home. A pilot model in the UK recycles this 20% 'saving' back into the hospital to provide special services for those patients who need them. As such, it is not a saving scheme, but rather a patient-focused scheme, which is currently being considered at national level. Safety in administration in the home setting might best be served by CSTDs.

A trade-off between safety and cost?

Precise techniques exist for measuring contamination, with monitoring occurring intermittently across Europe, in general not by national regulatory guidelines but rather as determined by individual hospitals.

New Thinking on Opportunities for CSTDs

- **Focus on the 'nothing in' element of the definition of a CSTD, realising opportunities when the introduction of microbial contamination would have profound consequences for the patient, for example, the immunocompromised and the critically ill.**
- **In Germany, there has existed since 1981 a one-hour rule, meaning that, once a vial containing a drug preparation with no preservative is opened, it must be used within one hour. Whatever is not used within one hour must be discarded. As in the case of the particularly vulnerable patients, the 'nothing in' feature of closed systems would seem to represent an opportunity in the case of multi-dose preparations that do not contain preservatives.**
- **Speak the language of healthcare professionals. Encourage a focus on the clinical pathway, for which the manufacturer constructs a narrative of the product, the preparation and delivery system, the patient group and the continued management. Sometimes the failure to switch treatment setting is precisely because of the risk around administration – if the manufacturer could advance the role of delivery systems as part of the clinical pathway as opposed to a standalone piece of equipment, the pharmacist could make it work. Change the paradigm. Engage with the manufacturer.**
- **Provision at source of a product with a CSTD would represent a major advance in the adoption of CSTDs, not least because the cost of the unit would pass through as a single cost to the central budget, meaning that additional funds would not have to be found for the device. Such a combined product would gain favour with procurement procedures, when product safety is one of the critical tender considerations. The responsibility would sit with the manufacturer to say that this presentation enables the safe manipulation and delivery of the product.**
- **Consider for use with vial-shared expensive drugs, for example, in outpatients.**
- **There may be an opportunity for the use of CSTDs with high-risk drugs in an emergency setting/out-of-hours/over the weekend.**
- **Non-typical pharmacy drugs, such as those used in ophthalmology and dermatology, were seen as an opportunity for the use of closed devices.**
- **There is an obvious niche in the preparation of biological clinicals, for example infliximab, in the clinic, on demand, so there is no waste.**

Abbreviations

CSTD	Closed system transfer device
NIOSH	National Institute for Occupational Safety and Health
UK HSE	UK Health and Safety Executive
INSHT	National Institute of Safety and Hygiene at Work
ESOP	European Society of Oncology Pharmacy
ISOPP	International Society of Oncology Pharmacy Practitioners

'It is not the risk of contamination that one runs, but the risk of the consequences of the contamination.'

The question is what you do with the information, because it is not the risk of contamination that is pivotal, but rather the risk of the consequences, which are, for the most part, ill-understood. The significance of the detection of contamination is that it draws attention to the fact that processes have to be analysed and improved so as to decrease the risk of contamination. In some instances this leads to uptake of CSTDs, and extensive training of the technical staff.

In summary, there is proof that CSTDs decrease the risk of contamination, when in the hands of properly trained staff. Institutions have a duty of care to make their working environments as safe as possible.

In the absence of further proof of added value of CSTDs, and with a regulatory framework slow to lead, the financial argument to support their uptake is found in the cost savings from drug waste reduction, i.e. disposal of unused drug product. Another possibility for countering the cost argument would be for product and device to be sold as a single unit; in so doing, the manufacturer would be able to sell the product with the assurance of maximum safe manipulation and administration, and the cost of the combined unit would be included directly to the central drug budget, with no additional funds having to be found for the devices separately.

Having challenged the paradigm of there having to be a trade-off between cost and safety, several opportunities for the use of CSTDs exist, and are summarised on the facing page.

Conclusion

There is a growing body of evidence to support the proposition that CSTDs, alongside rigorous protocols and a well-trained technical staff, decrease the risk of contamination in both pharmacies and wards. There is at the same time no doubt that budgetary constraints hold their uptake in check – where is the extra money to come from?

Setting the cost of CSTDs against the savings made by not having to dispose of unused product (in particular expensive biologicals) meets that argument head on. With that in hand, extension of the use of CSTDs in the specialist areas discussed and in the clinical care pathways suggests that there remain many opportunities for their uptake in a rapidly evolving European healthcare environment.

'You are responsible for the safety of your team. If it is unsafe, you have to take measures to make it safe.'

Selected References

A 2015 study of ward contamination from the Universitätsmedizin der Johannes Gutenberg-Universität Mainz
Bereitstellung von sicherheitsrelevanten Informationen zu Arzneistoffen und damit verbundenen Tätigkeiten. Kimbel R, Rosbach B, Segner V and Jochems P

An ESOP pilot study reporting pharmacy and ward contamination with cytotoxic drugs
Korczowska E et al. Poster presentation PP-001 at the European Association of Hospital Pharmacists Annual Conference, Vienna 2016

Information from the UK Health and Safety Executive (UK HSE) on precautions to take when handling hazardous drugs
http://www.hsc.gov.uk/healthservices/safe-use-cytotoxic-drugs.htm

A 2015 Technical Prevention Note from the National Institute of Safety and Hygiene at Work (INSHT) recommending the use of closed systems for the prevention from contamination with cytostatic drugs
TPN740, Draft by Xavier Guardino Solá of the INSHT

Quality Standards in Oncology
www.dgop.org/quapos.html

The roundtable 'CSTDs: a trade-off between risk and cost?' was convened in Brussels on 10th March 2016, with the support of BD, and was attended by senior pharmacists from the UK, The Netherlands, France, Germany and Spain.

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